

REVIEW OF DEVELOPMENT AND INNOVATION FOR NEW ZEALAND

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INTRODUCTION

We have spent the last two days considering logging equipment in New Zealand and what we, the loggers, have got to work with and will require to meet these production needs in the next 10 or 20 years. We have looked at some of the options to mechanising our operations, the effects of designing and building new equipment, the effects of importing, of equipment and the ramifications of these options. We have heard views on the levels of mechanisation that perhaps can be achieved and most importantly we have looked a little at getting the best from what we already have. To enable us to get the best from what we already have, we have looked at the maintenance requirements and we have looked a little further at overlaying all these factors, the machinery, the system around which the machinery must work and the relationship to productivity. Productivity per labour or machine unit. The resource inputs, labour, fuel, spares, etc, and the capital cost of our equipment all relate to the real cost of doing the work. This is the aspect which ties us in the middle to our wood seller and our wood buyer. To optimise labour and machine usage we have also looked at the effects of, and the need for training.

DEVELOPMENT

Let us now retrace our steps a little and look at the type of development that can take place. Who is this development or research group? Is it the logger doing modification and 'one-off' in-field developments? There is a place for this as there are many instances where the only practical way is to modify existing equipment. Is it the place of the university or the research group such as LIRA? A group which can pool the resources of the industry and use them to best advantage, perhaps because of a rather limited market, or because there are some time constraints on development. Thirdly, is it the equipment manufacturer? His place in research and development is obviously the place where large money is spent but likewise the group through whom large scale production runs have to be made. Without him there is no base for the adaptor and usually there would be no current production system. It is the equipment supplier who initially will have provided, in most cases, the basis for development by the other two groups.

Let us reiterate at this point that all groups are motivated by a financial interest. Certainly, any development done by the logger/contractor, the one-off innovator, must, at the end of the year, have enabled him to increase his annual profitability by increased productivity or reduced costs. Likewise, the only

reason why the industry would have supported a group development programme, was because there were cost savings to be gained somewhere along the line or where harvesting of an area which previously could not be harvested can take place. The wood is required at the best price possible.

FINANCIAL MOTIVATION

The equipment supplier can only be in business if he is making acceptable profit levels. He must be able to recoup his total expenditure in a reasonable time and provide his shareholders with an adequate return on their investment. Without profit the development would not be worthwhile and could not be undertaken.

We have seen over the last two days just what is involved in manufacturing, maintaining and developing equipment. There is a large effort and input from all, and honest answers are required to enable decisions to be made. Conning someone into doing development on a whim or with no future market is unacceptable, unless it is for pure research. Someone must rationalise the potential for successful development. If the overall effect is minimal, it may not be worth the effort in continuing a particular line of research as it cannot lead to profitable manufacture.

MARKET

We have looked a little at the market problems. We understand the need for an adequate sized market before large scale development can be undertaken. What is the effect of competitive products on the market place? A market search must take into account the competing products, what share of the market do they have and what development work is the competitor likely to be undertaking? It is possible that a competitive product is much further ahead in development than the one which you are considering. If the competitors product will do 50% of the work that your proposed equipment will do, perhaps you can still go ahead. However, it is very important to weigh up the effect of the competitive product on the market. If the competitor is that much further ahead in the market place, even though his equipment will only do 50% of the work, it may mean that you will have to accept that the competitive product will take 75% of the market, because of the time advantage. These are all very real issues to the equipment supplier because of the difficulty in distributing that particular product with a high level of technology in a particular market area. There may not be adequate support facilities to enable the product to achieve the success that it could in another location. In this we rely heavily on the equipment distributor, manufacturer or supplier, who will rationalise these issues. There is little point in an over enthusiastic logger or user, becoming the sole owner of a piece of plant in isolation, just because he is able to talk the salesman into importing or manufacturing that one-off item. Compromise is required by all.

THE NEW ZEALAND SCENE

To relate some of these problems to New Zealand, one must consider our industry and where some of the things we have talked about leave us on the world manufacture and market scene. Because of our limited local market most development is minor, either modifi-

some of the parameters and base data that were necessary. Since completing that work, LIRA has also looked at the potential market for such units and has shown that as with the move into our steeper country over the next 10 to 20 year period, there is a potential market for haulers and the rationalisation and the use of hydraulics, the use of newer technology, has led to the production prototype phase. However, even today the Series III Lotus hydraulic hauler is only a manufacturer's prototype. Now fully operational it is a unit that can be manufactured in quantity, but it has taken at least five years to get to that stage. There is still at least six months work to be done before that machine is a full production unit. Because of the size of the New Zealand market, adaptations to suit particular user's needs will undoubtedly be required. However, when this machine reaches the penultimate stage, with overseas markets and New Zealand users, it will be a full production machine. The jigs and the drawings will be completed to enable repetitive orders of identical pieces of equipment to be made, but it has taken a long development period and it will take some time to recoup those development costs. It is hoped that for the manufacturer, and for LIRA's sake, that the inputs that have gone into this are recognised by the industry and that the industry will support the development. Without the continuing support and purchase of what was demanded, there can be no development. Support is required through the development stages, and that has been readily forthcoming. Support is equally required at the manufacturing stage. Development can only be healthy if there is a profit for all at the end of the development and that includes the manufacturer, the equipment supplier, and the logger. It may be true that the manufacturer's prototype final specification does not meet the initial goals that were set. There will always be a compromise and continued testing against the parameters that were laid down. Not just performance testing, but physical testing for stress and strain to check that the theoretical design parameters and design calculations can in fact accommodate those stresses which take place in the field. In the case of the hydraulic hauler, as in the case of other equipment, it must be tested against existing equipment of a similar type, against competitors' models if they are available. Competition is healthy. In the development of the hydraulic hauler, the industry identified the need, LIRA undertook initial research work, forest industry companies and manufacturers developed the hardware, an industry working group supported the field work. A production prototype was the result. Today, a manufacturer's prototype is ready for testing.

The manufacturer's prototype and final manufacturer's machines must be tested. LIRA must again be involved. Certifying that these machines do in fact meet the design and performance standards. In this LIRA has an ongoing involvement. Looking around the world it is difficult to find hard analytical facts which can be used in many instances for the design of specialised logging plant. Certainly, the major equipment suppliers and developers have their own in-house design and development teams, each with their own data bank. However, it is very difficult to get access to this data. Where LIRA can independently undertake such work and where it is of a general nature, LIRA can release that information to the industry as a whole. Let us hope that LIRA will pick up the final stage of the hauler development and prepare a full research programme on the stresses and strains in the working ropes and

cation or adaption of existing equipment. Modifications which can be carried out by the user or by one of the smaller machinery suppliers as "add-on" equipment or accessories. Usually one off or small runs required, or picking up something which was developed by the specialist manufacturer overseas and which can be added to or used to modify existing plant.

For larger and more sophisticated development however, whether it is by the machinery supplier or by a research group, one must look at the long term economic effects. If it is group development, the total cost can be written off during development and therefore it is not necessary to build the initial financial investment into the final product cost. If, however, it is an equipment supplier or manufacturer who has to make his living from the development and sale of the equipment he has developed, all the development costs must be accounted for and must be costed into the product. Not the bare costs, but that full value assessed over the lengthy period of development. For significant developments this may mean up to five year time spans. Very large investments are therefore involved and the use of discounted cash flows etc and financial projections are most important. Before this type of investment can be made, a large market must be assured. Apart from minor components for the system, the New Zealand market is very small. The only way a New Zealand manufacturer could survive with a large scale development would be if he could find significant export markets. This is the reason we have been at the tail end of the chain and reliant on equipment that has been developed in other countries where the initial local market was a significant size. However, this has left us with equipment which is not ideally suited or designed to meet our needs. It has, therefore, been adaption of those overseas developments that has taken place in New Zealand. This does not mean to say that there isn't a case for equipment designed or built specifically for New Zealand conditions which also has an export potential with adaption to suit other countries needs. However, New Zealand does not generally fit that third category of having major equipment development by the machinery suppliers.

It is my opinion that in a country of our size an organisation such as LIRA can play a very important role. As distinct from a normal machinery supplier, or logger, LIRA, as for universities and other like bodies, is independent. Such groups should be able to undertake development and be independent enough to assess such developments after manufacture. To assess performance, to undertake formal tests which can be used to certify the equipment performance or specification. Hopefully logging equipment development in New Zealand will be brought to this organisation for advice and testing on an 'on-going' basis.

CASE STUDY

Let us reconsider the hydraulic hauler which became a LIRA project through development needs of N.Z. Forest Products following the 1977 cable seminar run by LIRA. Although the initial discussions on hydraulics took place back in 1977, it would be correct to say that small scale hauler development had been initiated by the current Director of LIRA back in the 1960's when a significant amount of work was undertaken in experimenting with small scale hauler designs and methods of operation. This early work provided

carrier equipment which can be used for further development of cableway systems in New Zealand. The testing procedures may even be extended to testing existing equipment already in the field and obtaining information which will be helpful to the industry for training and safety as well as for manufacturing. Such data would be useful to the logger when setting up cableway systems. The setting of guys, the tensions in the skyline, etc. To assist in taking out the guess work and providing information which was intuitive in old time loggers but which is not available in young loggers today.

SUMMARY

The relationship between the resource and the processing industry, and the interaction through the logging group, has been examined. This practical group who undertake the work required to harvest the investment in the resource for the investment in the processing industry. Other factors examined are the internal resource factors used to make the decisions for the development of any equipment necessary by the logging sector. The financial investment, capital, interest, etc., that is required to purchase the plant or that is required to develop the equipment. Labour without which the plant cannot be operated. Labour and capital are tied together by the operating factors. Costed mainly as fuel and maintenance. The end result of bringing together the plant and the labour, is production. Our aim is to reduce or hold the costs of production. This can be achieved by improving the productivity relative to investment, be it investment in plant or labour. Mechanisation assists us to achieve a reduction in labour, with, we hope, an improvement in productivity. But an investment in mechanisation will also mean an increase in the owning costs and possibly an increase in some of the operating costs for the equipment involved. It is the balancing of these investment costs that is critical to the effectiveness of investment in research and development. Research and development will not necessarily result in new equipment, but hopefully will result in improved methods, together with some improvements in the tools to be used.

In New Zealand, because of limited markets, major developments of large scale new equipment is unlikely. Refinement and development of, or adaptations to equipment that has become available overseas, will be normal. Development and adaptation by the logger, by an organisation such as LIRA, and by the equipment firms, hopefully the result of working together. Even for adaptation and development of existing equipment, the basic resource information is required and an independent group that can gather, analyse and disseminate the worth of such inputs has a big role to play.

From what has been seen in advance and subsequently at the seminar, LIRA is playing this important role, highlighted by this seminar, as it has been highlighted in other seminars. LIRA does bring together expertise and information from all sectors of the industry, overlaying one with the other and ensuring that the problems are communicated and attempts are made to solve them.

New Zealand is of such a size that the Logging Industry Research Association must continue to play this co-ordinating role in equipment development and research. When the hydraulic hauler has gone the full cycle and is in full production, LIRA will have

played a most significant role in its development.

It is hoped that after the seminar you will review the conference papers, reflect on what is required and respond by communicating further with LIRA to ensure that as many opinions as possible, whatever they may be, are made available to help LIRA choose the path for the development and research efforts that are required by our logging industry.

Treat this as an important aspect of the seminar. It is very expensive to design and develop new and innovative equipment. However, it is equally expensive if nothing is done and the costs increase to such a stage that the industry as a whole is put in jeopardy. If the industry cannot function economically, then the logger is out of work and will have been responsible for allowing it to happen. What is the right approach for equipment development in New Zealand? Is there a right approach? Should the research needs originate from the forest owner? What are the guiding rules to be used for research and development of logging equipment in New Zealand?