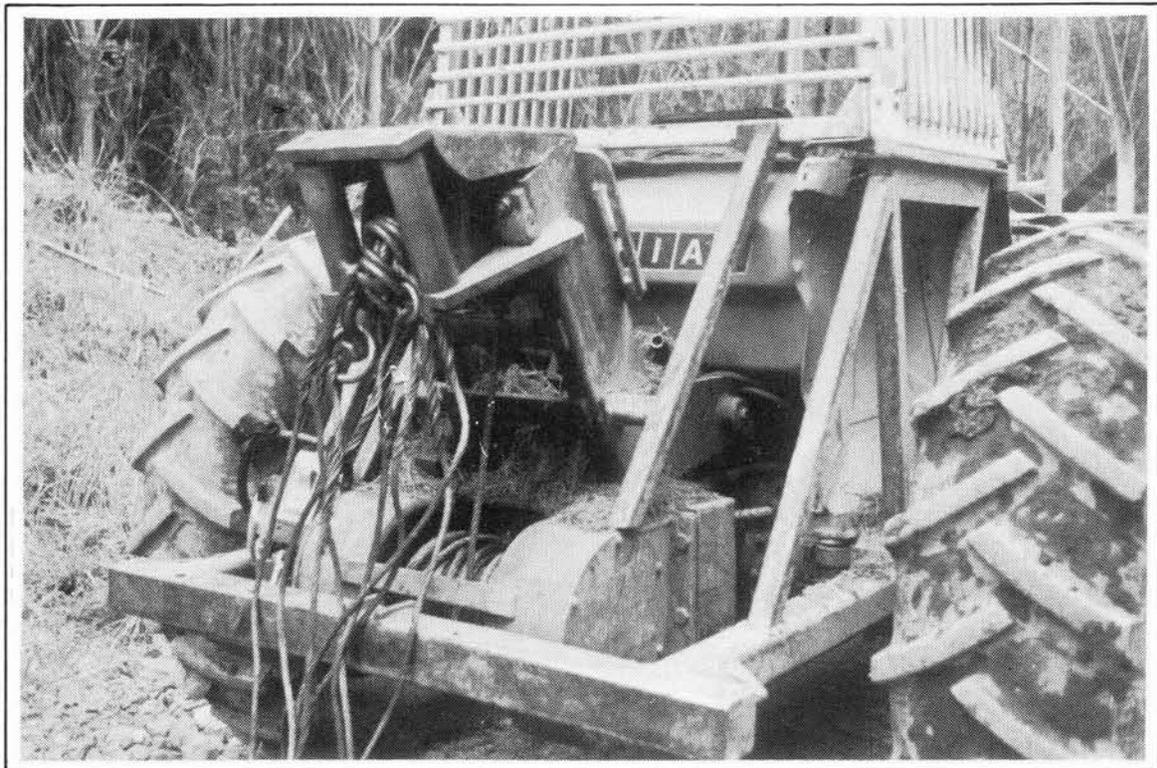




SMALL WINCHES FOR AGRICULTURAL TRACTORS

G. P. Coates



INTRODUCTION

LIRA recently undertook a survey of specifications of winches suitable for agricultural tractors. Results from this survey aim to determine which type of winch would be most suitable for different logging machines and operations.

Agricultural tractors fitted with winches are suited to thinning a range of small woodlot and shelterbelt areas. Overseas literature indicates that in Canada, Europe, and Scandinavia, systems using a winch attached to an agricultural tractor are an accepted method of smallwood extraction.

All overseas winches presented in this survey have been tested by overseas research organisations, but obviously not every type could be included. Specifications are not given for purpose built winches such as are commonly fitted to skidders and crawler tractors, and which may be adapted to fit agricultural tractors.

NOTE: Survey information has been taken direct from manufacturers' specification brochures:

- all data is subject to change by the manufacturer
- manufacturers also offer options to the specifications of the units listed, as well as other models
- no specifications have been tested or confirmed by LIRA

SUMMARY OF SMALL WINCH DATA

Make/Model	Drum Capacity		Max.Line Pull (kg)	Max.Line Speed (m/sec)	Weight (kg)	Method of Mounting		Power Req. (kW)	Fairlead Position		Controls	Special Features
	Length (m)	Diameter (mm)				3pt	Direct		High	Low		
Agri-Winch* (Canada) Model 747	90	11	4800	1.2	545	x		26-70	x		Manual dog clutch. Ratchet brake.	Winch built into logging arch/sulky combination integral butt pan.
Farmi * (Finland) V 303	70	8	3000	1.3	190		x	26 up	x		Manual friction clutch. Band brake.	Slotted skidding bar.
JL 310	70 50	8 10	3000	1.3	190	x		26 up	x		Manual friction clutch. Band brake.	Slotted skidding bar, stabiliser legs.
JL 45T	75 50	10 12	4500	1.3	315	x		37 up	x	x	Manual friction clutch. Auto brake.	Slotted skidding bar, stabiliser legs, integral butt plate.
JL 2/45	2 x 75 2 x 50	10 12	4500	1.0	410	x		45 up	x	x	Manual friction clutch. Auto brake.	As J1 45T
JL 60T	100 80	10 12	6500	1.1	520	x		37 up	x	x	Manual friction clutch. Auto brake.	As JL 45T
Fransgard* (Denmark) V-300 Combi	80	8	3000	1.8	N/A	x		37 up	x	x	Manual friction clutch. Ratchet brake.	Slotted skidding bar, stabilising legs.
Igland (Norway) Primo	60	10	3000	2.2	290	x		N/A		x	Manual friction clutch. Auto brake.	Integral butt plate, stabiliser.
Primax	125 100	11 12	5000	1.2	380	x		N/A		x	Manual friction clutch. Band brake.	As Primo
Compact 3000/2	2 x 90 2 x 150	10 8	3000	1.6	140		x	Up to 45		x	Manual friction clutch. Band brake.	Optional butt plate fair lead stabiliser combination 3 point linkage mounted.
Perfect 3000/2	2 x 90 2 x 150	10 8	3000	1.6	150		x	N/A		x	Manual friction clutch. Auto brake.	As Compact
Special 4000/4	4 x 30	11	4000	1.1	360		x	Up to 70		x	Manual friction clutch. Auto ratchet	As Compact
Special 4000/2	2 x 200 2 x 400	11 8	4000	1.8	305		x	Upto 60		x	Manual friction clutch. Band brake.	As Compact but also able to be used as highlead

Make/Model	Drum Capacity		Max. Line Pull (kg)	Max. Line Speed (m/sec)	Weight (kg)	Method of Mounting		Power Req. (kW)	Fairlead Position		Controls	Special Features
	Length (m)	Diameter (mm)				3pt	Direct		High	Low		
<u>Igland cont.</u>												
Compact 5000/2	2 x 110 2 x 250	12 9	5000	1.2	255	x		Upto67	x		Manual friction clutch. Band brake.	As Compact, extended drum capacity.
PS5000/2	2 x 110 2 x 250	12 9	5000	1.2	300	x		Upto67	x		Manual friction clutch. Band brake.	As Compact, single lever control for brake & clutch.
Compact 5000/2H	2 x 110 2 x 250	12 9	5000	1.2	300	x		Upto67	x		Hydraulic control brake & clutch.	As Compact. Suitable radio control & skidder mounting.
<u>Nilsson (N.Z.)</u>												
HS3000	130	9										
	60	13	1400	1.2	N/A	x		N/A			} Manual dog clutch Free spooling brake.	Basic hydraulic drive c.w. winch motor no power supply or control valves. Units can be built to suit requirements. Other models available.
5000	130	9										
	60	13	2200	0.8	N/A	x		N/A				
8000	280	9										
	140	13	3500	0.5	N/A	x		N/A				
10000	140	13	4500	0.4	N/A	x		N/A				
<u>Norse *</u> (Norway)												
3000	80	8										
	50	10	3000	N/A	80	x		N/A	x		} Manual friction clutch. Ratchet brake.	Complete with butt plate.
3000 Kombi	80	8										
	50	10	3000	N/A	135	x		N/A	x			
5000 Kombi	85	10										
	50	12	5000	N/A	185	x		N/A	x			
<u>Tayland</u> (N.Z.)												
T10	135	13	4550	N/A	150	x		N/A			} Manual dog clutch.	Basic winch can be supplied with brakes, controls, speed to suit order. Other models available.
T15	135	13	6800	N/A	N/A	x		N/A				
T20	200	13	9000	0.35	226	x		N/A				
	130	16										
<u>Vette</u> (N.Z.)												
	370	9	4000	0.5	N/A	x		30 up	x	Manual dog clutch	Complete with stabiliser butt plate combination. Optional brake, high fairlead.	

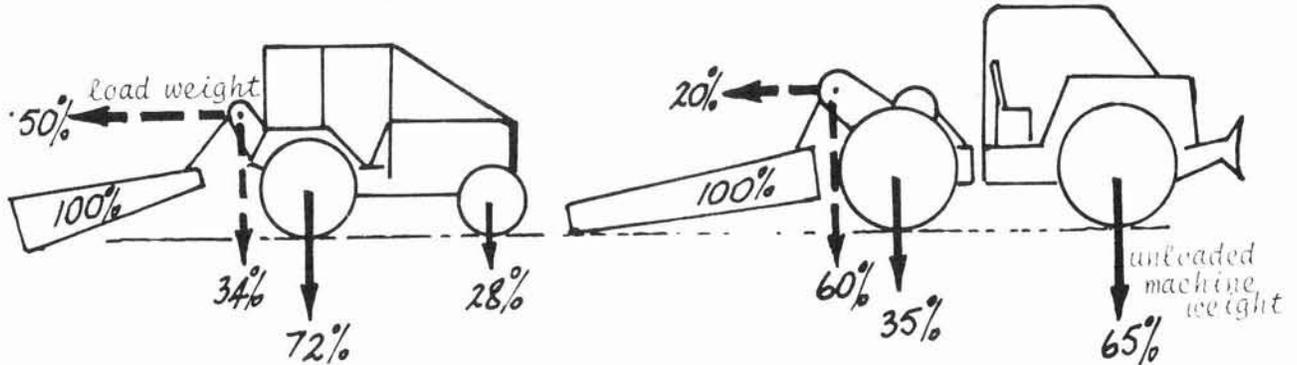
N/A - information not available

* - not currently available in New Zealand

NOTE: Rope sizes taken directly from specifications

COMMENTS

The main difference between a skidder and an agricultural tractor is weight distribution. A skidder has the greater percentage of its weight concentrated over the front wheels, whilst the reverse is the case for an agricultural tractor. This has a marked affect on the winching and tractive ability of the tractor. It is for this reason that most of the three-point linkage mounted winches are designed with integral stabiliser legs or butt plates. The forces during winching are transferred to the ground rather than acting as a tipping force on the tractor, because the fairlead is further from the centre line of the rear wheels than for a direct-mounted winch.



Figures 1 & 2 - Distribution of machine and load weights on an agricultural tractor head pulling and a wheeled skidder butt pulling. Ref.1

The fairlead position is critical. Most direct-mounted winches are fitted directly behind the tractor seat, and choice of fairlead position is optional. The tipping force can be opposed by the addition of counterweights to the front of the tractor, and should be transmitted by some form of sub-frame rather than the tractor chassis.

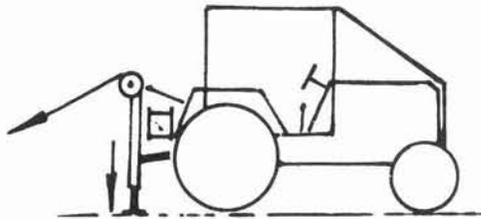


Figure 3 - Three-point linkage mounted winch with integral stabiliser legs.

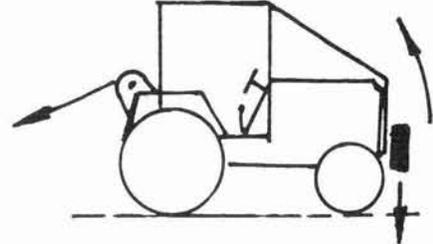


Figure 4 - Integrally mounted winch with counterweights to oppose tipping forces.

CONCLUSIONS

When selecting a winch the nature of the work the whole unit is to be involved in should first be determined. Such factors as expected size of wood, terrain, haul distance, and labour required for the rig, all have a bearing on the decision.

A winch mounted on a tractor three-point linkage is an implement that can be quickly attached or removed, leaving the tractor free for alternative work. Direct mounting, however, implies more permanent intent. Basic tractor suitability, positioning of the winch, fairlead, and controls, all have to be carefully considered, as once this type of rig is set up it is not easy to change. It is recommended that other units and small skidders be observed before the final layout is decided.

Ref 1 - Arvessen, Anton. Tree Length Skidding by Farm Tractors and Frame Steered Skidders, Norwegian Forest Research Institute, No.99 bind xxvii, 1970

For Further Information Contact: N.Z. LOGGING INDUSTRY RESEARCH ASSOC. INC.
P.O.Box 147,
ROTORUA, NEW ZEALAND. Phone 87-168