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Steep-Slope Timber-Harvesting Research in Western Canada

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STEEP – The FPInnovations Steep Slope Initiative

Professional
Eco-friendly
Economical
Transformative
Safe

FORMEC Austria 2015

Outline

- Facts about steep slopes in British Columbia (BC)
- Steep slope harvesting methods in BC
- FPInnovations Steep Slope Initiative
  - Introduction
  - Projects – tech assessment, machine stability, tech development, planning tools, environmental impacts.
  - Collaboration
- Summary

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Steep Slopes: the Need

- Changing harvest profile (MPB)
- High accident rate with manual falling
- Expensive
- Needed fibre supply
- Skilled labour shortage
- Concern about environmental impacts

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BC Timber Volume by Slope Class

	Total AAC (million m^3)	AAC > 35% (million m^3)	AAC > 35% (%)
Total	77.0	18.3	24%
Coast	18.1	10.1	56%
Interior	58.9	8.2	14%

Source: British Columbia Government data
AAC – Allowable Annual Cut

2013 Safety Statistics
Manual vs Mechanized Tree Falling

	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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Steep Slopes Initiative Roadmap

GOALS

1) Increased safety - reduce accidents by 50%
2) Increase margin - by $5/m^3
3) Access more fibre - 2 M m^3

2019-2020

- Operational machine stability rating system
- In-cab machine stability dash board

2018-2019

- Best practices applied widely
- Prototype in-cab real-time stability warning system

2017-2018

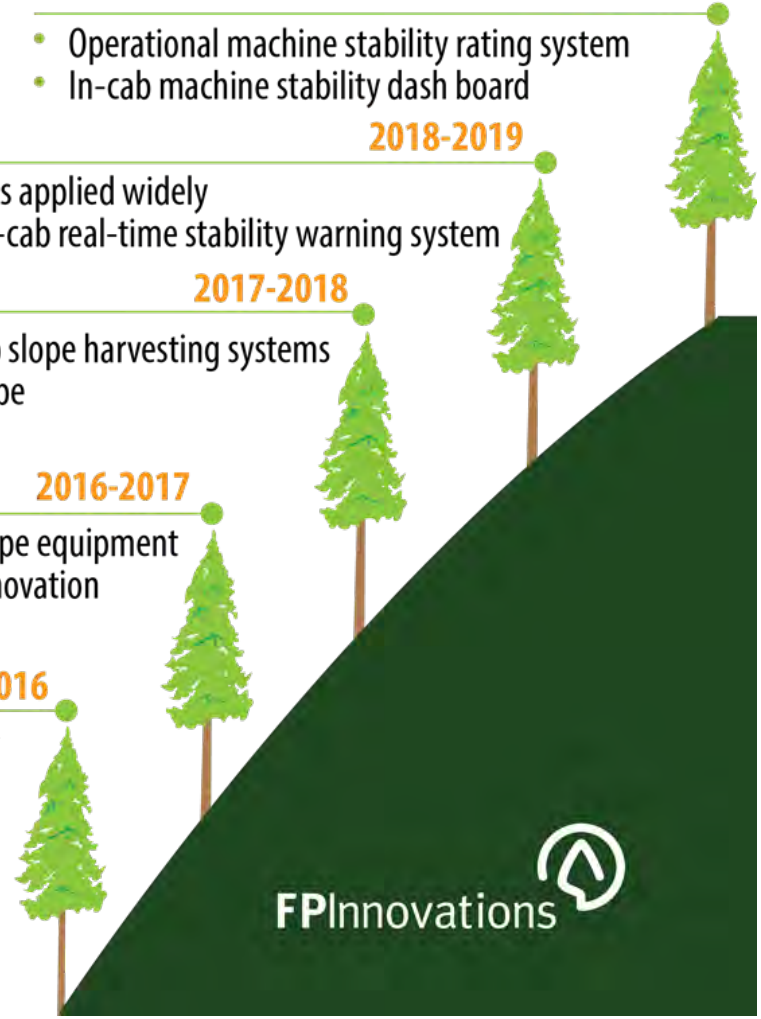
- Decision support matrix of steep slope harvesting systems
- Machine stability rating prototype

2016-2017

- Commercial availability of steep slope equipment
- Regulatory flexibility to support innovation

2015-2016

- Introduction & field testing of new technology
- Initiate regulatory changes



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Steep Slope Initiative Projects

- Technology Assessments
- Machine stability-related work
- Technology development
- Planning tool
- Roads and transportation
- Environmental impacts

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Technology Assessments

- Including:
  - Grapple cams
  - Yoaders
  - Pierce grapple processor
  - Electronic release chokers
- Benchmark against existing technologies & systems
- Help implement
  - Regulatory compliance
  - Best practices

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Technology Assessments: Winch-Assisted Systems

- ClimbMax (NZ) operating in the BC Interior for 18 months
- Remotely-operated bulldozer
- Ponsse-Alpine system
- JD-Haas system
- More systems appearing regularly

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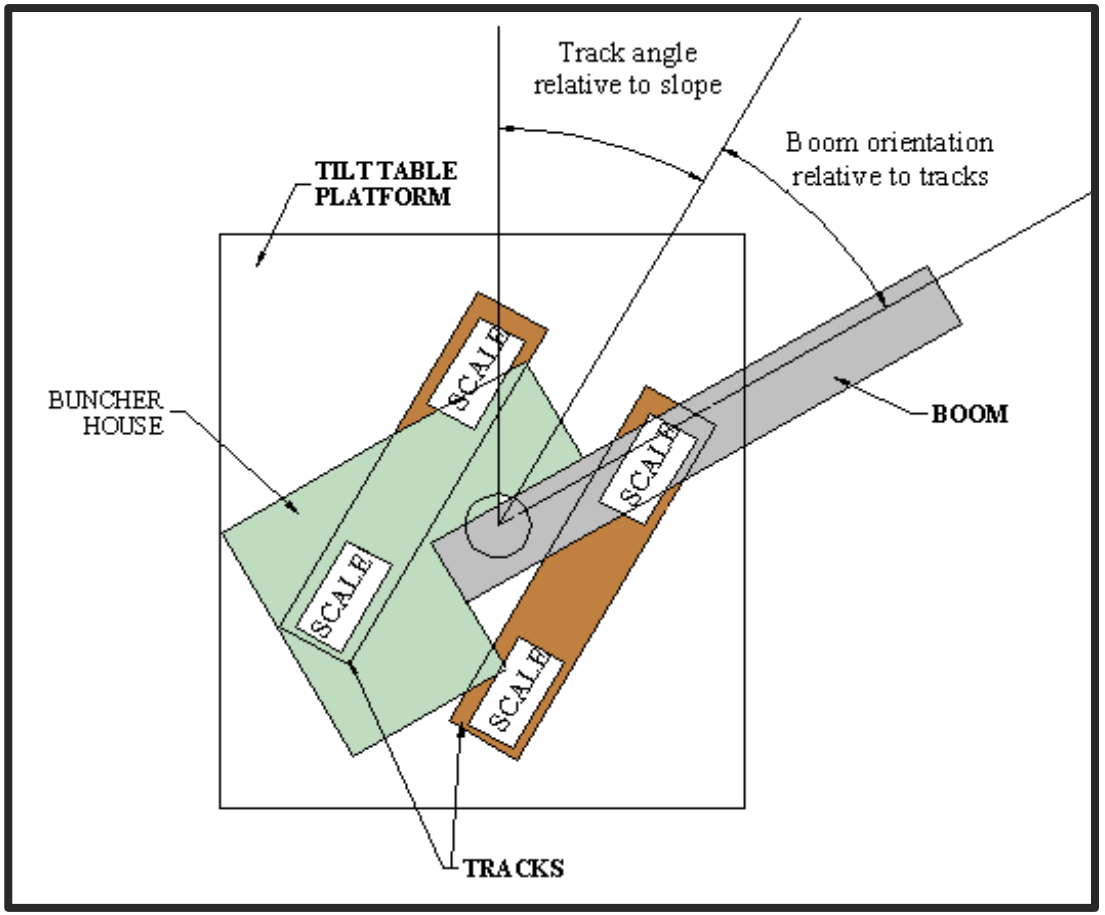
Technology Assessments: Winch-Assisted Systems cont.

- Combination winch-assist feller director and yarder.
- Recently developed in Washington

Winch-Assisted Harvesting

- Survey
  - 9 major BC companies (44.5 mln m^3)
  - Industry demand for winch-assist falling machines in next 5 years, 15.5 million m^3/year, **155 machines**
- Standard Development
  - Line tension monitoring
  - Assessment of cable wear and integrity
  - Machine stability and traction
  - Anchoring
  - Soil/track interface
  - Machine inclination

Machine Stability



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Machine Stability Testing

Example Test Positions
Compare LTRs at 35, 40, and 50% for the two machines

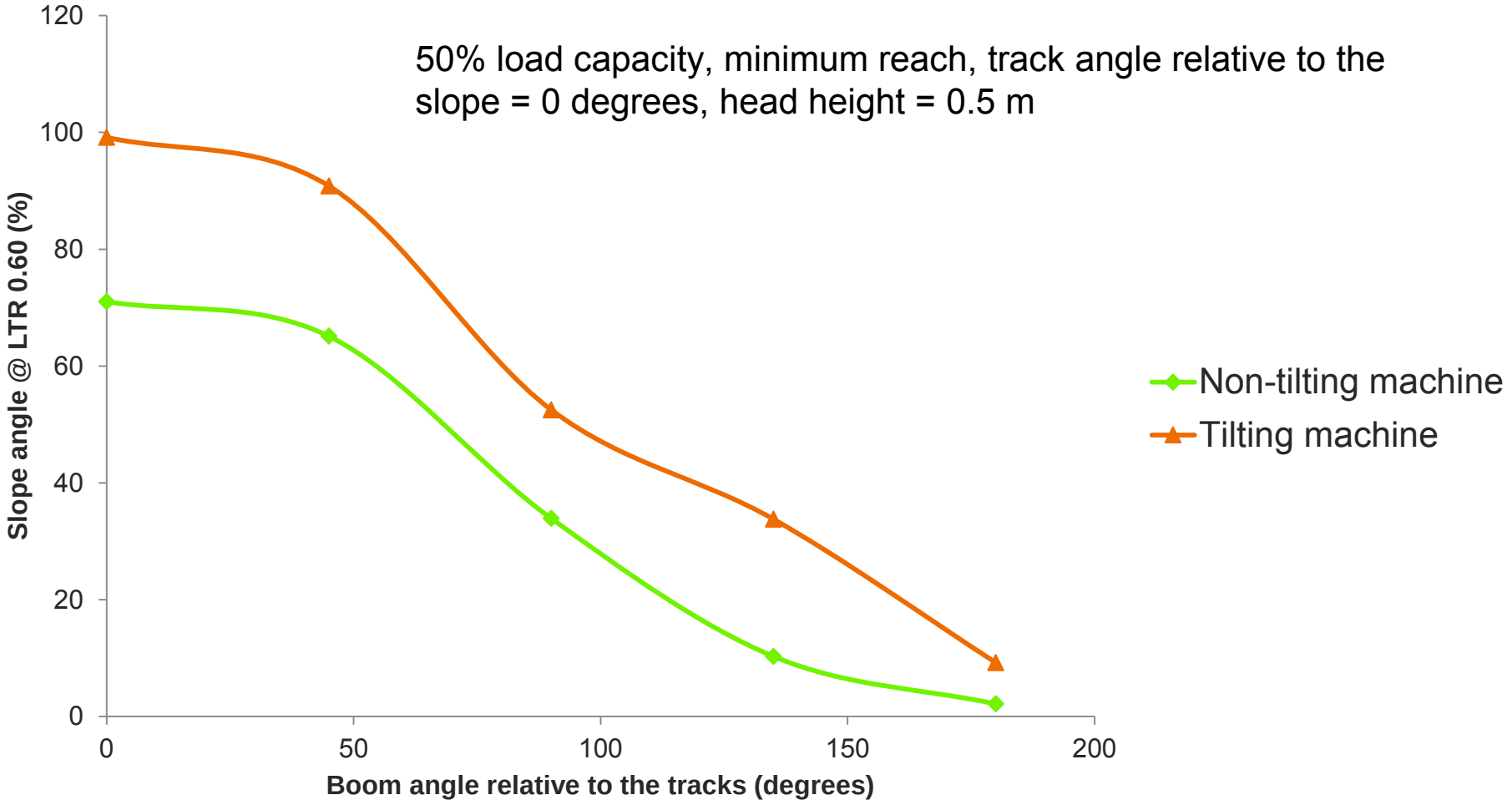
Position		Non-tilting machine			Tilting machine		
position	boom angle	LTR @ 35% slope	LTR @ 40% slope	LTR @ 50% slope	LTR @ 35% slope	LTR @ 40% slope	LTR @ 50% slope
5	0	0.05	0.13	0.30	-0.22	-0.14	0.01
3	45	0.14	0.22	0.38	-0.07	0.01	0.15
6	90	0.62	0.70	0.85	0.37	0.44	0.57

	LTR 0.00 - 0.29	good stability
	LTR 0.30 - 0.59	moderate stability
	LTR 0.60 - 0.89	marginal stability
	LTR 0.90 - 1.00	unstable

(LTR = load transfer ratio. Higher LTR = less stability)

(LTR of 1 = upset condition)

Machine Stability



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Technology Development

- Technology watch & market assessment
- Foster local technology development
- Adapted solutions to the BC needs & context
- Local winch-assist system (T-Mar)

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Planning tools

- Heli-logging making a come-back in B.C.
- Currently updating operating cost *assumptions*
- *Developing a user-friendly* planning & deployment model

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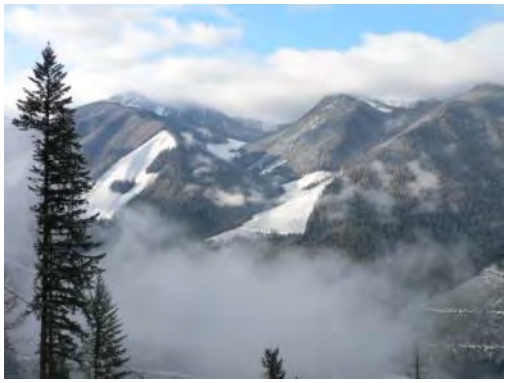
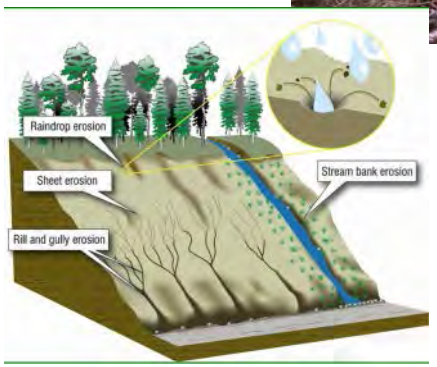
Environmental Impacts

- Collaborative project between FPInnovations, governments, universities, stakeholders
- Main issues around ground disturbance, rutting and terrain stability
- Develop/adapt/implement best practices with industry





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Collaboration

- Industry
- Manufacturer Advisory Group
- International collaboration
- Universities
- WorkSafe BC and BC Safety Council

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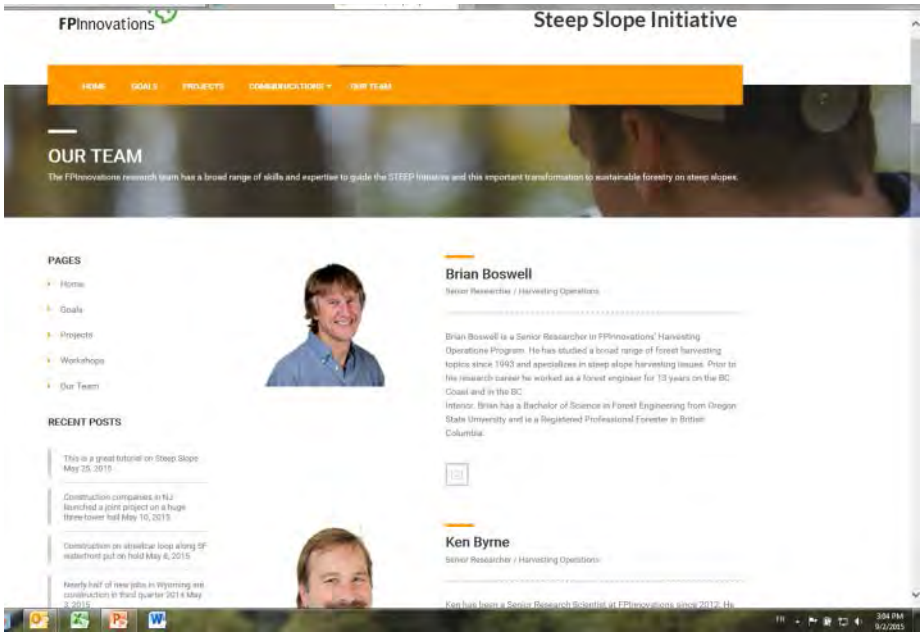
Web site – STEEP Initiative

- Dedicated steep slope initiative web page on the FPI web site
- Communications products, the team, project description, useful links



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Summary

- 5-year STEEP initiative
- Collaboration with numerous stakeholders
- New technologies
- Ensure safety, cost-effectiveness and environmental sustainability

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Thank you!

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