



Careful Logging Practices – Part II

Bark Abrasion

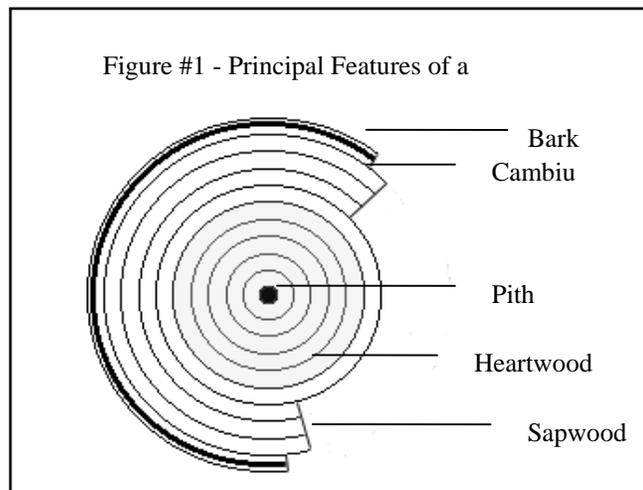
In the article Careful Logging Practices – Part I “Logging Damage Criteria”, it was emphasized that when logging in your woodlot one of the key steps in meeting your silviculture objectives and maximizing future financial return is to use logging methods that will minimize damage to the remaining trees.

What can landowners do to prevent tree damage in their woodlot? First, they need to have an appreciation of the problem. Second, they need to have an understanding of how a tree grows and third, they need to implement good forestry practices that will minimize the damage.

The Problem

Bark abrasion is one of the most significant types of damage that can occur during harvest operations. When this type of major damage occurs, it greatly reduces the quality and quantity of future wood products by causing stain or decay in the high-value butt log. In fact, major damage of this type can result in a 50 percent chance of tree mortality.

This type of damage generally occurs during the process of felling trees and during the removal (skidding) of the timber from the woodlot. In both cases, pressure and friction of one tree against another can cause the bark of a standing tree to be peeled off. This removes a layer of growth tissue (cambium¹) and exposes the underlying wood (xylem²) to further invasion of fungi. This may result in decay and stain of the wood, or



¹ Cambium – the thin layer of reproductive tissues separating the bark and the wood, which, by cell division, forms additional bark and wood cells.

² Xylem – the same as wood (characterized by growth rings arranged concentrically around the pith).

death of the tree. The incidence and severity of this type of injury varies seasonally in direct relation to the physiological processes in trees.

How Trees Grow

The diameter growth of a tree occurs through the division of cells in the layers of cambium located between the bark and the wood. Warm spring temperatures activate the buds of a tree to produce chemical growth stimulants, which are then distributed to other parts of the tree including the cambium.

The cambium cells are the most active during the spring season when they are fully saturated with auxin³. During this stage, the separation of the bark and cambium from the wood occurs more easily than during the dormant period when the cells are dry.

Different species demonstrate slightly different patterns in their resistance to peeling. In general, ring-porous species such as oak and ash begin cambium activity earlier in the season compared with diffused-porous species such as sugar maple or beech. The quicker transportation rate of auxins from the buds to the lower parts of the bole is the reason for this difference.

Resistance to Peeling

Figure #2 illustrates the variation in bark-peeling resistance over a growing season for sugar maple. The peeling threshold is a measure of the shear strength of the bark-wood bond.

The bond strength is very low during the active growing season from late April to late July. Note the upper swing of the graph on either end of the growing season (pre-April and post-August). During the dormant season, the bonding strength of the bark increases dramatically, and the chance of bark abrasion is dramatically reduced during this time period.

Preventative Measures

Harvest plan – conducting any operation in your woodlot requires planning. Carrying out a harvesting operation is no different.

The time preparing a harvest plan and walking your woodlot in preparation of starting your harvesting operations is time well spent. Not only does proper planning lessen the potential of damaging the higher value residual stand, it reduces the ecological impact and makes timber extraction considerably easier and cheaper.

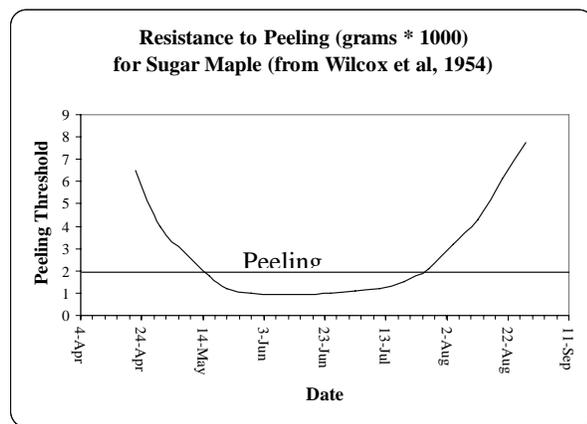


Figure #2 – Resistance to

³ Auxin – a substance found in plant sprouts, which can stimulate cell growth in plant tissues.

When preparing your plan you should give consideration to the following details:

Selecting equipment – assess the work to be performed and match the right equipment to the job. In most instances, selecting the smallest piece of equipment that is capable to perform the work will result in leaving a smaller “footprint” in your woodlot.

Timing – woodlot owners are encouraged to give serious consideration to operating outside the “resistance to peeling” season (after August 1) to avoid excessive logging damage to the residual trees stands. This is especially important when working in woodlots containing higher quality timber (i.e. areas managed under the selection and shelterwood systems).

Skid trails - the number of skid trails is often directly related to the amount of logging damage. Usually, the greater the area covered with skid trails, the greater the logging damage. Therefore, as a good practice the following points should be considered when conducting harvesting operations:

- the area should be harvested in an organized and progressive manner (i.e. working from the back of a skid trail out to the landing). This will avoid skidding through slash and assist in reducing damage to the residual stand;
- carefully plan the layout of your skid trails. The number of trails should be kept to a minimum. Ideally, trails should be laid out on foot and not from the skidder. Whenever possible, old established trails should be utilized;
- main skid trails should be straight or have gentle curves. Side trails should enter the main trail at angles less than 45 degrees. This will reduce load swing and assist in minimizing damage to the residual trees and regeneration;
- limit the grade of skid trails to avoid erosion. If you must work on steeper grades, plan to install water bars⁴. They will divert water off the trail into the bush and reduce the opportunity for erosion.
- skid trails should avoid heavy pockets of unmarked trees and be confined to areas where trees have been designated for removal; and
- bumper trees⁵ are not to be removed until the final cleanup of the harvest block has been completed.

⁴ Water bar – is a temporary shallow trench or small soil berm constructed across a road, landing or skid trail to help minimize the volume and velocity of water flowing over exposed areas. Water bars intercept and divert surface runoff from the road or trail to minimize erosion.

⁵ Bumper tree – is a low value tree left along the skid trail as protection to more valuable trees and younger regeneration. They are used to guard against skidding or equipment damage during harvesting operations.

Felling and skidding practices – good felling and skidding techniques should always be exercised as a good management practice and for safety reasons.

- directionally fell and align trees to the skid trail. Fellers should be encouraged to utilize wedges to assist in the directionally felling of trees and for safety reasons;
- limb and top trees where they are felled;
- utilize the cable and winch to pull down lodged trees. This will often cause less damage than using the skidder to remove this hazard;
- maximize the use of cable and winch by pulling the mainline to the hitch. To be effective, the mainline on the skidder should be a minimum of 70 to 75 feet in length;
- back the skidder into the side trails towards the load versus circling around from behind.

These are only a few of the good forestry practices that should be followed while conducting harvesting operations in your woodlot. Through good planning and the effective use of careful logging techniques, you can ensure you protect your woodlot from serious logging damage. Remember – your woodlot is an investment and by minimizing the damage to the residual stand, you will maximize your future financial returns.

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