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8.0 FIBRE CONTROL

8.1 Fibre Sources

Corner Brook Pulp and Paper Limited has two sources of wood fibre:

- Newfoundland roundwood (pulpwood) that is harvested and processed from trees grown in Newfoundland (~88%).
- **Wood chips** that are purchased from **integrated sawmills** in Newfoundland and potentially from offshore (~12%).

In addition to the above noted sources of “raw” fibre, Corner Brook Pulp and Paper Limited also includes approximately 16% recycled paper in its pulp furnish.

8.2 Fibre Measurement

All fibre must be measured to determine its volume (expressed in solid cubic metres (m³)). There are three fibre forms that are measured by Corner Brook Pulp and Paper Woodlands - roundwood, wood chips, and sawlogs.

8.2.1 Wood Measurement Procedures

Roundwood

Newfoundland roundwood is scaled in bulk form on pulpwood trucks, using an innovative camera scaling system. Pictures of both sides of each load are taken when the truck is positioned between two cameras. Scalers “digitize” the loads on a computer screen to determine the gross volume. After deductions are made for cull, undersize, and loose piling, the net volume is determined. The system also has a laser-based device for measuring the average length of pulpwood on the load for specific sample sections. Samples are accumulated for each Contractor / Operating area to generate an average pulpwood length for each harvesting operation. The **ISO 9001 Wood Yard Operating Procedures Manual** provides a detailed explanation of scaling procedures and guidelines.

Wood Chips

Corner Brook Pulp and Paper Woodlands sells logs to integrated sawmills in exchange for an equal volume of wood chips. Wood chips are either chipped from **slabs** or produced from **chipper canters**. These wood chips have to be measured to determine their volume, making deductions for bark content, rot, and sawdust (See Table 8-2).

This measurement process begins by weighing a truck loaded, and then empty, to determine the *green* payload weight. A chip sample is taken from each load to determine its moisture content and quality. The moisture content is used to determine

the **oven dry weight** of the load, which forms the basis for payment. Using the *green* weight (with moisture), the moisture content, and the basic density, the volume of the load can be determined (See Table 8-2).

Sawlogs

Sawlogs are cut by Corner Brook Pulp and Paper Woodlands contractors and sold to integrated sawmills. Sawlogs are measured at the sawmill to determine their volume. They are typically cut in the following length classes: 2.54 m (8'), 3.20 m (10'), 3.81 m (12'), 4.42 m (14'), and 5.03 m (16').

Sawlog lengths of 2.54 metres are typically piled crossways on wood trucks and measured (scaled) the same as pulpwood. They are commonly referred to as "stud logs". The specifications for stud logs are provided in Table 8-3.

Sawlog length classes ranging from 3.20 metres to 5.03 metres are referred to as random-length sawlogs. These sawlogs have to be measured on an individual basis. A **local volume table** is developed for each **operating area**, as the shape and form of trees and logs vary geographically, thus affecting volume.

At the sawmill, the length and top diameter of the log are measured to determine volume, using the **local volume table**. Deductions are made for quality defects (See Table 8-3) and the net volume is determined.

8.2.2 Procedure Monitoring

Solid Wood Testing

Solid Wood Tests involve determining the actual solid wood volume of stacked wood. The solid wood content of stacked wood can vary considerably, and is influenced by knots, piece diameter, straightness, bark thickness and number of other variables. For example, if a Solid Wood Factor was **59.8**, this would mean that 59.8% of the gross stacked volume is in actual wood with the remaining volume in bark, air space, and debris. A solid wood determination model has been developed that determines the solid wood content from a digital picture taken of a pile of wood. Typically, the average solid wood content is determined from a number of samples taken from a given operating area.

Check Scaling

All wood scaled by licensed scalers may be subject to check scales by the **Newfoundland Forest Service**. All scaling records, summaries, and detailed statements of amounts of wood scaled are to be available for inspection or audit at any time, on request of an authorized Government Official.

8.3 Fibre Quality Control

8.3.1 Specifications and Control Procedures

The specifications and various quality control procedures in place for all fibre forms (roundwood (pulpwood), wood chips and sawlogs) are summarized in tables 8-1, 8-2, and 8-3.

Table 8-1. Specifications and control procedures for pulpwood.

Specification ¹	Control
Only balsam fir, black spruce and white spruce is acceptable.	Non-conforming species are deducted from the scale.
Pulpwood must average no less than 2.50 metres.	Contractor supervision by Operations Superintendent.
Pulpwood must have a minimum top diameter of not less than 8 cm inside bark.	Undersize wood is deducted from the scale.
Pulpwood will have a maximum butt diameter of not greater than 56.0 cm inside bark.	Oversize wood is deducted from the scale.
Pulpwood with center rot greater than one half of the diameter of the bolt is not acceptable.	All cull wood is deducted from the scale.
Dead wood is not acceptable.	Cull wood is deducted from the scale.
Pulpwood must be cut square on both ends.	Any concerns are forwarded to the Operations Superintendent.
Limbs and knots must be trimmed flush with the surface of the bolt.	Problem loads are noted as “needs improvement” or “unacceptable”. A routine report is generated and further action may be taken by Operations Superintendents.
All loose debris must be removed.	Problem loads are noted as “needs improvement” or “unacceptable”. A routine report is generated and further action may be taken by Operations Superintendents.
Forked pieces are not acceptable.	Cull wood is deducted from the scale.
Pulpwood with fire char is not acceptable.	Cull wood is deducted from the scale.

¹ All specifications are assessed by the Mill yard scaler, with the exception of pulpwood lengths which are sampled by Operation Superintendents.

Table 8-2. Specifications and control procedures for wood chips.

Specification ¹	Control
Bark Content: <u>Summer (May1-Oct31),</u> Target of 0.3% - 0.5%, Maximum of 1% <u>Winter (Nov1 – Apr30),</u> Target of 0.5% - 0.7% Maximum of 1%	In the CQI ² calculation, bark contents < 0.3% in summer and < 0.5% in winter will result in merits; > 0.5% in summer and > 0.7% in winter will result in demerits. No bonus paid for average bark > 1.0%. Average bark contents > 2.0% are used and paid for as hog fuel .
Rot: Target <1%, Maximum 2%	Where rot levels exceed 2%, the Fibre Control Supervisor will notify the sawmill.
Primary Accepts: 4-8mm thickness Target of 63%	Measured from samples on GRADEX Particle Analyzer. Sliding pay rate based on overall CQI.
Secondary Accepts: 2-4 mm thickness Target of 15 %	Measured from samples on GRADEX Particle Analyzer. Sliding pay rate based on overall CQI.
Thick: 8-10 mm thickness Target of < 10%	Measured from samples on GRADEX Particle Analyzer. Sliding pay rate based on overall CQI.
Over thick: 10+ mm Target < 10%	Measured from samples on GRADEX Particle Analyzer. Sliding pay rate based on overall CQI.
Pin chips: Retained on 3mm holes Summer: Target 1.5%, Maximum 10% Winter: Target 5-8%, Maximum 13%	Where fine levels exceed 10% (summer), or 13% (winter), the Fibre Control Supervisor will notify the sawmill. Measured from samples on GRADEX Particle Analyzer. Sliding pay rate based on overall CQI.
Fines : Passed through 3mm holes <u>Summer:</u> Target <0.5%, maximum 1.5% <u>Winter:</u> Target <1%, maximum 2.5%	If sawdust levels exceed 1.5% (summer), or 2.5% (winter), the Fibre Control Supervisor will notify the sawmill. The % sawdust is deducted from the gross ODT Measured from samples on GRADEX Particle Analyzer.

¹ Samples are assessed at Corner Brook Pulp and Paper Ltd. laboratory to determine any variance from specifications.

² The overall quality for purchased wood chips is determined by a calculated Chip Quality Index (CQI).

Table 8-3. Specifications and control procedures for sawlogs.

Specification ^{1,2}	Control
Only balsam fir, black spruce and white spruce are acceptable.	Non-conforming species are deducted from the scale.
Studlogs must average no less than 2.54 metres. Random lengths are 3.20 m, 3.81 m, 4.42 m, and 5.03 m.	Contractor supervision by Operations Superintendent.
Studlogs must have a minimum top diameter of not less than 10 cm inside bark. Randoms must have a minimum top diameter of 13cm inside bark.	Undersize wood is deducted from the scale.
Sawlogs will have a maximum butt diameter of not greater than 30.0 cm inside bark, unless otherwise specified.	Oversize wood is deducted from the scale.
Sawlogs with center rot is not acceptable.	Cull wood is deducted from the scale.
Dead wood is not acceptable.	Cull wood is deducted from the scale.
Sawlogs must be cut square on both ends.	Any concerns are forwarded to the Operations Superintendent.
Limbs and knots must be trimmed flush with the surface of the bolt.	Any concerns are forwarded to the Operations Superintendent.
All loose debris must be removed.	Any concerns are forwarded to the Operations Superintendent.
Forked pieces are not acceptable.	Cull wood is deducted from the scale.
Sawlogs with fire char, or visible shake are not acceptable.	Cull wood is deducted from the scale.
Logs with conks or abnormal bulky growth on the surface are not acceptable.	Such logs are deducted from the scale.
<u>Straightness</u> Studlogs: (max. sweep of 3") Randoms: (The max. crook or sweep must not exceed one third of the top diameter, where the top diameter is greater than 15cm. No sweep for logs with a top diameter <15cm)	Deductions made for excessive sweep.

¹ All specifications are assessed by the sawmill scaler, with the exception of sawlog lengths, which are sampled by the sawmill scaler and Operations Superintendents independently.

² Sawlog specifications may vary by sawmill.

8.3.2 Freshness Management

Fibre freshness is of utmost importance to Corner Brook Pulp and Paper Limited. Fresh wood makes stronger, higher quality paper requiring less energy consumption and lower bleach levels for brightening. The following information shows the steps that have been taken to improve freshness.

Inventory Management

To aid in maintaining a fresher inventory, Corner Brook Pulp and Paper Woodlands has developed a *Cut and Delivery Schedule* and *Woodflow*, which are monitored on a weekly basis. These checks minimize inventory during the drier summer months. Furthermore, detailed yard management procedures are in place (*ISO 9001 Wood Yard Operating Procedures Manual*).

Other controls regarding inventory management are:

- Weekly tracking of both yard and woods inventories.
- Month-end inventory maximums.
- Low inventory at spring start-up.
- Three weeks' supply during the summer.
- Offshore Fibre Management: The brokers for Woodlands' offshore wood have been instructed to purchase fresh wood only. When a broker accumulates a barge load of wood, it is shipped to Corner Brook as soon as possible and consumed in a timely manner. Inventories are allowed to accumulate over the winter months, when there is no moisture loss.

Measurement and Tracking

To measure and track fibre freshness, Corner Brook Pulp and Paper Woodlands has developed a *Fibre Freshness Index* based on historical meteorological data of daily temperature and rainfall amounts, collected over many years. From this data, an index of *Standard Drying Days (SDD)* was determined. This is a tool that helps account for the seasonal differences in the rate that wood dries. In the month that has the highest index of SDD (July), each calendar day is considered 1 standard drying day. Therefore, July has 31 SDDs. All other months have SDDs based on their historical temperatures and precipitation patterns. For example, each day in Sept. has 0.5 SDDs which means that it takes 2 September days to equal the drying capacity of 1 July day.

Using this freshness index measurement system, freshness levels can be established and reported on a weekly basis for the following:

- Freshness of wood consumed
- Freshness of wood delivered
- Freshness of wood yard inventory

All wood delivered to the Mill has a specified "cut date" so that the Standard Drying Days since harvesting can be determined.

Employee Education & Involvement

In order to inform employees about freshness issues, Corner Brook Pulp and Paper Woodlands has taken the initiative to educate the workforce through training programs such as *Pulpwood Quality Specifications* and *Freshness Management*. Employees learn the benefits of having fresh wood delivered to the Mill and have the opportunity to make suggestions for improvement.

Fibre Freshness Task Force

The Fibre Freshness Task Force was initiated to brainstorm and problem-solve issues around fibre freshness. The task force consists of members from both the Mill and Woodlands Divisions. The mandate of the task force is to:

“Develop and implement strategies to significantly improve fibre freshness and quality from stump to chip bins“.

Operational Planning and Infrastructure

The following initiatives to improve operational planning and infrastructure will assist in the freshness management program:

- Plan suitable areas for spring deliveries.
- Improve / upgrade (i.e. ballasting) specific roads for spring trucking.

8.4 Mill Consumption Management

All fibre fed to the Mill is monitored and managed. Black spruce and balsam fir are the two main species of raw fibre that the Mill consumes, and are currently fed at a rate of approximately sixty percent balsam fir and forty percent black spruce. The ratio at which these two species are consumed has to be closely monitored. Each week the physical inventory of the Mill yard is measured. Based on deliveries of the past week, the volume and species content fed to the Mill for that same week is determined and reported. The Mill then makes any necessary adjustments to the in-feed decks, to ensure a consistent species mix.

The two fibre sources (Newfoundland roundwood and wood chips) have different fibre characteristics, which, if not controlled, can result in swings or upsets in the pulping process. It is therefore important that the Mill is fed an even blend by species and fibre source, to reduce process variability. For example, during the period from early spring to early winter, Corner Brook Pulp and Paper Woodlands receives wood chips from five different sawmills, some delivering spruce chips, others delivering fir chips. Therefore, loads have to be scheduled for delivery, in order to achieve a regulated flow of fibre.

As noted above, Corner Brook Pulp and Paper Woodlands have developed a system to monitor fibre freshness (Standard Drying Days - SDD). With this information (index) of fibre freshness, the wood yard is managed on a wood-age basis. The Mill is fed a blend

of fresh wood and wood from the inventory blocks, referred to as reclaiming. As noted earlier, reclaiming is usually done on a “first in-first out” basis.

8.5 Records and Reports

An important aspect of Corner Brook Pulp and Paper Woodlands’ effort to maintain fibre control is the generation of reports and records, on a routine (Daily, Weekly, Monthly) and miscellaneous (as required) basis. These reports are essential for all fibre control activities (quality, volumes, etc.), and government reporting requirements, and they form the basis for contract payments. Various forms of information and data are available to intra-Company departments, Government and other outside agencies that may have a business relationship with Corner Brook Pulp and Paper Limited. All wood fibre (roundwood and wood chips) purchased by the Company is measured and the data entered into the Company’s mainframe computer system, from which the various reports are generated. A complete list and description of all reports and records is available in *Reports and Records Manual*.

The following table shows various reports that are generated on a daily, weekly, monthly and miscellaneous basis, regarding fibre control:

Table 8-4. Fibre control reports.

REPORT	DESCRIPTION
Daily:	
Daily Wood Delivery Distribution	Daily roundwood deliveries (m ³) to wood yard by Forest Management District, major group, supplier, and union or non-union.
Daily Scale Slip Register	Reports: load #, ownership, delivery time, supplier, trucker, % spruce, volume stacked, gross deductions, net volume stacked, net volume solid and off-load location.
Weekly:	
Weekly Deliveries by Ownership	Weekly roundwood deliveries to wood yard for current week and month-to-date by: Management District, major group, supplier and ownership.
Weekly Planned vs. Actual Deliveries	Summary of planned vs. actual deliveries by: major group, supplier, seasonal quota, assessed penalties, bush inventory, % union and spruce content.
Cull and Undersize Report	Roundwood deliveries to wood yard for current week & year-to-date by major group and supplier showing: volume, % cull, and % undersize.
Pulpwood Quality Report	(Weekly & Year-to-Date) Reports fibre quality, i.e. cull & undersize, debris, etc.
Species Content Report	(Weekly & Year-to-Date) total volume, and actual & designated spruce volume (in m ³ & %) by Management District, major group and supplier.

REPORT	DESCRIPTION
Weekly continued:	
Species Content Report	(Weekly & Year-to-Date) total volume, and actual & designated spruce volume (in m ³ & %) by Management District, major group and supplier.
Species Designation Report	(Weekly & Year-to-Date) Volume and % of spruce/fir delivered to wood yard and segregated by species for mill consumption, sorted by Management District, major group and supplier.
Seasonal Report	(Weekly & Seasonal (Winter/Summer)) Roundwood delivered to wood yard by; Management District, major group, supplier and trucker displaying: total loads & volume, average load & volume, and average cull and undersize.
Wood Yard Inventory Report	Summary and detailed description of wood yard roundwood inventory displaying: block #, pile #, length, height, volume (m ³), date complete, & species.
Freshness Analysis Summaries	Summaries of: (1) <u>Wood Inventory Profile</u> by month cut (volume (m ³) and %). (2) <u>Freshness Analysis of Roundwood Inventory</u> (block # and volume, species volume, % spruce, Ave. SDD and range.) (3) <u>Freshness Analysis Roundwood Consumption</u> (block #, row #, volume used (m ³), ave. SDD and range). (4) <u>Freshness Analysis Roundwood Delivered</u> (block #, row #, volume, ave. SDD and range). Detailed reports of the above summaries are available on demand.
Weekly Exchange:	
Sawmill Reports	Accounts of sawlog, roundwood and wood chip volumes (m ³) exchanged with various sawmills, and current balances owed.
Weekly Operational Data Report	Number of personnel working in Woodlands operations by: contractor, union, non-union, and woods inventory, for each Management District.

REPORT	DESCRIPTION
Monthly:	
Monthly Wood Delivery by Ownership	(Monthly and YTD) Roundwood delivered to wood yard by: Management District, major group and supplier.
Monthly Government Report	Deliveries to wood yard by: Management District, operating permit #, supplier # and name, location, month and YTD displaying volume stacked and volume solid.
Monthly Fibre Purchases by Ownership	Monthly & YTD Actual Fibre purchases (roundwood & wood chips) displaying: Management District, union/non-union, ownership, monthly and YTD mill consumption and book inventory.
Monthly Solid Wood Test Summary	Summary of Solid Wood Tests complete displaying: scaled and measured data determining Actual Solid Wood Factor.
Monthly Length Test Summary	(Month & YTD) Summary of length tests complete displaying; pieces sampled, % short, ave. length and total volume delivered.
Crown Stumpage Report	(Month & YTD) Summary of roundwood purchased and stumpage collected from Crown Land operators by; Management District and Crown permit #.
Roundwood & Woodchip Deliveries to Mill (Calendar Month)	(Month & YTD) Summary of all fibre delivered to Mill by volume (m ³); previous & current “book” inventory, bush inventory, Mill consumption and exchange volume balance.
Miscellaneous:	
Specific Contractor/ Group	Volume (m ³) by contractor or group.
Report by Area/ Trucker/Supplier	Volume delivered to wood yard by trucker, supplier and area, for current week, month-to date and year-to-date.
Report of Loads Scaled by Hour	Number of loads scaled at the wood yard by hour and shift.