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Winch-Assist Technology for Steep Slope Harvesting

Timber Measurement Society

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Outline

- Why winch assist
- Equipment systems
- Future direction

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Why winch assist ?
3 key reasons

Safety

Available fibre

Adaptability

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Safety

	Manual Tree Falling & Bucking	Mechanized Tree Falling	Forestry
Person Years	490	483	16,215
Injury Rate %	26.8	1.9	5.2
Serious Injury Rate* %	8.4	0.6	1.3
Claims paid $million	9.3	0.4	44.3

* >30 days off

Source: WorkSafeBC

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Available Steep Slope Fibre

BC Timber Volume by Slope Class

	Total AAC[1] (million m^3)	AAC > 35% (million m^3)	AAC > 35% (%)
Coast	18.1	10.1	56%
Interior	58.9	8.2	14%

[1] Annual allowable cut

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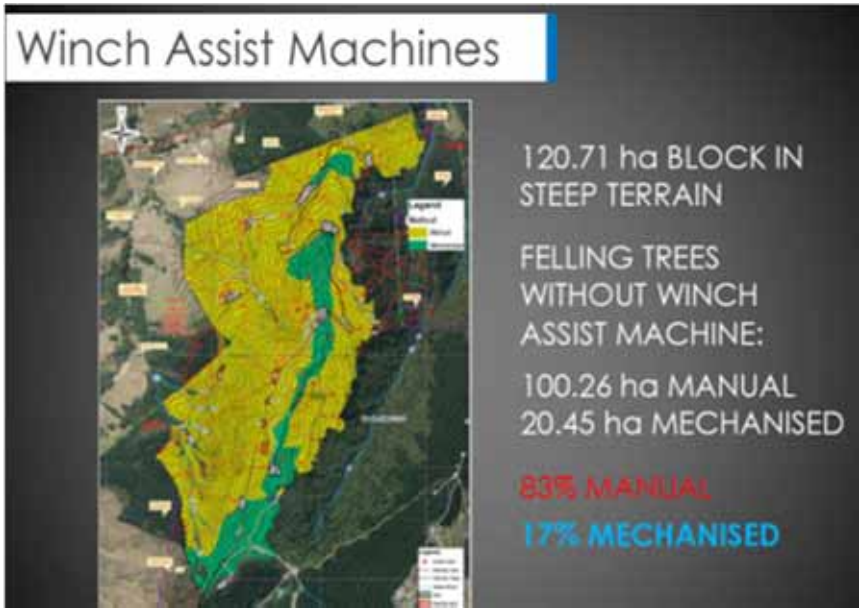
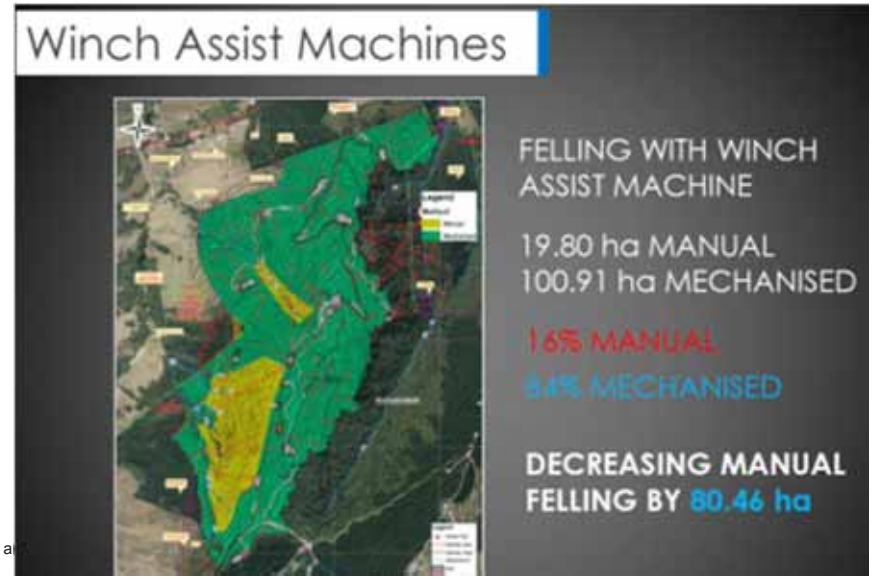
Adaptability

- Options for competitiveness
  - Cut and pile for yarding
  - Cut and shovel-log
  - Versatile terrain capabilities
  - Safe and content workers
  - Improve overall performance
  - Increase overall productivity

Source: Dale Ewers





Winch-Assist Machines: Europe

- Cable assisted forwarding started in late 80's
- Expanded to harvesters in 2000's
- Range in complexity and sophistication
- 800+ commercial units in use

Ponsse with Herzog Winch

- Operating in Oregon

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John Deere Haas Winch

- Operating near Kamloops B.C
- FPInnovations assessing this system

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Anchor point is a stump

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Major European Winch Manufacturers Include:

- Haas
- Herzog
- Komatsu
- Ecoforst

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New Zealand Developed Technology

- Felling machine is tethered to an anchor machine

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Winch Equipped Anchor Machines

Excavator

Dozer

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EMS TractionLine

FFE Excavator Mounted

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Remote Operated Bulldozer

ClimbMax

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North American Technology

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Summit Winch-Assist in Washington

- Anchor machine - winch system
- Single cable
- Summit's 3rd design, 7th unit built
- Several units using hot saws
- Bucket is chained to carriage, not dug in
- Observed with Hot Saw

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T-Mar LC150 “Rhino”

- Easily accessible emergency stop (radio).
- Load cell monitors and records cable tension
- Twin anchors
- Fail safe spring brake in mechanical/hydraulic failure
- 3 camera feedback

Tracked

Higher cable tensions
Lower stability/traction
More available/serviceable

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Wheeled

Lower cable tensions
Better stability/traction
Less site degradation

Felling Heads

- **Hotsaw**
  - Good in understory
  - Good with small diameter stems
- **Directional**
  - Good uphill and downhill
  - Capable of hoe-chucking
  - Longer reach

Winch assist ready

Major manufacturers are making these now with:

- Front escape hatches,
- 4 point seat belts,
- Engineered attachment points
- Engines designed for steep operation, reservoirs, tanks
- Longer track frames for stability

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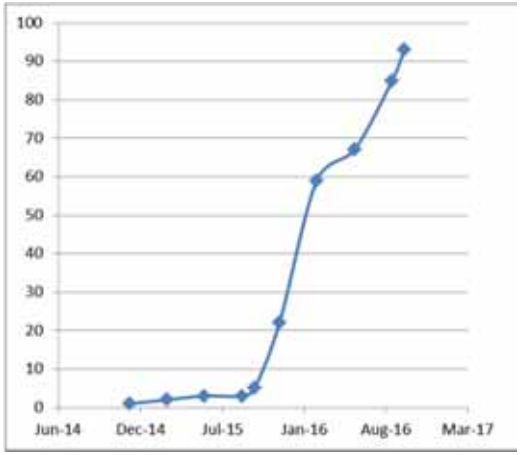
Winch-Assist Wave Hitting BC Steep Slopes

- 44 machines purchased or planned in BC

Winch Machines	BC		US PNW		
	Current	Planned	Current	Planned	
Climbmax	5	2		1	
ROB	4	8			
Haas	2	5			
HSM	2	1			
Herzog/Alpine		4	4		
EMS	1	5	2	8	
Summit		1	9	12	
T-Mar			1		
FFE	2	1			
T-Winch		1			
Total	16	28	16	21	81



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Development Needed

- This concept is still under rapid development, operating limits are yet to be defined
  - Slope, soil, machine type – stability and traction
  - Cable wear and integrity
  - Anchoring
  - Operator learning
- Working methods
  - Safe Work Procedures
  - Operator and contractor training
- Engineering planning and layout
  - More options to consider
  - Road and landing design

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FPINNOVATIONS' STEEP SLOPE INITIATIVE

GOALS

- Reduce accidents by 50%
- Increase margins by $5/m^3
- Increase access to economically available timber by 2 million m^3/yr.
- Mitigate environmental impacts

http://steepslopeinitiative.fpinnovations.ca/

Summary

- Winch-assist works.
- Safety and cost-reduction benefits.
- Some adaption to BC conditions required

Thank you

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Steep Slopes

People
- Safety! High accident rate with manual falling
- Skilled labour shortage

Fibre
- Changing harvest profile (MPB)
- Fibre supply shortfall

Costs
- Expensive timber
- High investment in new gear

Eco-system
- Environmental impacts

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Concepts - What is Best?

- Integrated winch or anchor machine?
- 1 or 2 cables?
- Tracked or Wheeled?
- Dozer or excavator?
- Felling head?
- Sophisticated or simple?
- What kind of safety systems?

Winch-Assist Revolution

EMS
TractionLine

Play Video
EMS Tractionline

- EMS anchor machine with JD 909 FB
- EMS with Tigercat, WA

FFE Anchor machine screen in buncher

Haas Winch-Assist

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Alpine/Herzog Winch on Ponsse

- Operating in Oregon

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Alpine/Herzog Winch

HSM

- Felling head/clam-bunk skidder
- Long logs.

Summit Winch-Assist

- Adding twin drums

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LC150 Remote Winch Assist

- 100% Remotely Operated – No Person On the Machine
- High 3’ Clearance
- 1500’ of 1” Swaged Line
- Independent Guyline & Anchor Blade
- Very Stable
- Primary Communication Through Cable Tension
- Can Be Used With Multiple Machines

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Anchoring

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