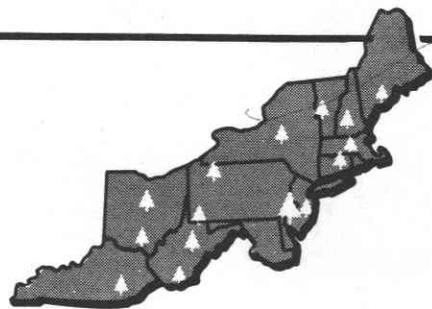


# Northeastern Forest Experiment Station



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## DEVELOPMENT OF MINIMUM STANDARDS FOR HARDWOODS USED IN PRODUCING UNDERGROUND COAL MINE TIMBERS

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*Abstract.* This note presents minimum standards for raw material used in the production of sawn, split, and round timbers for the underground mining industry. The standards are based on a summary of information gathered from many mine-timber producers.

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Each year the coal mining industry in the United States uses millions of board feet of wood products in underground mining operations. Each ton of coal mined required an estimated 1.3 board feet of sawed timbers and 0.5 linear feet of round or split props.<sup>1</sup> In 1975, nearly 290 million tons of coal were produced from underground mines, 78 percent of which came from the eastern hardwood timber area of the Appalachian Region (West Virginia Coal Association of 1976).

Some mine timbers are manufactured by large sawmills from the poorer sections of grade logs. However, the largest portion of sawed material is manufactured by specialized small sawmills. The raw material used by these small mills is mostly low-quality logs and bolts.

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<sup>1</sup> Knutson, Robert G. 1970. Wood use in mines. Unpublished report on file at Forestry Sciences Laboratory, Princeton, W. Va., 35 p.

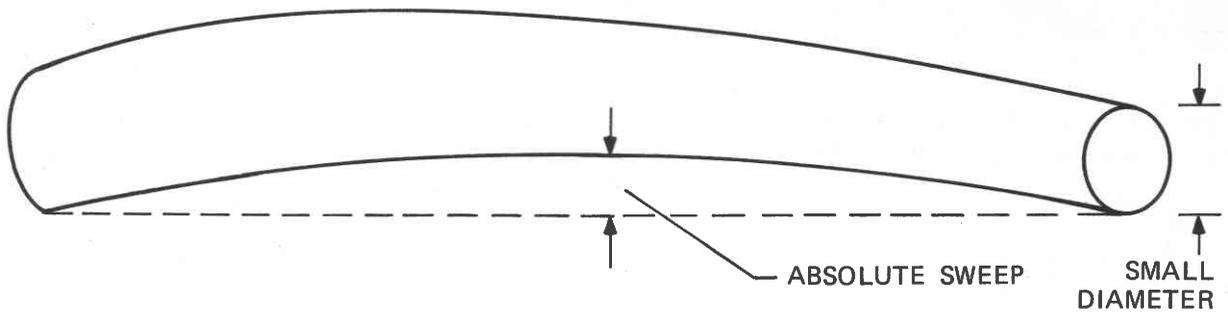
How poor in quality can a piece of wood be for use as a mine timber? This question is important to researchers investigating uses for logging residue and thinnings, and to producers of logs and bolts for mine-timber production.

Since there are no published data on standards for raw material used in mine timbers, I developed standards for minimum logs and bolts.

I visited mine-timber producing firms in eastern Kentucky, eastern Ohio, western Pennsylvania, southwestern Virginia, and West Virginia. These firms represented all sizes of operation and all phases of mine-timber production—sawn timbers, round and split props, and single or specialty items such as blocks or wedges. At each location, I obtained quality and size requirements and specifications for raw material for both sawed timber and props.

From the information collected, I developed the following minimum standards for determining

**Figure 1.—Sweep calculation.**



MAXIMUM ABSOLUTE SWEEP PERMITTED: 1/2 SMALL DIAMETER

EXAMPLE:

SMALL DIAMETER	MAXIMUM ABSOLUTE SWEEP
18 INCHES	9 INCHES
12 INCHES	6 INCHES
6 INCHES	3 INCHES

characteristics of roundwood suitable in manufacturing sawed timbers and round or split props.

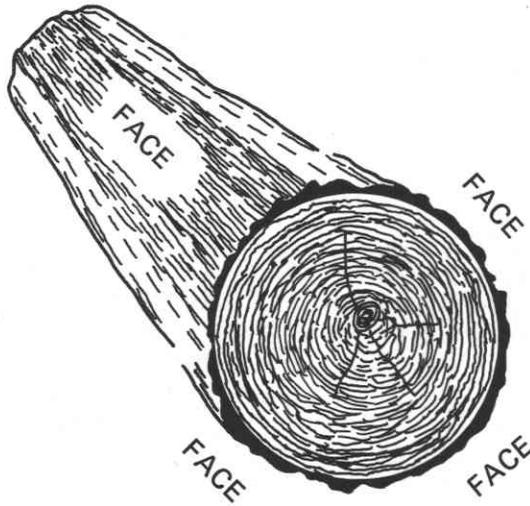
- I. For producing sawed products — standard mill.
  - A. Minimum diameter: 7 inches (small end).
  - B. Minimum length: 6 feet (Maximum: 16 feet).
  - C. Sweep. Absolute sweep (Fig. 1) not to exceed one-half the diameter of the small end, and allowed only in sound pieces without large knots.<sup>2</sup>
  - D. Decay or hollowness.
    1. Pieces up to and including 10 inches: none.
    2. Eleven inches up to and including 15-inch diameter: one-fourth diameter.
    3. Over 15 inches: one-half diameter.

E. Surface defects.

1. No surface defects larger than width of 1 face (Fig. 2).
  2. Seam.
    - (a) Straight allowed.
    - (b) Spiral allowed only when limited to 1 face of log or bolt.
- II. Sawed products — bolter mill.
    - A. Minimum diameter: 6 inches, small end.
    - B. Minimum length: 2.5 feet.
    - C. No decay or hollowness.
    - D. No sweep.
    - E. Surface defects: none larger than width of 1 face.
  - III. Sawed products — special.
    - A. Minimum diameter: 12 inches.
    - B. Minimum length: 18 inches.
    - C. No decay or hollowness.
    - D. No defect larger than 1 face.
    - E. Maximum defect: 1 large defect per piece.

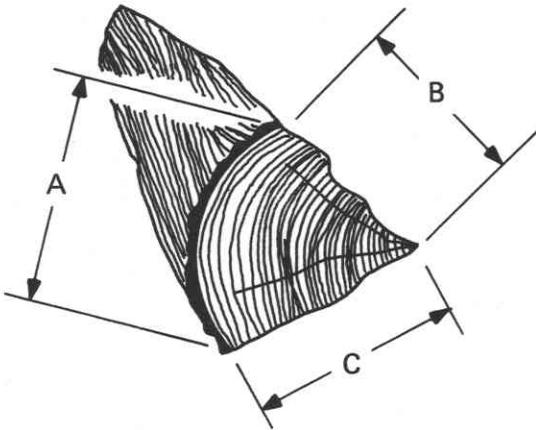
<sup>2</sup> Diameter greater than one-half width of 1 face.

Figure 2.—Face description.



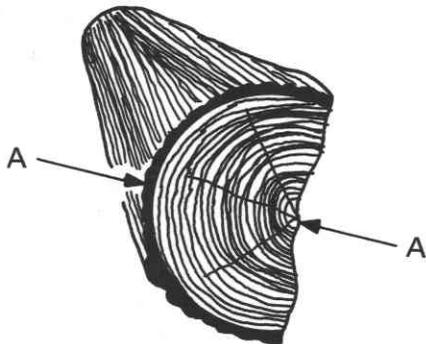
FACE: ONE-FOURTH CIRCUMFERENCE ALONG SURFACE OF ROUNDWOOD (STARTING POINT OPTIONAL)

Figure 3.—Split prop measure.



MORE THAN 1 SPLIT FACE

TWO OF THREE MEASUREMENTS "A", "B", OR "C" MUST EQUAL 1 INCH PER FOOT OF LENGTH: 4-1/2-INCH MINIMUM



1 SPLIT FACE

MEASUREMENT "A" MUST EQUAL 1 INCH PER FOOT OF LENGTH: 4-1/2-INCH MINIMUM

#### IV. Props.

##### A. Round.

1. Minimum size: 4 1/2-inch diameter, small end, and 4 1/2 feet long. Over 4 1/2 feet long, 1-inch diameter for each foot of length.<sup>3</sup> (Some props under 4 1/2 feet long sold but must have 4 1/2-inch diameter).
2. Only slight crook or sweep.
3. Decay or hollowness — none.
4. Knot size no greater than width of face and cannot interfere with strength.

##### B. Split.

Same specifications as round prop.

End measurement (Fig. 3).

One split surface.

Measure between bark and split surface perpendicular to split surface; distance in inches must equal prop length in feet.

Minimum: 4 1/2 inches.

Two or more split surfaces.

Measure along split surfaces (bark portion considered a split surface). Each of two surfaces measured in inches must equal prop length in feet. Minimum: 4 1/2 inches.

These standards express existing minimum quality and size requirements for mine-timber raw materials. They should help increase the understanding of the type of raw material acceptable for a regional market that in 1975 consumed an estimated 300 million board feet of sawn timbers and 125 million linear feet of round and split props. The standards should prove particularly useful to (1) those involved in developing markets for low-grade timber, particularly logging residues and thinnings; and (2) the suppliers of mine-timber raw material in evaluating presently unused or underused sources of acceptable wood.

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<sup>3</sup> The Federal Mine Safety Law allows no less than 1-inch diameter for each 15 inches of length with a minimum diameter of 4 inches. The minimum standards presented in this report are based on current practices.

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