

Management implications of IFR Technologies Invader system

Alastair Riddle

The original goal of the work programme started by Forest Research and later Fletcher Challenge Forests, Liro Limited, Interpine Forestry, Interpine Liro limited and now IFR Technologies was to produce a stem optimising tool that was fast enough to use at production speed in our logging operations. With the Invader tool now in place, it is becoming apparent that the management information provided by the system will be of as much value to forest managers as the log optimising gains. The Invader system offers manufacturing-type control of the harvesting process. Forest owners, large and small will benefit from the transparency and control offered.

All the information that the logmaking tools collect is linked to a particular skid, time, contractor, crew and tool operator. All the stem descriptions are stored and downloaded to a central database, as are all log records, including grade, diameters, lengths, volumes and quality information. Once in the database, this information can be queried in a myriad of ways. Tools operated by loader operators record details of the stock leaving each site. A reconciliation of stock produced and stock loaded at each site enables the reporting of stock available for delivery to customers. IFR Technologies are customising this function to better suit the needs of our major clients and are also moving to use RF links between field tools and databases to provide real time information.

Harvest planning and control

The Invader system provides, for the first time, information to control harvest management functions including production planning, control of production and delivery. Huge opportunities exist to use this information effectively.

Production planning

The production plan-ning task is to produce the log product mix required to meet current orders by placing the right crews in the right stands, each with the right cutting instructions. To solve this problem, an optimising application needs the market orders, the opening log stocks, and the possible grade out-turns from each of the stands that are available to harvest. The application also needs to be able to take a sample of stems that represent the stand and "manufacture" them with alternative cutting strategies to identify the mix of stands and cutting plans that will fill the orders for best profit.

The Invader system provides an accurate record of the opening log stocks. The possible grade out-turn from stands available for harvest can be analysed using the now familiar MARVL system. Where harvesting has already started and a sample of trees has been recorded with calipers, Invader's batch analyser can be used. This analyser uses the exact log specifications that the market requires to cut batches of stems and report out-turns by grade.

At present the major corporates in New Zealand are in the process of developing their own production planning systems and Forest Research has its "Condor" system ready for commercialisation. Invader can supply the essential data required by these systems.

Production Control

Production control ensures that logging crews produce the product mix required by the market without over or under-running orders, and that the products are manufactured to specification. Planning tools typically base decisions on averages, such as average tree and daily crew, but in a real production situation there are many variations in tree size, product mix, product characteristics and production rate that will affect the planned programme. A real time or close to real time control system is needed and Invader provides this. The tools report the manufacture of each product by specification length. If the production rate is greater or less than that necessary to fill an order in time, new instructions can be sent. Similarly, when an order is filled instructions can be sent to stop the production of that grade of log. The characteristics of each grade can also be reported by skid or amalgamated across a region. If an SED average for a line of logs falls below that specified, new instructions can be sent to lift that average. If there are any new cutting instructions, the field tools automatically collect them when downloading. With RF communications, downloads can occur continuously.

The information gathered by the tools can also be used for crew management purposes. Key suppliers are able to receive reports on their crews' performance on a daily basis or in real time, and by grade and total production, average merchantable volume per tree, number of butt pieces versus tops, or length of butt pieces. Forest owners have manufacturing control reports on the way that the calipers are being used. Reports on each logmaker show the quality codes being used, number of codes entered per 10m of stem, how often diameters are taken and the way the sweep system is being used. This allows training to be targeted to those who need it most.

Control of Delivery

Log delivery can be managed by people or by truck scheduling software. Both need accurate data to make truck dispatch decisions. The data needed is the stock available at each location (supply) and the daily requirements of each customer continually adjusted for deliveries (demand). Invader can report on stock levels at each skid and where necessary, differentiate between total stock and stock available for uplift.

The stock system reports truck loading details during the day and can be linked to a customer log yard management system or be used to continuously monitor customer log stocks.



Accurate data needed in log making

What are the implications for non-corporate harvest managers?

As an example, consider a consultancy arranging the logging and marketing of smaller, privately owned forests, using three to six logging contractors. A once-per day data download system using telephone modems would allow the consultant to send each crew its cutting instructions, ensure even lines of within-specification logs between each crew, know the production by grade and length by crew and in total each night, know the stock available and the stock loaded that day, and so coordinate their business.

Using the Invader system will also enable the consultant to offer extra services to customers and landowners that should give a significant marketing advantage:

- Reassurance that the best logmaking decisions are made given the current marketing environment;
- Daily production reports; and,
- Record of loadouts linked to truck docket numbers.

Many small forest owners approach harvesting with a great deal of fear (sadly, often justified). Daily reports using such an objective, transparent system will be very reassuring and an effective marketing tool.

Conclusion

IFR Technologies Invader is now providing forest managers with detailed and timely information not previously available. This information is providing new opportunities to streamline forest management and improve margins.

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Superskids offer operational alternative

Paul Dickinson

Superskids, as defined by Carter Holt Harvey Forests Ltd. (CHHF) are whole-stem processing skids located near (within about 7 km of) the stands of trees to be processed, but of a greater size than conventional skids, typically exceeding a surface area of 5000 cubic metres. Superskids differ from central processing yards (CPY) in that CPYs are reasonably permanent entities processing stems from relatively long average haul distances, where roading networks allow safe and efficient long distance, whole stem haulage to the CPY. A single CPY may process stems from thousands of hectares.

Superskids are temporary entities which process stems from from a smaller area, up to 500 hectares of forest, while still offering many of the same advantages that CPYs have over conventional sized landings.

The wood catchment size is usually limited by the quality of the roading infrastructure to the skid. Roading influences stem haulage time, and the physical ability of the stem trucks to negotiate the roads, since trucks can potentially carry 38 metre stems. Similar to CPYs, superskids generally require what is called "two-staging" of whole stems, from the site of felling to basic extraction pads on the road edge, then from the extraction pads, to the superskid on a stem truck. Stems can be supplied to the superskid from several extraction operations, allowing high volume throughput. A minimum of 60,000 tonnes of available wood is generally regarded as being required to justify the establishment of a superskid operation.

Why use superskids?

An obvious value-recovery advantage of having a large stem processing area is to remove the physical constraint to the number of log types that can be produced (e.g. enhanced log stacks area). With high volume throughput and log storage capability, there is the ability to produce certain high-grade log-types that are traditionally slow to accumulate and would not be produced on a conventional skid given skid area and time constraints (e.g. sapstain risk).

CHHF's superskid experience to date shows a significant 'freeing-up' of production volume due to the elimination of interference between work elements at the extraction site. In many operations, stem processing tends to be the 'bottleneck', especially on small skids and especially in hauler operations. Processing away from the primary extraction site allows production to increase.

In addition, at the superskid machinery can be customised to specific tasks. For example two hauler operations each usually producing 170 tonnes per day with processing under the spar, can each produce over 230 tonnes per day when stems are removed by a stem truck to a superskid. In this case, the increase in output is accomplished through the addition of a stem truck, a minimal increase machinery when considered over the whole operation.