HARVESTING TECHNOLOGY IN NEW ZEALAND NEW SOFTWARE MEASURES WHAT MATTERS

Part One

The last few decades have seen considerable changes to logging practices in the Pacific Northwest and New Zealand. The demise of many yarder manufacturers in the 1990s has led to an aging fleet of yarders. At the same time increased costs of labour and environmental compliance and a shift to greater proportions of annual harvests on steep terrain have created further challenges.

With a large planting boom in the early 90s, which has a typical rotation of 25-28 years for the predominantly Pinus radiata stands we plant, many of the forests coming up for harvest in New Zealand consist of smaller trees and are in smaller estates or "farm forests", with little infrastructure and scale that is not to the loggers' advantage. Loggers face many other obstacles that are not unique to New Zealand. However, despite the obstacles, New Zealand loggers are continually finding new ways to incorporate technology and tools to make their lives easier; ideas which are worth sharing.

When thinking about logging technology and innovations coming from New Zealand, the first thing that comes to mind are probably processing heads like Waratah, radio-controlled chokers like Fortronics, or more recently, the development of winch-assist machines. While there is no doubt that these were all significant advancements for the industry that changed the way many loggers operate, there are also many other smaller developments that are influencing the way we harvest timber; changing the way we plan, manage and execute logging.

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Forest managers are increasingly making use of updated payload analysis software programs like Cable Harvest Planning Solutions (CHPS). While these programs are built on previous software like Logger PC, they are fully integrated within the ArcGIS environment as an add-in toolbar where foresters do most of their mapping.

CHPS allow a harvest planner to select landing locations and then automate the calculation on physical feasibility with regard to corridor distance and payload limits for various skyline systems and carriages, with the click of a button. These improvements are shortening the analysis time and there is less need to survey the site beforehand to input terrain information into the program. While there is often no substitute for boots on the ground reconnaissance, high resolution LiDAR can be used to generate the terrain beneath cable spans with incredible accuracy and most companies have invested in using LiDAR based maps for their commercial forests.

Loggers are benefitting from this improved payload analysis as the payload estimates for each span are provided to them. Using the supplied information they are able to highlight difficult yarding areas and can work with the harvest planner to come up with alternative solutions, which can be quickly checked for feasibility. Some loggers are taking this a step further by using colour-coded payload maps loaded onto a tablet placed in a winch-assisted felling machine cab. With GPS capability, this allows operators to know their position in a stand and accurately fell and bunch payloads to optimize productivity.

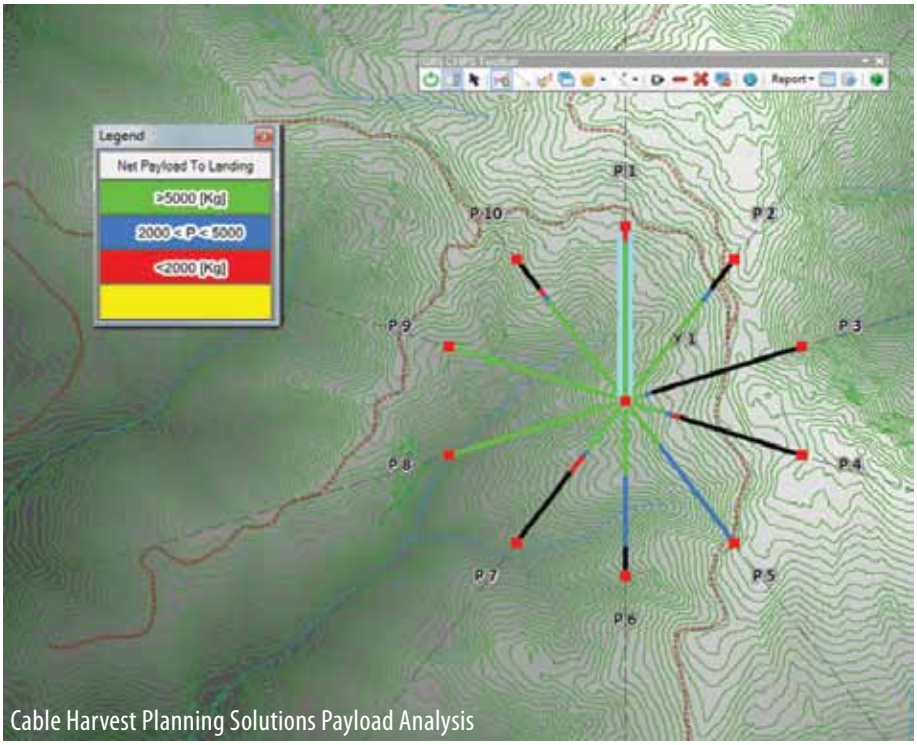
While the analysis software calculates payloads, in order to ensure that the planned payloads are feasible, yarders need to be set-up according to the designed deflection. Methods to measure skyline deflection in the field have existed since the mid-70s. However, few loggers used these methods as they required some mathematical calculations along with measurements of distances and angles. Many loggers now have access to smart phones and can use the recently developed Cable Yarding Deflection app,

Photo: Logsafe GPS Monitoring

which is essentially a calculator that provides users with step-by-step instructions for measuring deflection (from either the landing or tail hold position) using the app's inclinometer in conjunction with a laser range finder to measure distances. Now loggers can quickly verify the actual per cent deflection achieved during setup and also assess hypothetical situations, like moving a tail hold further up a back face to improve deflection.

Tension monitors for yarder operations are widely regarded as a useful production and safety tool.

Photo: Logsafe GPS Monitoring



Cable Harvest Planning Solutions Payload Analysis

Tension monitors for yarder operations are widely regarded as a useful production and safety tool. While many new yarders, especially those built in Europe, have integrated tension monitors, they are rare on New Zealand's existing older fleet. Tension monitoring allows payloads to be modified to suit the lift capacities of a site to improve productivity. Most tension monitors only have a digital numeric display and the information is lost after it has been displayed. A new type of display and data management system for tension monitors has been developed, also into an app. The app displays tension in a live streaming graph much like a heart rate monitor at a hospital. Users can scroll backwards in time or zoom in or out to view different peaks and time frames. Additionally, there are colour-coded zones displayed on the graph that relate to the selected rope's safe working load, endurance, and elastic limit. At any point in time, a routine can summarize the operating time spent in each of these zones. In addition to monitoring and improving safe operating practices, the app is also useful in helping to: train new machine operators; assess the effect of different operating techniques on overall tension loading and behavior; document rope wear and service life; and complement other software that provides feedback to operators.

Each of these technological advances will help improve production and safety and reduce costs. The next issue will cover GPS and drone technology.

Originally a forester from California, Hunter Harrill is a senior research assistant at the New Zealand School of Forestry. He provides research for the logging industry through New Zealand Forest Growers Research (FGR), teaches forest engineering at the University of Canterbury and provides outreach and extensions services to loggers and forest managers.