

## BOMAN MARK III-H SKYCAR: A CASE STUDY

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### Introduction

The demand for reduced unit logging costs and the increasing clearfell volumes requires improvements in the efficiency and capabilities of cable logging operations. One method of achieving this is the use of motorised slackpulling or skycar carriages.

This case study assesses the viability of the Boman Mark III-H skycar as an alternative extraction tool and is intended to provide harvest planners, supervisors and contractors with information on where and how they could be utilised.

### Specifications

- Deutz 4cyl, 106 hp, air cooled turbo charged diesel engine
- 12 volt radio system
- Radio controlled (Talkie Tooter)
- Hydraulic pump, motor and brake, with spur gears
- "Tommy Moore" sheaves
- Drum capacity: 122m of 16mm (5/8")
- Weight 1950 kg
- Cost, approximately \$148,000 (New Zealand)

### Study Area

The Boman III-H was studied in Kinleith Forest. A typical profile of the study area is shown in Figure 1.

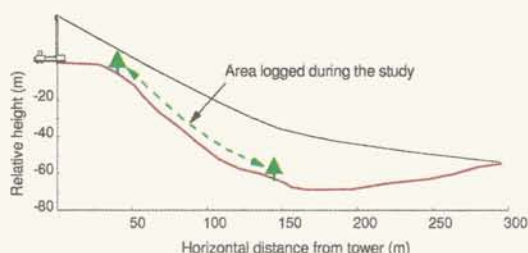


Figure 1 - Typical slope profile showing the portion of the span from which timber was extracted



### Operational Description

- The hauler used in the study was a Bellis BE85.
- The felling pattern was downhill, with the butts facing the hauler.
- Gravity return system was used throughout the duration of the study.
- During inhaul, the drags were not fully suspended but the dropline was raised enough to lift the butts and part of the trees.
- The ability to operate the carriage independently of the working ropes was utilised with the dropline raised/lowered while the carriage was moving on the skyline.
- Three breakerouts were used during the study.
- Some drags were pre-stopped.

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## Cycle Times

Table 1 - Cycle time Summary

Average haul distance	116 metres
Average time carriage in use per cycle	1.82 minutes
Delay free cycle time	4.83 minutes
Average total cycle time	5.61 minutes

A line shift and a mechanical problem (buzzard hook broke off dropline) largely accounted for the operational delay time. Pre-stopping delayed the carriage for 17 of the 65 cycles. After the line shift, one of the three breakers had lunch while the other two carried on breaking out, from this point pre-stopping did not take place. This alternating approach to lunch breaks kept the skycar carriage in operation throughout the duration of the study.

Total carriage time, as a proportion of delay free cycle time, was low at 38% as a result of:

- short average haul distances
- the skycar being able to raise and lower the dropline during out haul and in haul.

By contrast, the crew elements of the cycles accounted for 62% of delay free cycle time.

## Productivity

The study commenced at 7.30am and concluded at 1.30pm. In this period, a total of 116 stems were pulled giving an hourly production of 19 stems. Assuming that production continued at the same rate for the rest of the day, then 152 stems could be pulled in 8 hours.

The same crew has, at times, pulled in excess of 300 stems/day.

## General Comments

There are currently five contractors in New Zealand using Boman skycars in their operations, and their comments with regard to performance and reliability of the skycar are very positive:

- Lighter winch rope and strops make handling easier, and so becomes a factor in quicker hook-on and breakout times.
- Combining the inhaul on the skycar's skidding drum and

inhaul from the hauler main drum allow for rapid drag speed, from just after breakout, to the carriage.

- Dropline times are minimal as slack can be payed out while the carriage rides the skyline.
- The skycar is mostly utilised in shotgun settings. Alternatively, the tail rope can be hooked on to the carriage to get up the back slope.
- Dropline can last up to two months.
- Mechanically reliable, all comments received by owners were positive.
- The best situation for a skycar to perform is in smaller piece size (under 2 tonne) with high stocking, enabling the pre-setting of chokers.
- Two inhaul speeds allowing for good control over the drag.
- Excellent control over the amount of suspension of a drag.
- Any good system can have its drawbacks, the skycar is no exception. The purchase price of a Boman Mark III-H is around \$148,000 so they are an expensive tool to add to your hardware.
- Optimal drag size is between 3 and 3.5 tonnes. Once over 4 tonnes, the skycar's winch is working hard to get the drag to the carriage. This can have a negative affect on cycle times. Breakerouts need to be aware of the skycar's limitations and plan drags accordingly.
- The skycar is limited by ground profile. It requires reasonable clearance (to avoid carriage damage) and is limited to the depth of gullies it can work due to the rope capacity of the dropline drum.
- Bridling capabilities: technically it is possible but in practice you could run into problems. You could not pull dropline slack faster than what the dropline could payout. Doing this could cause damage to the winch. Also you are limited to the amount of slack you can pull due to the rope capacity of the dropline drum.

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