ISSN 0111-6711

LOGGING INDUSTRY RESEARCH ASSOCIATION NEW ZEALAND

REPORT

Vol. 8 No. 4 1983

GUIDELINES FOR WINDTHROW SALVAGE

A. P. Gleason

INTRODUCTION

On 9 April, 1982, galeforce winds blew down approximately three million cubic metres of trees in the Bay of Plenty region. To assist those involved in harvesting the windthrow, LIRA assembled a working group to discuss past experience and seek ways to solve the current problem. On completion of most of the salvage, a one day seminar was held. Participants summarised their experience and outlined guidelines for future salvage of windthrow. The following report reviews those guidelines.

DAMAGE ASSESSMENT

The first step is damage assessment from aerial photography. Using available stand data, volumes damaged can be determined by species and log type. Some ground survey is required to check assessments of breakage.

To establish salvage priorities, product values and susceptibility to deterioration must be considered. Areas should be classified based on the extent of damage. Four priority classes are common :-

Complete blow down, requiring complete salvage
Partial blow down, requiring a clearfell and salvage
Partial blow down, requiring selection salvage
Minor damage, not economical to salvage

Factors influencing classification are :-

Size - small windthrows can be completely salvaged but large areas require that priorities be identified.

Market restraints - can restrict the level of salvage - if the market is saturated, logging is most likely to concentrate on the highest value timber.

Age of stand - may be best to clearfell young stands and start the rotation over again.

Future supply - some stands may require partial logging to save standing timber for future demands.

The time delay before sapstain, wood rotting and insect damage occurs is dependent on the time of year, regional climate, species and, most important, the weather following windthrow. Trees snapped or broken off the stump will start to deteriorate immediately whereas trees that are windthrown with some roots intact can be expected to last longer. Wet and cold winters or hot dry weather will delay fungal attack. Insect damage is likely to occur during warm, wet weather.

It is important to re-check the initial assessment as the salvage operation progresses. Management decisions must be flexible enough to change as updated information becomes available.

PLANNING AND OPERATIONAL CONTROL OF SALVAGE OPERATION

The first job is clearing access roads. New roads, when required, should be parallel to the direction of windthrow. Because butt pull extraction is necessary to reduce breakage and improve breakout, the direction of pull to any one landing is effectively reduced from 360° to 180°. Thus, to keep haul distances down to reasonable levels, landing densities may need to be almost doubled. It is important to keep haul distance short, to reduce turnaround time, and in order to have the machine close to the fallers to assist when required.

Existing machinery is usually sufficient to do the salvage although, due to the increased difficulty in breaking out, the rope sizes should be increased. High stumps and heavy slash will cause greater wear and tear on the machines and slow down crew productivity. Because of this, it is often advisable to reduce the crew size and increase the number of crews.

Sorting on the landing is critical and skiddies must be taught the acceptable quality standards for various log grades as the logs deteriorate. It is better to reject for log quality on the landing than at the mill or wharf.

SALVAGE TECHNIQUES

Felling and crosscutting is the most difficult and dangerous task in windthrown timber. Special crosscutting techniques have been developed using undercutting, boring cuts, offset cutting and angle cuts to reduce slabbing, prevent jamming of the saw and kick-back. Generally, it is advisable to cut the tree as close to the stump as possible to reduce the danger of log springing. With leaning trees, side scarfing at right angles to the lean and the use of boring backcuts can help to reduce slabbing. When tensions within a tree are in doubt, wait for a machine to assist. Steep country poses special problems as trees and stumps can often roll downhill following crosscutting.

Manual delimbing of windthrown trees should be limited to the safely accessible part of the tree. Often, by partially delimbing a tree prior to crosscutting, a better understanding of the lay of the tree is achieved. However, when working in standing trees, delimbing should be done at the landing or at a safe processing area after breakout. One technique is to breakout and bunch the trees away from the felling face for safe delimbing. Trees are then bunched for later extraction.

Crawler tractors are probably the best all purpose tool in windthrow salvage operations. Combined crawler tractor and skidder gangs can be highly versatile, but it is important the tractor spends the majority of its time pulling wood, rather than pushing it around. Novel harvesting techniques must not be overlooked. Rubber-tyred loaders have been used successfully to extract small whole trees to a central processing area. Grapple units can be effective in extracting trees with stumps still attached. There may also be a potential to use mechanised felling and bunching machines, if available, and these may greatly improve safety and productivity of the operation.

Steep country logging is difficult at the best of times and windthrow compounds the problem, particularly with hauler logging. Ground skidding systems should be used to their limits. Tracking for salvage of completely or partially blown areas is often the most cost effective and successful technique. Where haulers are used, skyline systems are far superior to highlead due to their increased lift and breakout capacity.

Productivity in windthrow will be affected by the drop in piece size and the difficult and dangerous working conditions. At the start of the salvage operation there will be dramatic drops in productivity. Once gangs become more familiar and skilled in windthrow salvage, productivity should level at about 5-15% lower than normal conditions. Productivity losses in haulers are greater. To protect the safety of the bushmen, rates should be set for safe operating levels and no pressure should be on gangs to produce at the sacrifice of safe techniques.

SAFETY CONTROL — CRITICAL DANGER AREAS

Increased attention must be given to safety and provision should be made for mobile first-aid units and transport facilities. Communication is important and ideally a radio network will link all gangs to a central headquarters. The most dangerous aspects of windthrow are associated with the felling. Some of the critical danger areas are :-

(1) Crosscutting thrown trees - due to the tensions built up, the stem can spring sideways or upwards.

(2) Rolling stumps - once the tree is severed from the stump it can sit back or roll over to one side.

(3) Spar trees - because spars have a low centre of gravity, it is difficult to control their direction of fall. Once felled, they can bounce and roll unpredictably.

(4) Leaning trees - the felling of leaning trees can result in tree slabbing (barber-chairing).

(5) Felling into standing or partially leaning trees - this can dislodge broken tops or push a spar in the direction of the faller.

(6) Branch kick-back - limbs of several trees are often crisscrossed and held in tension. The cutting of one limb may release another limb from tension, snapping it back towards the operator.

(7) Log movement during extraction - during breakout fallers should be alert as the breakout of one log often frees another from tension.

If possible, only the most experienced gangs should be used in windthrow salvage. Meetings should be held to stress safety, first aid, critical danger areas and operator techniques for reducing the hazards. Visual material describing safe techniques should be distributed to all gangs and trainers should demonstrate the techniques in the field.

WOOD PRESERVATION

Windthrows result in a large supply of wood on the ground beginning to deteriorate. Markets are often saturated so there is a need to preserve the wood in log form. Log preservation is too costly for pulp log storage, but can be effective for storing export and domestic sawlogs. Currently, there are three options available in New Zealand - log pond storage, sprinklers and chemical treatment.

Log ponds are generally not feasible due to the large areas of shallow water required. Storage under sprinklers is currently the most viable approach and logs have been stored for over three years with little or no quality loss. Areas must be flat, well drained and have electricity and a supply of clean water (approximately two million litres per day for 20,000 m^3 of wood). Only logs of the best quality, with no sapstain, should be stored. The third option of chemical treatment, although successful, is costly and should be used only for high value export logs.

The feasibility of storage is dependent on the cost, market conditions, local utilisation capacity, future wood supply and the volumes damaged in the windthrow. In order for storage to be successful, enough wood must be stored to prolong the supply significantly.

UTILISATION AND MARKETING

There is a need for close co-operation and communication between the forest owner, the logger and the end user. Operational constraints must be identified, such as capacity of the user industries, productivity of the salvage operations and the time delay before windthrow material is beyond recovery.

Decisions must be made about the purpose of the salvage operation. The main options are; to maximise value recovery by concentrating on the salvage of sawlogs to supply existing users, and make additional outside sales or log exports; or to conserve the resource and maximise volume recovery under current sales agreements.

Windthrow can result in smaller diameter and shorter logs arriving at the sawmills and a much higher percentage of pulpwood. Forest owners can drop their minimum sawlog specifications to reduce the level of pulpwood, but lower volume logs reduce sawmill profitability. In addition to the change in log size, there can be log quality losses through shattered or split ends, compression shake and as time wears on, sapstain.

Wood that is unacceptable to a sawmill ends up at the pulpmill. As the windthrown wood ages, brightness of refiner pulp decreases. Even with bleaching, newsprint quality can still decline so the proportion of windthrow material may have to be reduced. Sapstain does not affect kraft paper quality.

In general, the ability of the end users to utilise additional windthrow volumes is limited. Pulpmills usually operate at near maximum productive capacities. To fully utilise the material, more markets must be developed through exporting or trade agreements with users outside the region.

SUMMARY

After assessing the damage, decisions can be made regarding priority of salvage. Planning should be flexible enough to allow for changes as the problem becomes more clearly understood.

The salvage operation should be done with existing machinery, using the most experienced personnel available. Crawler tractor units are the most versatile equipment in windthrow. Additional roading and landings will be required to keep hauler distances down. It is important to keep haul distance short to reduce the turnaround time and keep the machine close to the fallers.

Safety of the workforce is most important and training is essential. The emphasis on training and safety should be maintained throughout the salvage.

Utilisation and marketing problems will occur, but, with the co-operation from all parties, most of these problems can be overcome. Wood preservation in log form may provide alternatives to overcoming marketing problems.

Additional references cn Windthrow Salvage available to members from LIRA's library are :-

"Windthrow Salvage Seminar" - Proceedings of a Seminar held in November 1982. A. P. Gleason.

"Salvage of Windthrown Forests in New Zealand" A.P. Gleason, LIRA Digest Vol. 6 No. 2 1982

"Windthrow Salvage in New Zealand" - Notes from a Working Group Meeting. Unpublished LIRA Report. A.P. Gleason.

For Further Information Contact: N.Z. LOGGING INDUSTRY RESEARCH ASSOC. INC.
P.O.Box 147,
ROTORUA, NEW ZEALAND. Phone 87-168