WI 240809.02

T 267

BALLOT NO. 02 - SARG

DRAFT NO. 01

DATE May 29, 2025

WORKING GROUP CHAIR N/A

SUBJECT CATEGORY Pulp Properties

RELATED METHODS See "Additional Information"

CAUTION:
This Test Method may include safety precautions which are believed to be appropriate at the time of publication of the method. The intent of these is to alert the user of the method to safety issues related to such use. The user is responsible for determining that the safety precautions are complete and are appropriate to their use of the method, and for ensuring that suitable safety practices have not changed since publication of the method. This method may require the use, disposal, or both, of chemicals which may present serious health hazards to humans. Procedures for the handling of such substances are set forth on Safety Data Sheets which must be developed by all manufacturers and importers of potentially hazardous chemicals and maintained by all distributors of potentially hazardous chemicals. Prior to the use of this method, the user must determine whether any of the chemicals to be used or disposed of are potentially hazardous and, if so, must follow strictly the procedures specified by both the manufacturer, as well as local, state, and federal authorities for safe use and disposal of these chemicals.

Compression Wood Identification in Pulpwood

(Ten-year review of Classical Method T 267 cm-15)

1. Scope

1.1 This method is concerned with the detection of the compression wood that can be recognized by unaided vision or by means of a simple viewing device (*1*). Normally this is sufficient for operating purposes. Microscopic and chemical tests may be required in special cases.

1.2 Severe and intermediate forms of compression wood are easily recognized, once the observer becomes familiar with their general characteristics. The borderline form requires some practice to distinguish it from normal wood. A viewing box is useful for training an observer and as an aid in deciding doubtful cases.

2. Significance

Compression wood is a type of abnormal structure that forms on the lower sides of leaning trunks and the branches of all coniferous species (*2*). For most uses of wood, its presence is undesirable; in pulpwood it may cause lower pulp yields, lower pulp strength, and pulp bleaching difficulties (*3*). Its effects vary according to the form and quantity of abnormal fibers present. Although compression wood may amount to a considerable proportion in some logs, the overall quantity is generally not large enough to give serious trouble in pulping. It can occur, however, in a large portion of certain trees and so affect the general quality of pulpwood cuttings. An influx of such material into a mill system can well be the explanation for a sudden fluctuation in pulp quality.

3. Definitions

3.1 Compression wood is ordinarily distinguishable in a log's transverse section by eccentric and wide annual growth rings. Earlywood (sometimes referred to as springwood) is that portion of the annual increment of growth which is produced at the beginning of the growing season (usually in the spring, hence, springwood). Latewood or summerwood is that portion produced during the latter part of the growing season (during the summer). The combination of earlywood and latewood forms the growth ring, sometimes referred to as the annual ring. Seemingly large latewood areas in the wider parts of the rings are actually earlywood and latewood compression tracheids. Compression wood may be confined to a few growth rings, or it may comprise from one-third to one-half of the cross section. Compared with the normal wood, it has a "lifeless" appearance which is the result of lack of contrast between earlywood and latewood. It differs from normal wood in gross anatomy, minute structure of the individual fibers, and in chemical composition. It occurs in gradually merging forms, from that which differs distinctly from normal wood to that which is recognizable only by microscopic examination.

3.2 In general, compression wood may be divided into two broad classes:

3.2.1 Severe and intermediate forms (Figs. 1−3), which are conspicuous and easily recognized on sight (*4, 5*).

3.2.2 Borderline forms, which require some experience to recognize with the unaided eye and may need microscopic examination to identify positively.

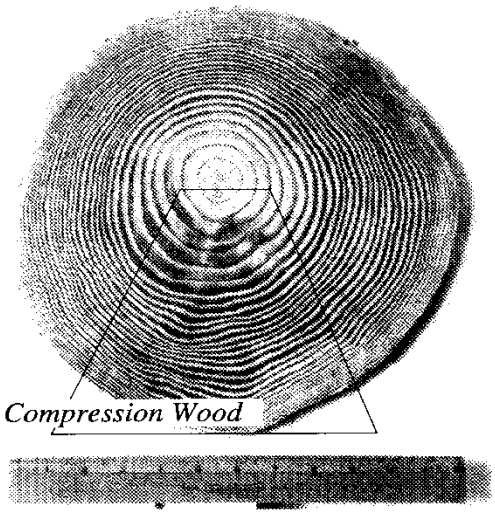

Fig. 1. Cross-section of loblolly pine with annual rings of moderate width; normal wood in upper portion, and pronounced compression wood in central part of lower portion.

Fig. 2. Cross-section of black spruce pulpwood showing pronounced compression wood in lower portion.

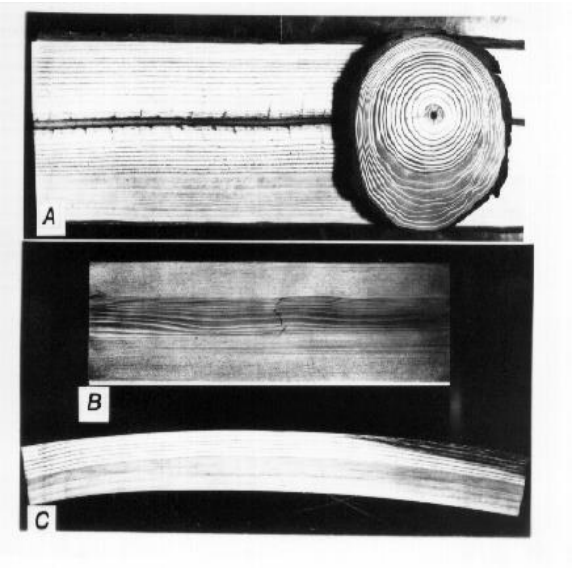

Fig. 3. *A*, Eccentric growth about the pith in a cross-section containing compression wood. The dark area in the lower third of the cross-section is compression wood. *B*, Axial tension break caused by excessive longitudinal shrinkage of compression wood. *C*, Warp caused by excessive longitudinal shrinkage of compression wood. (Photograph made available by Forest Products Laboratory, USDA Forest Service, Madison, Wisconsin).

4. Apparatus

4.1 *Viewing device,* used as an aid to determine the presence of compression wood, consisting of any convenient means for viewing thin cross sections of pulpwood by light transmitted through the section.

4.1.1 This device may be a box containing a 100 or 150-W electric lamp, with openings in its sides for ventilation, and a rectangular or circular aperture or window in the top, over which the log section may be placed. The aperture should be at least as large as the average section of pulpwood and covered with clear glass set flush with the top surface of the box. Paperboard or thin sheet-metal shields should be provided for shutting off light passing around the outside of smaller specimens.

4.1.2 Another type of viewing device is a rectangular or circular metal type made from paperboard or sheet metal. The specimen is held or clamped on one end of the tube, and viewed from the other end against strong sunlight, or a powerful electric light in a dimly lighted or darkened room.

4.2 *Saw*, sharp, for cutting specimen disks from the logs.

5. Sampling and test specimens

From each test unit obtained in accordance with TAPPI T 257 "Sampling and Preparing Wood for Analysis," saw a transverse section of the log about 3-6 mm (1/8 to 1/4 in.) thick. Sanded surfaces are unsatisfactory, because during sanding the cell cavities become filled. This reduces the translucency of normal wood and thus its contrast to compression wood.

6. Procedure

Place a specimen in the aperture of the viewing apparatus; the compression wood then appears relatively opaque (Fig. 4) as compared to the translucent normal wood (*6*).

NOTE 1: Very severe compression wood can be detected easily by its comparatively wide and eccentric growth rings containing much latewood which is not as hard as normal latewood nor, when dry, as dark. This gives compression wood a somewhat "lifeless" appearance.

NOTE 2: Pitch-soaked wood is highly translucent, regardless of whether or not it contains compression wood, so that very pitchy wood makes the determination difficult.

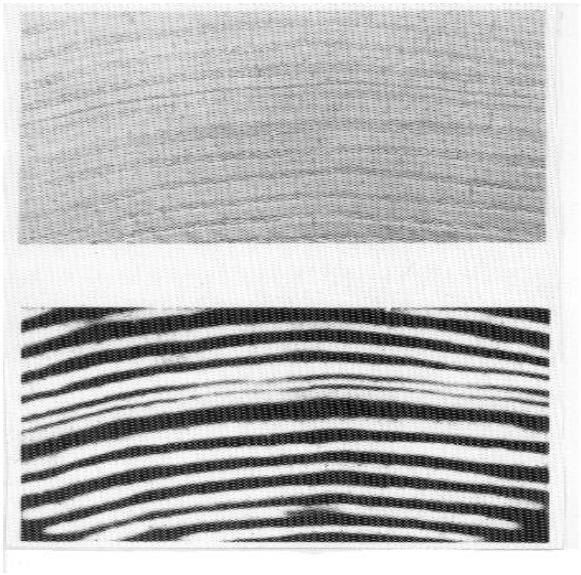

Fig. 4. Cross-section of compression woos in southern yellow pine 4.8 mm (3/16 in.) thick. Top view: photographed in reflected light. Bottom view: photographed by transmitted light. Note the opacity of the latewood.

7. Report

For each test unit, report the presence or absence of compression wood.

8. Precision

A precision statement is not applicable for this qualitative method.

9. Keywords

Wood, Compression wood, Identification, Pulp yields, Testing

10. Additional information

10.1 Effective date of issue: To be assigned.

10.2 This method, formerly T 20 os-72, was confirmed as a Classical Method in 1985 by the Pulp Properties Committee of the Process and Product Quality Division. (The new number, T 267, was assigned in accordance with the policy of renumbering all lower-numbered pulp testing methods as part of the T 200 Series.) Classical Methods are those which are no longer in common use, or have been superseded by advanced technology. Classical Methods are technically sound, have a history of use, and contain a body of literature references that make their preservation valuable. The current regulations require a 10-year review of Classical Methods by the Standard-Specific Interest Group (SSIG) every ten years.

References

1. "A Simple Device for Detecting Compression Wood," U. S. Forest Products Laboratory Report 1390 (Dec. 1941).
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3. Moore, T. R., and Yorston, F. H., "Wood Properties in Relation to Sulfite Pulping," *Pulp Paper Mag. Can.* **46** (3): 161 (Feb. 1955).
4. Pillow, M. Y., Schafer, E. R., and Pew, J. C., "Occurrence of Compression Wood in Black Spruce and Its Effect on Properties of Groundwood Pulp," *Tech. Assoc. Papers* **19**: 178 (June 1936); U. S. Forest Products Laboratory Report R1288 (April 1936).
5. Pillow, M. Y., Chidester, G. H., and Bray, M. W., "Effect of Wood Structure on Properties of Sulfate and Sulfite Pulps from Loblolly Pine," *Southern Pulp & Paper* **4** (7): 6 (Dec. 1941).
6. Pillow, M. Y., "A New Method of Detecting Compression Wood," *J. Forestry* **39** (4): 385 (April 1941).

Your comments and suggestions on this procedure are earnestly requested and should be sent to the TAPPI Director of Quality and Standards.

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