Session 3
Paper (c)

A HOLISTIC APPROACH TO LOGGING AND RE-ESTABLISHMENT OPERATIONS

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ABSTRACT

Linking logging options and forest re-establishment is vital. The primary objective is "return to stump". That is seeking ways to maximise sustained financial return to the forest owner. All operations are linked when working on steep terrain with environmental considerations being paramount to the sustained continuation of that business.

INTRODUCTION

As forest owners and operators we must be sensitive of our surrounding environment. As growers and harvesters of a saleable resource, we must promote how pro-active we are in matters concerning the environment. We are learning quickly that good environmental promotion in the international market place will help SELL our forest produce abroad. Commercial plantation forestry presents a great opportunity to promote this aspect of our business. Many of our customers know very little about New Zealand. Therefore we have to be active in promotion of effective and responsible land management practices. We need to sell

- PLANTATION FORESTRY
- RENEWABLE
- CARBON SINK
- ENVIRONMENTALLY SUSTAINABLE.

This paper relates to the Nelson forest estate of Tasman Forestry Limited.

THE FOREST

The Nelson/Marlborough forests include Golden Downs, Rai Valley, Wairau Valley Crown Forest Licence areas and a number of freehold Tasman Forestry Limited forests - comprising 62,000 hectares of stocked land area.

The ownership of these forests are - 51% Fletcher Challenge Ltd and 49% foreign institutional investors, with Tasman Forestry Limited as managers.

GEOGRAPHIC LOCATION AND GEOLOGY

The larger portion of the forest estate is in Golden Downs Forest in the Nelson region and falls into two major water-shed zones of the Waimea and Motueka rivers. The predominant soil type is known locally as "Moutere gravel" which was formed from glacial moraine and comprises a mixture of clay soils and river stone. These soils are considered stable and are well suited to plantation forestry.

To the south and west of these gravels a band of unstable and very erodible soils exist. These are know as "Separation Point granites".

To the east and along the Richmond ranges a narrow band of steepland and mountain rock types exist. These are predominantly greywacke and argillite and are considered quite stable.

Rai Valley Forest has two major water sheds of the Pelorus and Whangamoa rivers. Soil types vary considerably but generally belong to the Pelorus steepland rock type group and are often sedimentary. There are frequent out crops of greywacke. Despite being steep terrain, these soil and rock types are very stable.

The Wairau Valley forests boarder the Wairau River catchment on the North and South Bank. Topography, soil and rock types on the North Bank are similar to the Rai area, while the South Bank is generally less steep. The Wairau forests are on generally stable country.

I have taken the time to explain briefly the nature of soils and underlying rock types to give an overview of the likely problems forest owners may expect when operating on steepland terrain.

By far the majority of our forests are on the stable and easily managed Moutere gravels. This however does not mean any less planning or a reduced environmental awareness.

HISTORY OF SOIL AND WATER CONCERNS

The region has had its share of environmental concerns over the years. Settlement and subsequent large scale cutting of native forests began some 150 years ago when English settlers first arrived. Today, most areas of plantation forest were previously farmland. In fact forest planting in the 1960's on a number of potentially erodible sites was practised e.g. on Separation Point granites

As a region, planted forest covers some 10% of available land. Parks and reserves are abundant and an important regional feature. Horticulture and various forms of farming are practised in the lower river flat lands and lower hill country.

When one considers the regional economic importance of forest produce and the number of people employed then the reality of proper and correct forest practices to ensure an environmentally sustainable industry, becomes apparent. It is estimated that there are 1,750 people employed in various forms of forest sector work. Some 30 -35% of the region's wealth results from the forest industry.

CONTROL AGENCIES

Without doubt sound harvest planning is paramount to the successful mixing of cost effective logging and the protection of soil and water values.

Gone are the days when an effective plan was to place skids in the valley bottom and use dozers and skidders to extract logs down gullies onto the skid site. This was a common practice in the Nelson region not too many years ago, and no doubt helped lead to the introduction of the Section 34 control mechanism of the Soil Conservation and Rivers Control Amendment Act 1959. In Nelson this notice became effective in July 1971 and required all landowners to gain consent from the Catchment Board to clear timber and construct roads. This notice caused much debate which involved organisations such as NZFOA, NZLA, Federated Farmers, sawmillers, corporate and private forest owners and contractors. Interestingly the Crown (forests) were exempt from the Section 34 controls. At that time most employees were on "wages" and employed directly by the Crown. Their contractors were not exempt however. Understandably some considered the Section 34 notice a discrimination against sections of the forest industry. This perhaps illustrates the difficulties faced when harvesting on a large scale first began.

The Section 34 notice expired in November 1979 and was replaced by a "Voluntary Restraints" order.

These new "Voluntary Restraints" and their control mechanisms for various soils, were written to cover all land users and were no longer discriminating against forestry. This may have been the turning point for an era of communication and listening by all concerned parties. Forestry companies were expected to abide by "Forest Operation Guideline N°5", a Water and Soil Management publication of 1978. Initially the Voluntary Restraints conditions were to be on a one year trial. It appears however that the system worked to a large degree with the forest companies very much in favour, and which has continued through various forms to the present day and the introduction of the Resource Management Act 1991 (RMA). This Act encompassed all previous Acts of parliament concerning water and soil values.

The Resource Management Act 1991 considers the "effects" of land disturbance. Controlling any land disturbance in Nelson region is currently under the authority of the Nelson Marlborough Regional Council. Industry have been working closely with Council in forming workable guidelines and as recently as February 1992 have put together an amendment to the New Zealand Forest Code of Practice to cover the Nelson and Marlborough regions. This document has been ratified by Council and a forest industry working party and will form an important focal point in the development of future rules in relation to land disturbance.

It is hoped this initiative will be taken on board by the three Unitary Authorities who take over all Regional Council responsibilities from 1 July 1992 onwards.

We currently operate under a Regional Land Management Plan, which, when introduced in October 1991 referred to the "Voluntary Restraints" and its numerous amendments since 1979 as they pertain to Section 34 of the Soil Conservation and River Control Amendment Act 1959. However this transitional mechanism under the RMA meant that all land use consents were discretionary and could require public notification. Forest companies again saw a discriminatory element creeping in.

The forest industry subsequently introduced a successful amendment to the RMA which ensured at least during this transitional phase no resource consent would be publically notifiable.

The transitional mechanism is working although industry at large consider the geographic extent of land use consents too great. In industry's opinion these areas include lands of minimal environmental sensitivity and would best be handled by permitted use classification in conjunction with the previously mentioned associated Code of Practice.

CURRENT OPERATIONS

Regime:

Pinus Radiata

Tasman Forestry Limited practices a clearwood regime. Plantings are with the highest growth and form rating available at a stocking of 800 sph.

Diameter/height related pruning is undertaken in variable lifts to achieve a pruned height of 6.5m. Non commercial thinnings reduce a stand to a final stocking of 250 sph. Rotation length target is 30 years. All operations are economically tested using the N.P.V. (Net Present Value) methodology.

Douglas fir

Some 17% of the forests are stocked in Douglas fir. It is planned to re-establish in this species as suitable seedlings become available. A utility or framing regime is practised, with initial planting at around 1,100 sph generally of 2 year old seedlings. Douglas fir grows exceptionally well on colder damper southern slopes. Final stocking varies between 250 to 350 spha after both commercial and non-commercial thinnings.

THE HARVESTING

Our annual plan in 1992 is 550,000m³ which is approximately 1,200 ha of clearfell in area. Determining the actual stands to harvest is a joint effort from Resources, Marketing and Operations staff. Generally the determining factor of which stands to harvest rests with the market plan and customer demand. There is some degree of flexibility however, and it is Operational staff responsibility to create a balance in the final analysis.

All of the above is important when considering logging planning - we endeavour to undertake roadworks and skid site preparation some 12 months ahead of planned actual harvesting date.

The Nelson Marlborough area is moderate to steep terrain and a leaning towards cable logging systems is practised. We currently have seven haulers and five ground based crews, which match our crew schedule planning for systems optimisation fairly closely.

Our point of sale is "landed" at our customer's yard. Therefore all internal roading is a Tasman Forestry Limited responsibility as is the selection of suitable log cartage contractors.

Being 60% orientated to cable harvesting has a negative effect on flexibility. To get around this problem planning must be very thorough and closely linked with good woodflow information systems.

OPERATIONS PLANNING

As said before - sound planning is vital to the smooth operation of our industry. Operational planners must be well qualified and educated so that a very broad approach can be taken to where to place a skid or how to get a roadway to it and which harvesting system to use.

My experience in this area has demonstrated that on steep terrain we need a ratio of two planning people to one if comparing staff requirements to Central North Island. To do the job correctly, steep terrain requires time and effort.

We use conventional 1:10,000 and 1:5,000 contour maps, aerial photos and local knowledge. GIS is being developed.

In Golden Downs Forest roading is predominantly ridge top. These ridge top roads are generally the most direct link to the public road system.

It is interesting to compare costs, i.e. trade-off analysis, on moderate slopes that can be logged by either ground based or cable machines. One would assume that the ground based system would be the cheapest.

However this is not always true. When consideration is given to the broader scene. Consider using a ground base system when the area is roaded on the ridge top. i.e. Extra cost in:

- new valley road construction
- skid site construction
- contour tracks to log equate to land loss
- road R&M increases
- longer cartage lead out of the gully
- more expensive land preparation.

In summary a $3.00/m^3$ difference in logging cost can easily be eroded and tip the scales in favour of a cable system. Such can be the advantages of cable logging and the experience of contractors who operate these machines. It use to be said that skyline logging was more expensive than highlead. Today the opposite is true and further to that, in our experience, ground based and cable logging costs on balance are quite comparable.

All this is very positive when considering environmental aspects. We are finding that an efficient and well planned cable operation is very hard to beat.

Planners need to consider all aspects. Trade-off exercises taking into consideration both costs and land disturbance must be undertaken. There is a place for both ground based and cable operations and it is the planner's job to correctly match machine to terrain.

Today planning must further consider aspects of the RMA and thus seek resource consent for those areas requiring such. Being well organised and in constant communication with the Soil and Water authority is very important in achieving timing goals.

SKID SITES

We aim to construct hauler pads of less than 3,000 metres square and ground based pads of less than 2,500 metres square.

Correct siting of hauler pads is vital, both to future production constraints and the actual construction aspect.

The two biggest problem areas (other than room to fleet out and stack 15 log sorts) is water control and disposal of slash.

Slash or "birdsnests" can accumulate at an alarming rate and are generally pushed over the edge of the skid. They have been known to "blow-out" and slide off down the slope. This is something that must be avoided. Currently we engage the use of a 30 tonne excavator to drag the slash back up onto the skid. This can be very costly, with a difficult pad costing in excess of $2,000 to stabilise. It is interesting to note however with the introduction of a Bell Static Delimber in one of our operations, slash is much cleaner and easier to handle and will not pose the same problems.

Usually when a birdsnest has blown the problem has been triggered by incorrect water control. The zone between the slash and skid side cast spill, once wet, can become very unstable.

We ensure correct water control measures are undertaken on leaving each skid, and dismantle as far as possible the birdsnest. Even taking the weight off the top of the slash heap helps considerably. Currently we only dismantle birdsnest which we consider, will be a problem. These are generally in stands where branching is very heavy and terrain is steep. Tended stands do not cause as many problems.

LIRO will be undertaking a trial in the near future on different machines types and methods of dismantling or controlling these problem birdsnests.

We do not experience problems on ground based landings as all the branches and heads are trimmed in the bush.

Just what is the extent of landing construction and the area of land out of production? We currently construct between 100 to 120 landings per year. Skid sites are surfaced stripped and benched to help avoid slumping. The 'bench' also helps contain slash accumulation by acting as a resting ledge. Only 10 to 15% of skids cause any "birdsnest" problems.

Areas wise we lose around 2.5% on hauler setting and 3 to 3.5% on ground based setting of land to skid sites. This accumulates to a large area of land permanently out of production. As yet we do not practice skid site re-establishment but pure economics must indicate that some type of crop or activity should be utilising this vacant land.

I welcome suggestions.

ROADING

Constructing 10 to 15 kilometres of new roads per year requires good planning and management.

The biggest single problem we face with roading is the future supplies of quality metal. In the past because of an unlimited supply of river gravel, metal was literally poured onto roadways. The round shape of river gravel required a good depth to ensure binding. However past abundance of river gravels has ceased and it is now becoming a scarce resource, according to authorities who manage permitted uplift. Very soon there could be no river gravels available except to National Roads Board and high quality end users.

To prepare for this eventuality we now crush most of the gravel we are permitted to uplift - thus reducing volume (per metre of road) and achieving a good locked surface. We are also experimenting with recovery of gravels from within the forest in places such as skid sites. A local contractor has built a mobile crushing plant. The natural resource is fed in one end, the clays and fines are shaken out mid way and the good quality stones are crushed, with a very suitable metal being achieved. There are big benefits in this concept both cost wise and environmentally. Costings to date indicate a saving of $2 to $4 per cubic metre spread on the forest road.

Environmentally there are two advantages - one being the utilisation of suitable materials from a skid site being formed, where very little material is side cast. The second is that rivers will be left alone to generate minimal volumes of gravel naturally without future removal, thus enhancing the river ecology.

POST HARVEST

Water control is the major concern. We include water control measures on job prescriptions and require contractors to clean up their work site before moving on. This includes water cutouts, clear water table, re-establish water control to ensure adequate drainage. Sites are inspected prior to the crew shifting and if all is okay the job prescription is "signed off".

LAND PREPARATION (The Link)

The degree of cutover land preparation required largely depends on the previous logging system practised. This can be split to - hauler sites, ground based sites.

For hauler sites there is often very little need to undertake any further preparation. Sites that have been highlead logged are mostly left clear of any vegetation and ideal to plant straight in to. Skyline settings vary and at the worst there is an accumulation of slash in gully bottoms as often the tree is fully suspended. From a site feasibility and soil disturbance value skyline logging is preferable in that slash and previous undergrowth are left very much intact. This can however pose a problem in re-establishment.

Ground based sites generally require some form of land clearing. Previously the heavy slash and undergrowth of gorse and fern was line dozed. This in today's climate is considered no longer acceptable by our company on slopes over 16°.

We now practice a mixture of land preparation techniques ranging from minimal (highlead) to a high almost of 100% site work over. Note that each establishment site is ranked according to suitable site preparation method prior to any work commitment.

On long stable slopes of less than 16° and flat country some dozer line raking is still undertaken. Lines are dozed through the cutover at approximately 7 metre centres. This practice is reviewed if any soil disturbance occurs. In favour of this method is the slash is dropped on the contour tracks - thus helping to control water.

On steeper slopes up to 17° to 35° we are now using a hydraulic excavator to line rake slash into windrows. This method, used extensively in Geraldine Forest over many years, has very little impact on soil disturbance. It can be described as delicately lifting slash and placing it into the windrow (at approximately 15 metre centres).

Another system not previously tried in Nelson is the use of a towed 6 to 7 tonne roller. On flat country this system is excellent at chopping up branches and undergrowth which both enhances planting access and provides for faster decomposition of the cutover materials. We will be trialling this roller concept on hauler and contour logged cutover sites this winter. The operator will generally be working a gravity roller system.

Chemical Sprays

Most cutover sites are pre-plant aerial sprayed before mechanical preparation using a mixture of Roundup and Escort. Experience is showing this to be a very effective means of weed regrowth control. This method gives around 12 months weed free competition, enabling the seedling to quickly establish. It is imperative from a soil and water point of view to get that second crop re-established as quickly as possible.

We have tried on hauler cutover sites - chemical spot spraying after planting using Velpar. Many of these sites required hand releasing this summer to knock back vigorous fern growth. Wider spots may have improved this. However, this method does not help control the prolific gorse growth experienced in years two and onwards. This treatment approach is still being evaluated.

Costs are similar for either aerial blanket preplant spray or a spot release spray hand release regime.

Burning

Very few cutover sites are burnt. This year we are looking at burning on an experimental basis two blocks that have steep gullies which have accumulated a high portion of slash. This slash can be much too high to plant through and very difficult to access for treatment using mechanical means.

THE TASMAN ACCORD

This historic Accord was signed on June 22, 1989 at a special ceremony at Fletcher Challenge House, Wellington. Signatories to the Accord were, Tasman Forestry Ltd, the Minster of Conservation, the Royal Forest and Bird Protection Society, Federated Mountain Clubs and the Maruia Society.

The Accord protects Tasman Forestry Limited native forest holdings throughout New Zealand, encompassing some 38,599 hectares of freehold forest estate. Funds were also granted for Kokako research in the Mamakus.

This significant event demonstrates Tasman Forestry Limited's commitment to the environment.

RESPONSIBILITIES

In discussing methods of logging, roading and re-establishment used by Tasman Forestry Limited in Nelson we should for a moment focus on where responsibilities lie:

Firstly the land is owned and managed by Tasman Forestry Limited. Staff skills in planning and supervision are vital to providing direction and work standards for all operations. The Company has the responsibility in providing instructions, standards, goals and over-all control.

Secondly, all work is undertaken by independent contractors. Selection of contractors with the necessary skills is also vitally important. We are indeed fortunate to have access to some highly skilled and very innovative contractors in Nelson. The contractor has the responsibility in providing the machinery, men and skills to undertake the job.

Thirdly we have the over-view responsibility of the local authorities. These organisations are responsible for setting regional rules that best protect soil and water values while ensuring operations can proceed in a manner that suits the situation.

In summary all three players have an equal marriage of common need. To progress, good communication and understanding is paramount to success.

SUMMARY

Sound planning by companies, skilled application by contractors and guidelines established through consultation with the community by local authorities will mean continuation of our business of sustained management of our plantation forests.

Managed with commonsense plantation forests are very beneficial to sustained land management and the very best of land uses.

Believe me when I say our customers especially offshore are taking a real interest in how we handle operations of an environmental nature.

Vital for future development in forestry is the building of more and sophisticated processing plants. To hope to gain the funding necessary from within New Zealand is wishful thinking. Thus offshore financiers will be needed and to attract their cash we need to promote sustained management in an acceptable environmental manner.

We must:
- think smart
- think safety
- think environmentally
- maximise return to stump.

I trust this has given you a brief holistic over view of our operations in Nelson. I have purposely kept away from technical aspects of the job because to me forestry is a business that must be managed with an open mind to best match the economic gain to a sustainable business.