

# NEW ZEALAND MACHINE OPERATOR TRAINING NEEDS ANALYSIS

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## BACKGROUND

In 1991, I was invited by LIRA to examine the mechanical harvesting equipment used in New Zealand. Originally, the brief was to look at the training requirements for mechanical harvesting as such, but it was broadened out to look at the equipment that is used for harvesting in the present day, and to make recommendations on training that would enhance the performance of the New Zealand forest industry.

From this inspection and examination, I was asked to prepare recommendations on the development of a training package and how that would be structured and delivered.

## EXECUTIVE SUMMARY

(a) The review indicated that enhanced technical awareness in the workforce would help the logging industry maintain its competitiveness in the long term, and long term viability. I guess that would be one that would warm the Minister of Forestry, that's where he was looking to come from.

(b) Training programmes should be developed for:

- logging machine operators
- maintenance personnel

- logging contractors
- new employees in the industry

What I am saying here is that they are the four areas that the programmes need to address. In other words, let's make sure that the base target population which is existing today is up to standard, and meets Bryan Vincent's minimum standards.

There is a requirement there, I believe, for the maintenance personnel, logging contractors could be helped, and we need to look at people as they come into the industry.

(c) After the syllabus of the programme has been developed a method of delivering the training on a regional basis should be formulated by the contractors. It should be formulated by the contractors.

They are the people where this ground swell, or the driving of this scheme, should come from. Ultimately, they are the people who are going to be the beneficiaries in the first instance. Because the person is going to be trained, and is going to have more skills.

So a method of delivering this training should be formulated by the contractors, the industry, and educational institutions. They are the three prongs. But the contractors are the ones which, in ERFIC's case, got overlooked.

LIRA would be the logical organisation to co-ordinate this development. In the development of the programmes that we are looking at a lot of research goes into them, and LIRA, being a research organisation, has a source of information and resource, and also has access to the broad industry. That is my reasoning behind that.

- (d) The training programme should initially be prepared for skidders and loaders and progressively developed to cover other equipment in use.

## INTRODUCTION

This report is made on the basis of information obtained by way of site inspections and interviews with a number of logging supervisors and managers. The examples given to support the statements are not "one-off", and the examples are too numerous to detail but they are indicative of the situations I observed.

LIRA provided my basic introduction to the industry in New Zealand, and their resources assisted in formulating a preliminary idea, which were then expanded by visiting many operations.

The skidder-based logging system is the predominant situation in New Zealand. Fully mechanised logging is still in its infancy. The apparent simplicity of these logging systems makes it easy to overlook the potential gains in efficiency, productivity, and cost savings. Cost savings can occur from better technical knowledge and practices of those involved.

## RESULTS

The brief examination of the industry indicated that a training programme would enhance performance of machines in forest harvesting operations, and that this programme should initially be developed, for skidders and loaders, as they are the prime equipment now.

### 1. WHY?

There are good examples of the areas where valuable improvements could be made:

- (a) I came across an operation and the skidder had stopped. The operator was struggling through the undergrowth with a couple of 20 litre cans of oil. So it attracted my attention, it was an unusual practice. The skidder came to a halt in the compartment because the hydraulic system had run out of oil. The operator then had to walk out to the roadside and fill his cans, and return to the skidder. He poured the oil into the machine. He did manage, I would estimate, to get about 85%, or perhaps 75% of the oil in, and made a non-productive drive to the roadside to complete replenishment of his hydraulic system.

When the skidder arrived at roadside, I took a closer look. The transmission had overheated. All fluid levels were low and a hose was leaking and needed to be replaced. The result: loss of production, reduced availability and life of the skidder.

I enquired as to whether a systematic start-up, shut-down procedure was followed. The reply, came about as a sort of back-handed reply ... "Well, that wouldn't be a bad thing to do. But we're about hauling logs, what's wrong with you?"

- (b) The neglectful appearance of a lot of the machinery does not indicate a regime of maintenance, let alone one of preventative maintenance. I got a feeling, and I'll stand corrected, but I got a feeling out there the maintenance regime is one that we call 'JIT' (Just In Time) and when we say "just in time, whoops, we're slightly late".
- (c) An operator was changing a hose on a loader - a replacement hose being picked up off the ground. Being a technical person that sort of attracted my attention. When questioned about the absence of seals or plugs at the end of the hose the reply was, "The filter will take care of that!". I found that level of understanding of hydraulics to be fairly general both from the operators and the logging contractors. Even the best hydraulic system with a flush system will only, at any one time, filter 15% of the production of the pump. He's putting that dirt into an actuator on the end of his system, and it's going to be a long while before that grit that he put in there is going to get back to even look like getting into the filter.
- (d) Discussions with logging contractors in the Bay of Plenty area gave me a strong impression that their technical understanding of the machinery they employed would benefit from a training package made easily accessible to them.

## 2. HOW?

The training package with three modules should be developed and put into action to enhance the industry's performance:

### Module I - Basic Machine Operations

Training for operators already in the industry should be aimed at developing their skills in a practical way. This would be a

relatively short programme, but extremely valuable in view of my observations during the inspection.

The aim of the training programme would be:

#### (a) Logging Machine Operator Safety

We look at safety in our training programmes in the broadest possible sense: safety from the point of view of an operator, safety of the machinery, and safety within a given environment.

#### (b) Demonstration of the correct methods

- Start up
- Monitoring during operation

This machine that I looked at as an example shouldn't have been let to get to that state before someone looked at it. Hence the importance of monitoring during operation.

- Shut-down procedures.

### Module II - Hydraulic System for Operators

This would follow the first module, operators being trained in basic maintenance, trouble shooting for machine problems, and machine systems. A basic understanding of fluid power, or hydraulics in this case, machine electrics, and other systems would be provided.

This would be a longer programme than the first, but would result in the participants having a better working knowledge of their machines.

I put that forward for this reason: I think that if a person has a better understanding of his machine, an appreciation of what he's handling he will look after it better. For instance, on a machine, a tyre's down a bit, the operator kicks it and says "It looks

alright, it still goes round". But if he understands that it needs to run at a correct pressure he'll more readily look at it and say "That's not correct, I'll need to do something about it". That's the sort of thing that we're leading to here.

What he needs is an understanding of what his equipment does. The classic is that a real characteristic of a bulldozer operator is to reach over and grab the stick, and give it a pull and let it go. The end result is it sends a large pulse through his hydraulic system. If an operator understands what happens in a spool valve and why it reacts that way and why he needs to pull that lever and put it back where he found it, in other words return it gently and take that impulse out of it, he will do that, I believe, more readily. The down stream effect of the impulse I just indicated to you, is one of the reasons why a lot of hoses give out round unions. The hoses are flexing all the time around unions, so it's generally from impulse that causes that, either from the operator or from the actuator.

### **Module III - Forest Machine for Service and Repair Personnel**

This package is to offer both practical and theoretical aspects of the following subjects:

(a) Fitting skills.

When you see a confident, skilled tradesman walk up to a hydraulic union with a Stilson to tighten it, fitting skills might be something you want to put before him. For those who don't understand, a Stilson actually crunches in, and is likely to destroy the union rather than tighten it.

(b) Fluid Power (Hydraulics)

(c) Electrical systems

(d) Pneumatics

Still quite a bit of the equipment uses pneumatics in braking.

(e) Electro-hydraulics

That would certainly put him in a good position to start to look at the new equipment that's about when we're looking at proportional hydraulics.

## **PRESENTATION**

### **1. Structure**

For the programme to be successful, logging contractors would need to be involved in the formulation and structure of the training and be committed to the programme. There's no doubt in my mind that that is the reason why we are successful. Back in Tumut we had a researcher go out, and we started to compile our equipment. We looked at what we were doing, and what we thought was needed, and each time we took it back to a contractor to be validated. He said, "That's not what we want. This is what we want", or "You're going too high", or "You're going too low".

And I think in the end those people looking at it certainly brought it back and made it something that the contractors wanted. It was neat, it was specific. It met their training needs and was relevant.

It's the contractors that can do that, they understand their equipment, and after all they're the people that are going to make the final assessment of who's going to be trained, and they need to be comfortable with the programme.

The set up of the industry in New Zealand would indicate that various forest companies would also need to be involved, to ensure the programme was useful throughout the country. If we just look at a group of contractors here, it may not be relevant in Nelson or somewhere like that.

Ideally it would be part of a National Training Scheme and the Logging Forest Industry Training Board does need to participate in what these people put forward.

As LIRA brings together the parties involved in its activities, perhaps LIRA should oversee the programme development, promotion and introduction. Sponsorship by Government, forest industry and machinery distributors could then be coordinated.

A meeting with senior management of forest operations of Carter Holt Harvey Forests Limited was held at Napier. It certainly had a positive outcome. This company expressed the opinion that any training in the machinery area of logging should be established on a regional basis. To this end, a request for the proposed training programme to be conducted in the Hawkes Bay region was made, and Carter Holt would consider sponsoring such a proposal.

## 2. Training Resources

As this region would be a good place for a pilot course, with that sort of response, we made contact with the Hawkes Bay Polytechnic to establish the level of possible resources. A venue was likely to be available. A visit to the Caterpillar dealer certainly showed some enthusiasm and support for the programme.

Just as importantly, a hydraulic trainer and sundry equipment for training in the technical aspects of the project is readily available to kick start the training programme but will require further development as the training package evolves.

This equipment can be sourced in the short term from Waikato Polytechnic with instruction coming from organisations such as ERFIC. At this stage of the game, I believe, the Polytechnics do not have suitable training staff. It is not my intention to knock the Polytechnics at this stage. We went down to the local one here (in Rotorua) and met Ken Johnston. They reckon it's impossible "to make a silk purse out of a sow's ear", but he was giving it his best shot. Back home we'd call him an "Aussie battler" and give him all the help we could. He was manufacturing his own training aids, he was building equipment that had windows and sections cut out of it,

so that people could see what was going on, to give a real practical application. He was giving it a good go, with no money, just time and plenty of initiative.

The machinery dealers had expressed their support, being in kind rather than up front finance. We put on a session at LIRA which was supported by Titan, Trackweld, and Gough, Gough and Hamer. Those companies have demonstrated their willingness to participate. They certainly did support me well over that short programme, which was put on at short notice. That same feeling and preparedness is there when I was speaking with them today. This will be a most valuable resource and part of the programme could be used in future when new machines are purchased by contractors. Having them involved they'll understand what the training programme is, and it may be that part of their sales will include part of that programme.

Other resources will be required from Forestry companies and logging contractors, and LIRA may be able to encourage a significant input from the technical, and educational authorities in New Zealand.

## RECOMMENDATIONS

Since my visit here in March 1991, Dean O'Connor from Sam Webb Logging Limited, Taupo, attended a Hydraulic Maintenance course at Tumut, N.S.W., and I'll share Dean's thoughts with you here:

*"I would like to say that the tutors on this course explained all the lessons very well, and the presentation was excellent. The course was more than worthwhile and I feel that if every mechanic and fitter that is working with hydraulics was to complete this course they'd be able to work with hydraulics with more confidence and knowledge."*

My recommendations from the visit have been this:

- 1) That machine operator training for the machinery already being used in the industry be formalised. You have to recognise the skills that are already there and that a pilot programme be developed and run by the end of 1991.
- 2) That technical training be put into place to support the abovementioned training. By technical training I'm suggesting taking the operators on further there.
- 3) That a training package be developed for further training and development of those people charged with the responsibility of maintenance and repair of equipment, including the logging contractors. This need could be met in the short term by having appropriate people sent to the ERFIC Training Centre at Tumut in the third quarter of 1991.
- 4) That a comprehensive training package be developed using resources from the abovementioned training package to meet the needs of people entering the industry from 1 January, 1992.

#### ACKNOWLEDGEMENTS

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I'd like to thank the logging contractors who gave freely of their valuable time to assist, particularly one logging contractor. His name is John Milnes. Thanks mate. I have nothing more. Thank you.