

WIDER TYRES REDUCE LOGGING COSTS

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Introduction

The benefits of fitting wider tyres to a skidder to improve machine stability and extend the working season on poorly drained soils are well documented. However, eight years after the introduction of wider tyres into New Zealand, there are few skidders operating with wider tyres. The one with the longest operating history is owned by Diack Logging in Southland (Figure 1).

Although they are not widely used, there is a need for more stable, low ground-pressure machines. It may be the perception that the tyres are too expensive which has deterred contractors and companies.

This Technical Note highlights the advantages and disadvantages of using wider tyres, and discusses the effect on logging costs. Specific reference is made to Diack Logging's experience with their machine.

Advantages and Disadvantages

The advantages and disadvantages of fitting wider tyres to skidders can be summarised as follows:

Advantages

- reduced fuel consumption
- increased productivity
- reduced soil disturbance
- potential to use smaller machine for same job



Figure 1 - Diack Logging's JD640E skidder

- smoother ride
- improved stability (particularly on side slopes)
- greater operating range (slope and soil conditions)

Disadvantages

- high tyre cost (typically, 2 to 3 times the standard tyre price)
- increased machine width
- reduced manoeuvrability

Some major benefits of using wider tyres are the lower ground-pressures and increased machine stability. Although generally only considered for extraction on wet soils, the benefits of wider tyres also apply to rolling terrain. The added width of wider tyres can however be a disadvantage where contour tracks are being used.



The Southland Experience

Ground-based logging in Southland can be difficult for year round operations because of poorly drained soils. This can reduce the operating season for a ground-based operation and significantly increase the potential for site disturbance.

Diack Logging has operated a John Deere JD640E skidder fitted with 1090 mm tyres since 1995. This machine replaced a slightly more powerful machine fitted with standard width tyres (780mm).

Since purchasing the wide-tyred skidder, average daily production (based on two years' records) has increased by 15%.

Using Liro's costing format, the use of the wider tyres is estimated to have increased daily system cost by \$60 from \$2,515 (JD640E with standard tyres) to \$2,575 (JD640E with wider tyres). Built into the cost estimate for the wider tyres is an allowance for a 10% reduction in fuel consumption and a tyre life of 6000 hours. Diack Logging have not experienced an increase in repair and maintenance costs since fitting the wider tyres. When the machine was purchased, it was fitted with larger differentials and axles (JD740E) to cope with the extra stress imposed by the wider tyres.

Based on our estimates, the use of wider tyres could potentially decrease logging costs by 12%. The estimated increase in daily cost (\$60/day), could have been offset by increased production of only 3%.

The potential for increased tyre damage, found in some wide tyre operations, was reduced by running higher than recommended tyre pressures (40 versus 22 psi). The increased pressures would in effect reduce traction. However, traction was improved by using chains during winter and in wetter areas. Also, the use of chains contributes to increased tyre life by reducing tread wear.

Machine stability, particularly on side slopes, has been increased markedly through the use of the wider tyres. Based on an overseas study, the critical tipping angle for the JD640E would have increased from 32° to approximately 44° by using the wider tyres.

The performance of the wide tyred skidder has been monitored by Rayonier New Zealand Limited through the measurement of soil disturbance across their operations. Rayonier have found that the use of the wider tyres has reduced the extent of deep disturbance relative to the use of standard tyre widths (Figure 2).

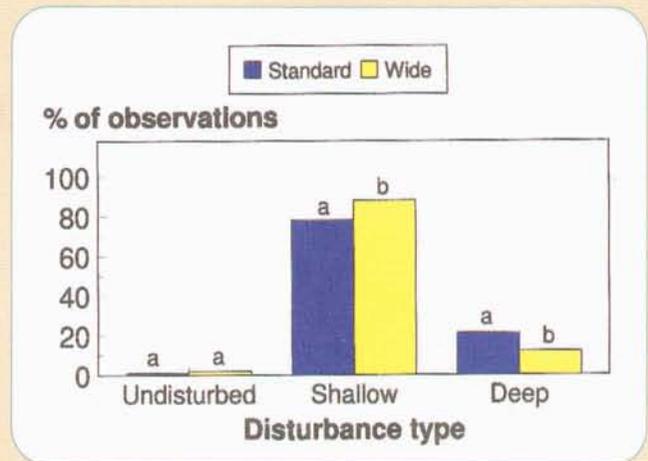


Figure 2 - Disturbance assessment results. Results by disturbance type with the same letter are not significantly different ($P > 0.05$). Results courtesy of Rayonier New Zealand Limited.

Conclusions

Diack Logging has successfully operated a skidder with wider tyres for the past two years.

The added costs of fitting the tyres appears to have been completely offset by the increased productivity. The result has been an estimated reduction in logging costs of 12%.

Skidder stability was substantially improved and soil disturbance was reduced by the use of wider tyres.

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