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Two Years Steep Slope Initiative – Questions, Answers, and Practical Outcomes

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FORMEC, Brasov, Romania

27 September 2017

Outline

- FPInnovations overview
- Steep Slope Initiative
- Safety developments
- Research focus
- Summary

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- A not-for-profit world leader in creating scientific solutions to support the Canadian forest sector's global competitiveness
- >400 dedicated employees across Canada
- Annual budget of $75 million
- Shared between Industry, Federal and Provincial Governments
- Approximately 200 industrial members across Canada
- Partner with universities and other R&D institutions

Vancouver, BC

Pointe-Claire, QC

Québec, QC

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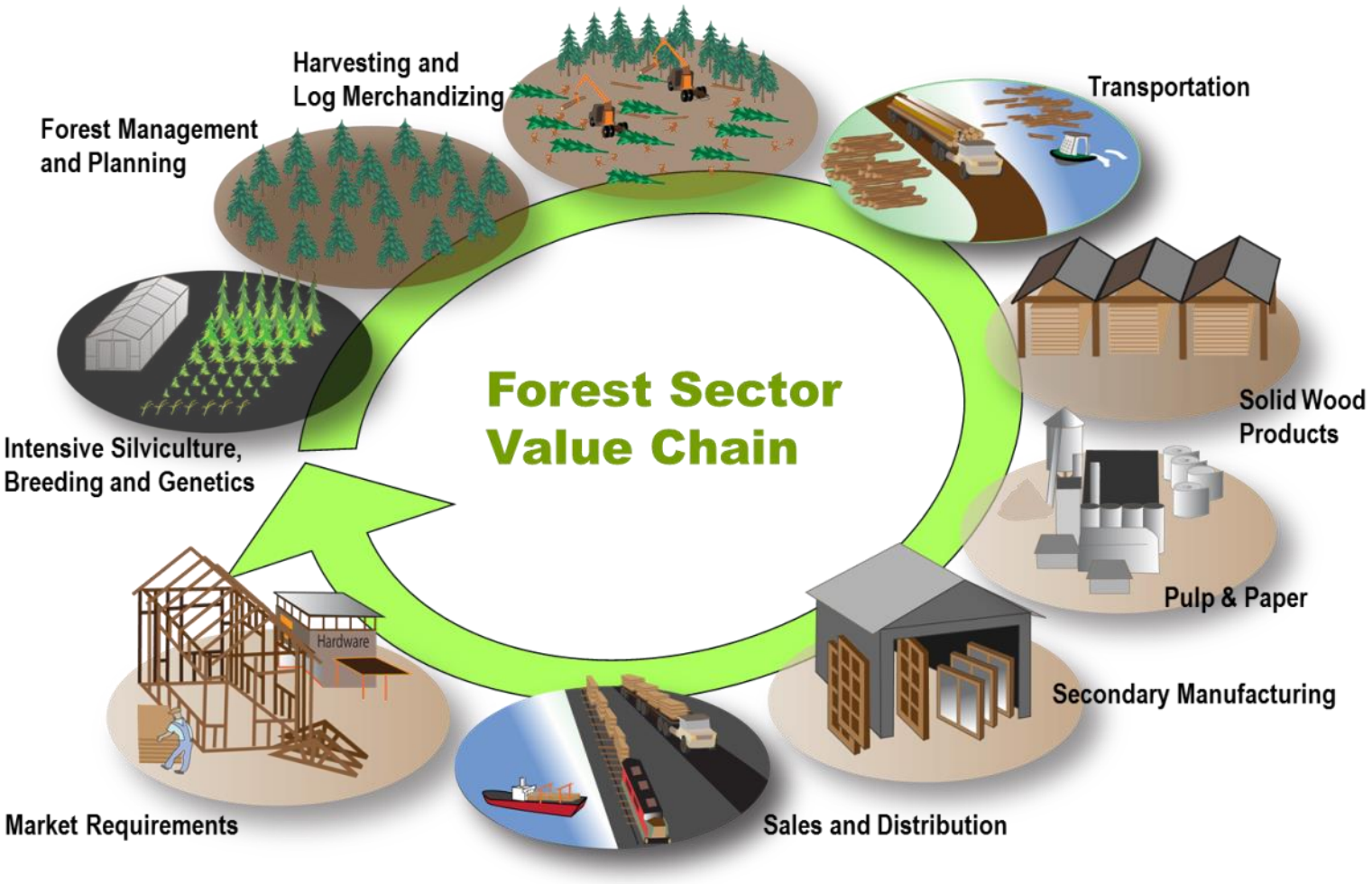
FPInnovations R&D covers the whole forest sector value chain



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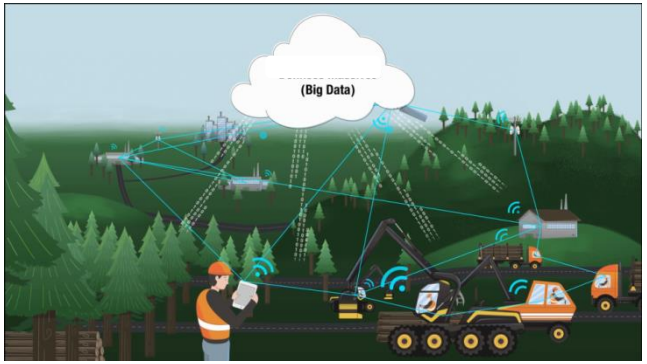
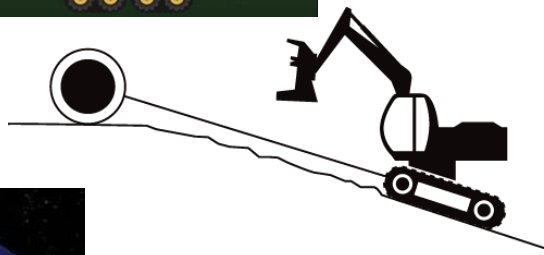
Forest Operations Key Initiatives

- Forestry 4.0
- Steep Slope Initiative
- Remote Sensing Initiative
- Transportation Initiative
- Mid Term Timber Supply
- Nova Scotia Bioeconomy Hub





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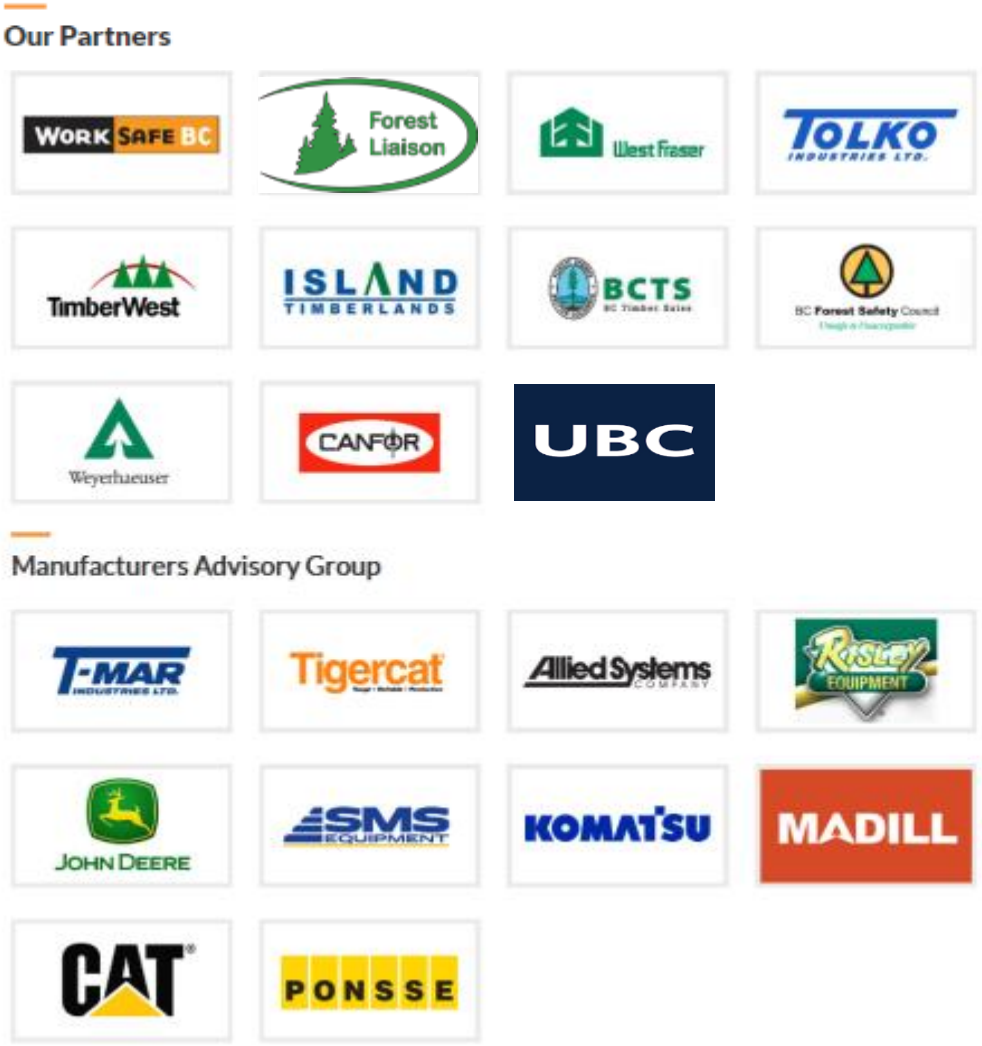
Steep Slope Initiative

- Goals:
  - Enhance worker safety
  - Improve operating margins
  - Increase accessible fibre
  - Mitigate environmental impacts
- Extensive partnerships
  - Industry
  - Manufacturers
  - Research Agencies
- Includes projects in:
  - Harvesting
  - Roads
  - Transportation



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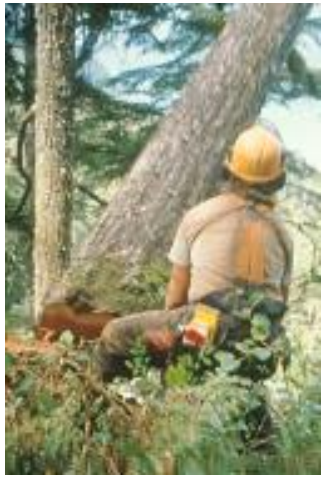
Steep Slopes

People
- Safety!
- Labour shortage

Fibre
- Harvest profile
- Fibre supply

Cost
- Expensive gear
- Increased costs

Eco-system
- Environmental



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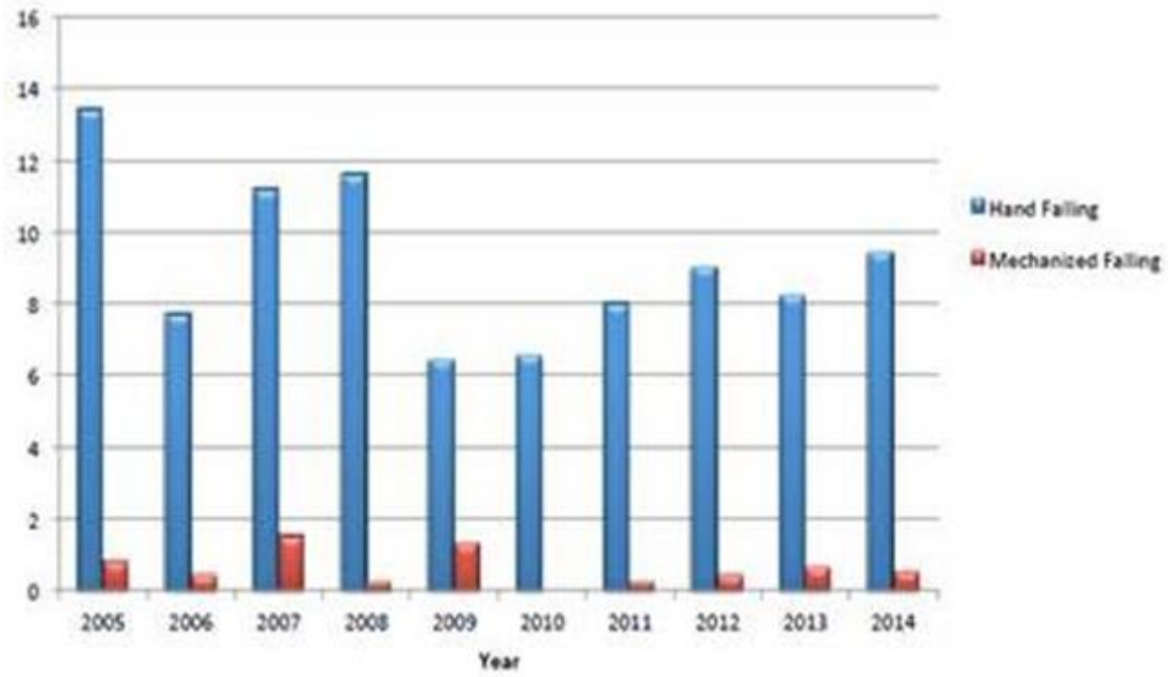
Forestry Injury Rates in BC



2015

- 29.4 - Hand-falling
- 8.0 - Silviculture
- 5.0 - Forestry
- 3.5 - Integrated logging
- 2.1 - Provincial, all industries
- 1.7 - Mechanized falling

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BC Timber Volume by Slope Class

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

Source: MFLNRO Forest Analysis and Inventory Branch

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FFE Falcon

EMS Tractionline

T-Winch

Haas/John Deere

Ponsse

HSM

ROB

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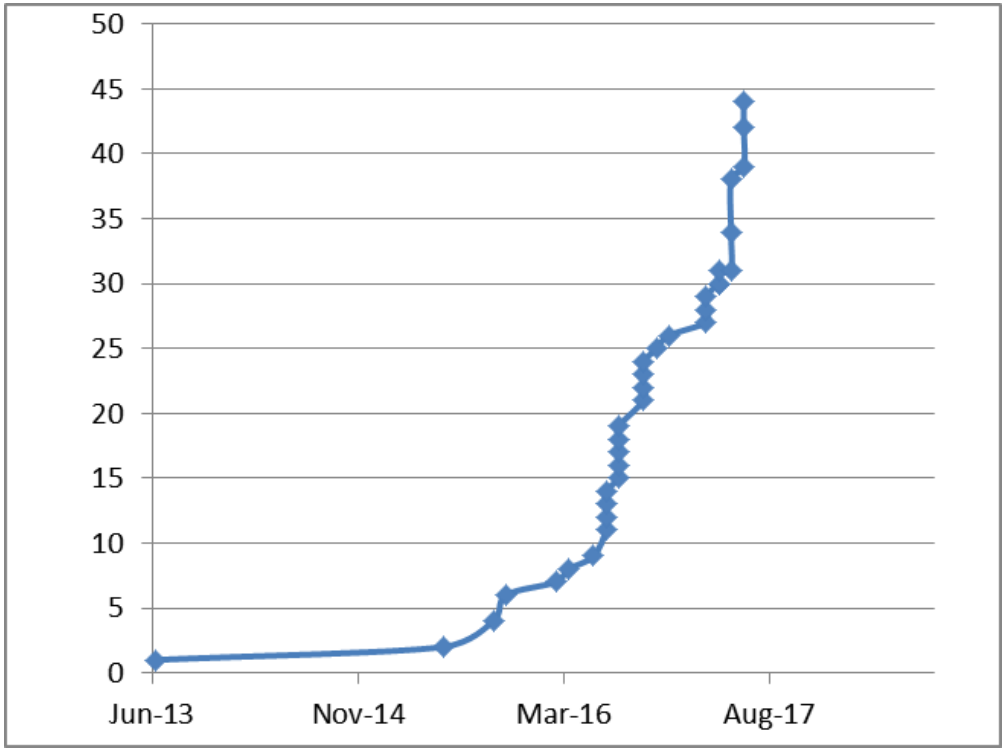
Winch-Assist Wave Hitting BC Steep Slopes

- **~50 winch-assist** machines purchased or planned in BC*
- More than **40 grapple cameras** purchased



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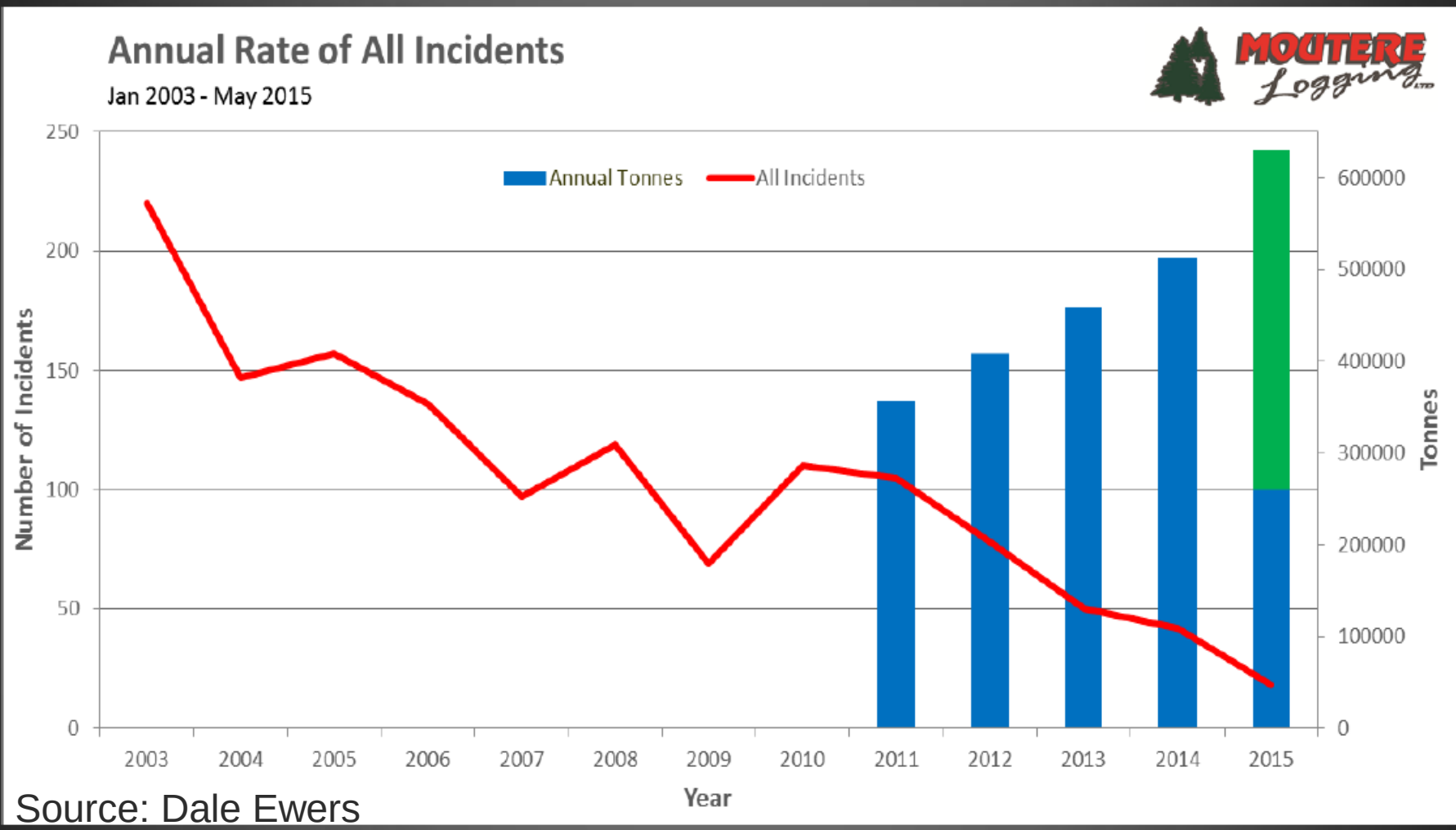
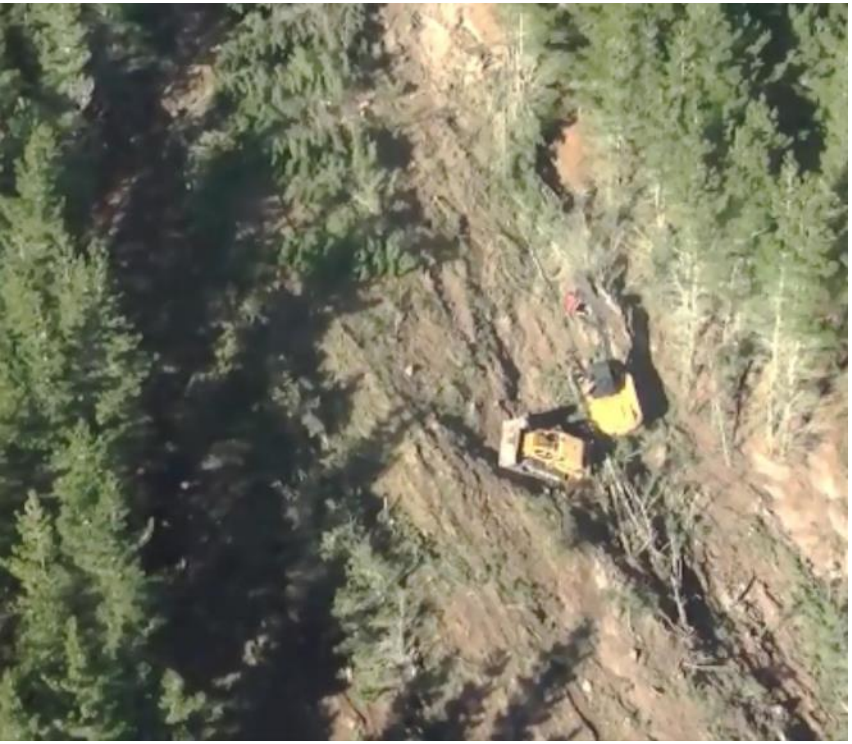
Safety developments

It Is About Our People



Source: Dale Ewers

Safety Developments



First Serious Incident

Man seriously injured in Canterbury logging incident

Last updated 09:02, June 14 2016

WESTPAC RESCUE HELICOPTER

A 23-year-old man became trapped under logging machinery near Methven on Monday.

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Safety Developments

New Zealand update:

- No serious incidents
- Continued failures of cables and connectors that are not reported
- Failures difficult to relate to triggering events

PNW update:

- No serious incidents
- Machine tip-over in Oregon
- Two known cable failures in BC

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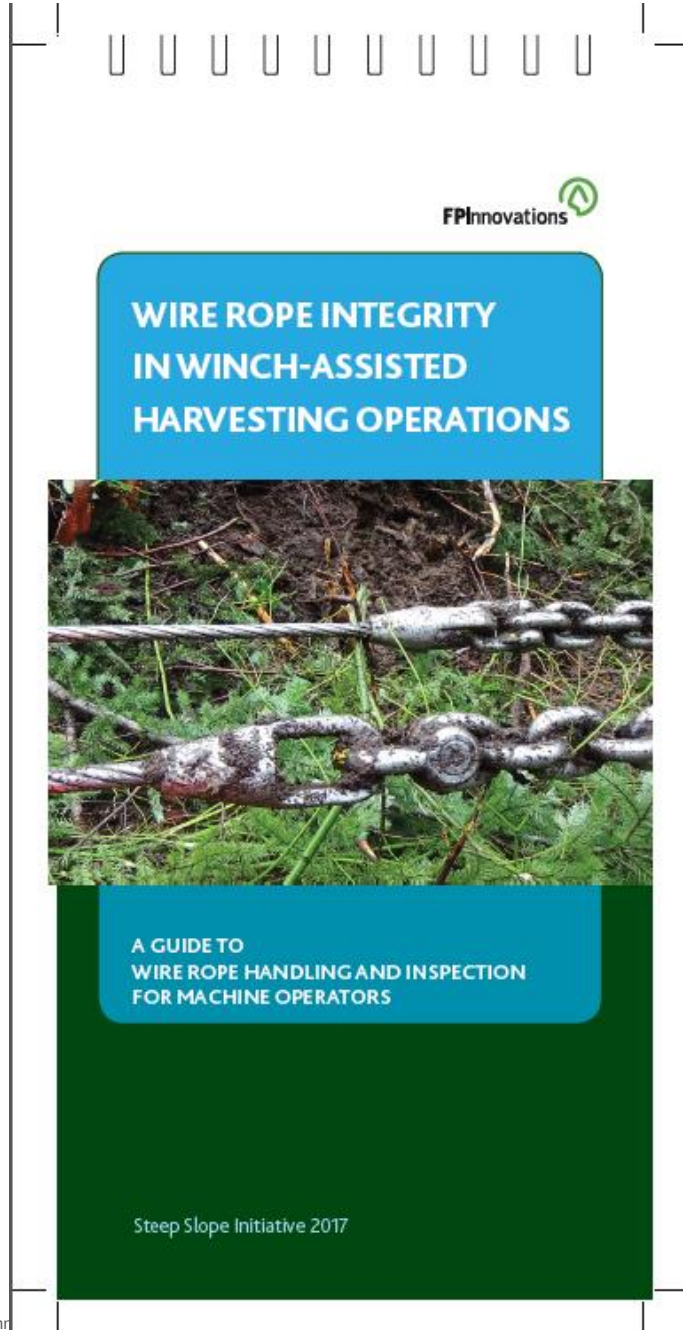
Research focus: Best Practices

- Draft doc ready – focus on safe practices
- Field visits and post-mortems
- Operator aid/s
- Planning and layout
- Upcoming workshops



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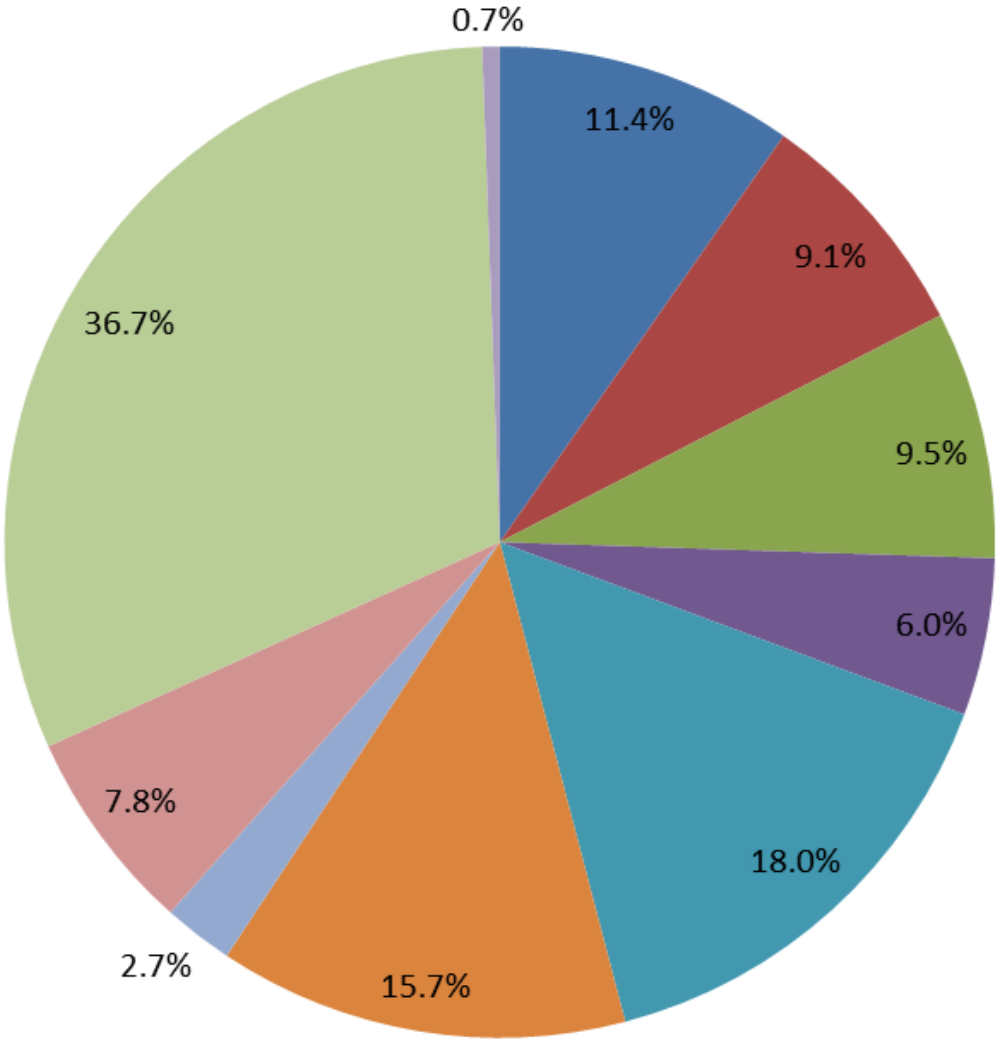
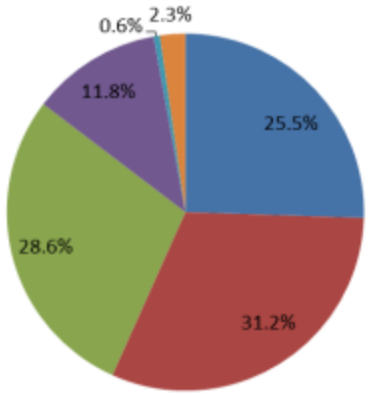
Research focus: Productivity



- Bunch
- Cut
- Swing and grab
- Shrub brush
- Travel (downhill)
- Travel (uphill)
- Operational delay
- Other
- Forward
- Line handle



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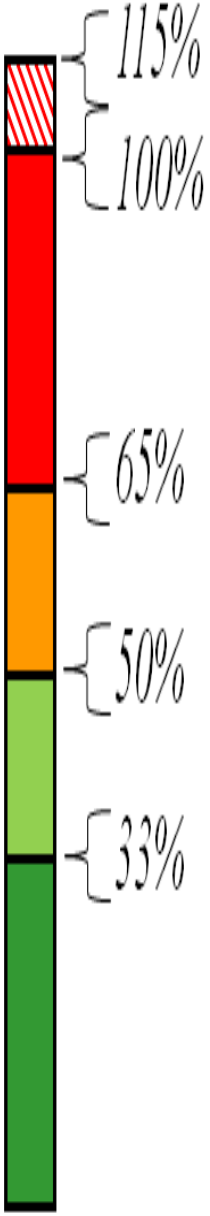
Research focus: Tension

- **Extreme tension events**:

Source: Rien Visser



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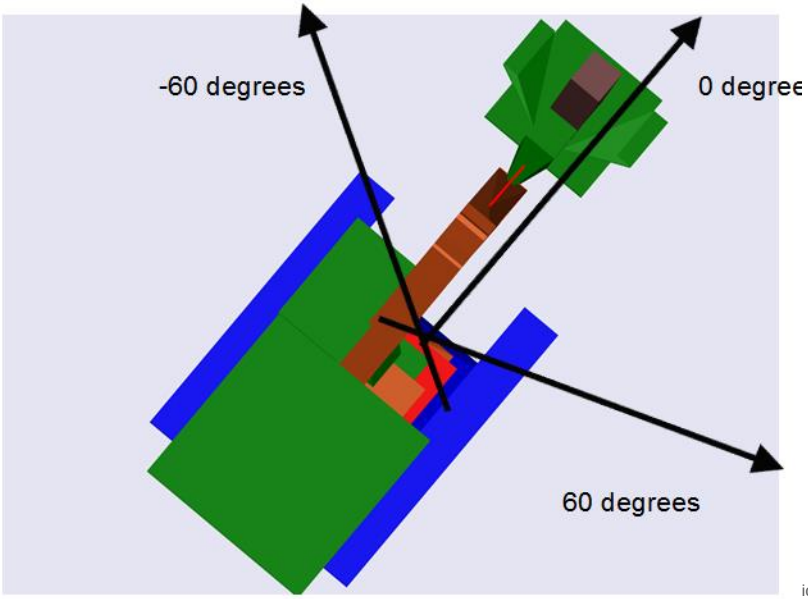
Research focus: Traction & Stability

Range of Traction Line Angles Evaluated



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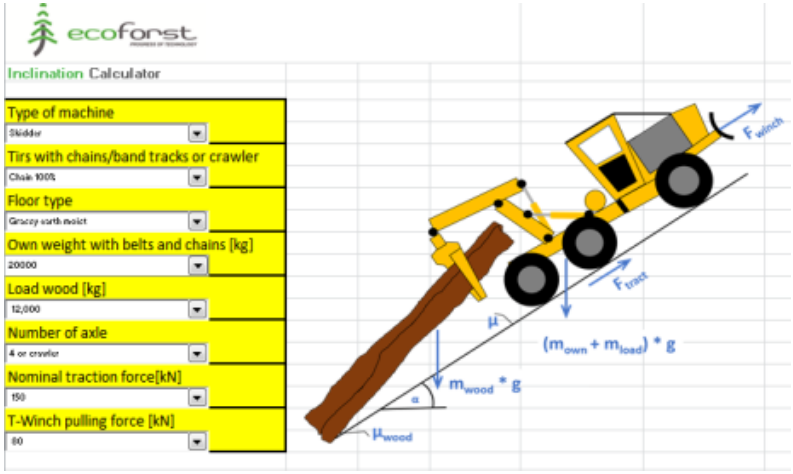
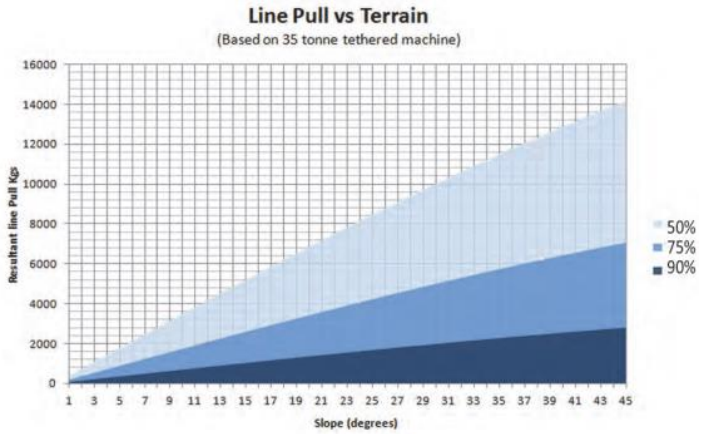
Research focus: Safe Operating Limits

- Developing BC calculator for safe operating limits
  - Coefficient of friction – soil type
  - Line tension
  - Machine Weight
  - Slope
  - Traction force





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Research focus: Anchors

- **Anchors**:

Stumps:

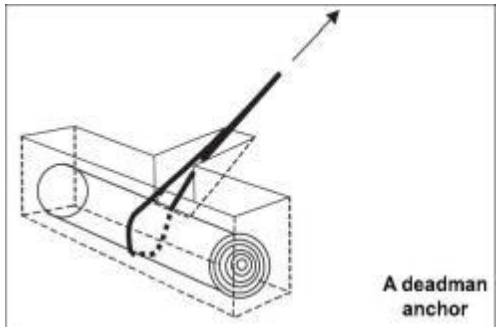
- Strong stump…or multiple stumps
- Fresh stumps, strong soils

Deadman:

- Dimensions
- Install at right angles

… Notch?

… Horizontal angle?



Source:
R.Visser 2016

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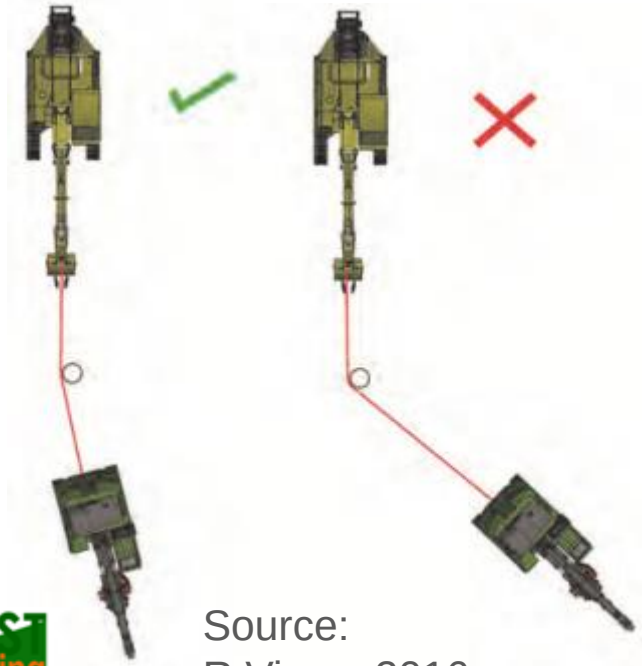
Research focus: Rub trees

- **Use trees to change direction** :
  - Tension drop through friction around tree
  - Pull over trees
  - Rope can cut / bind into the tree
  - Rope and tree heat up



Source:
R.Visser 2016

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Research focus: Environmental

- Working Group established
- Methodology discussion, remote sensing

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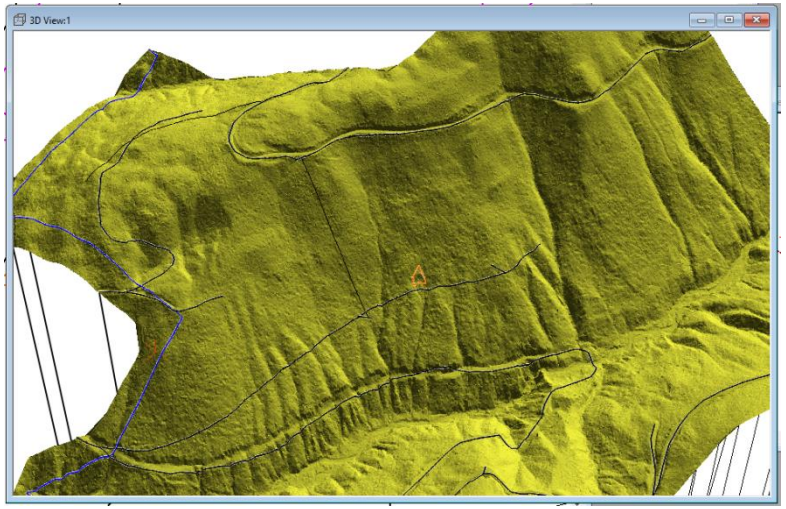
Research focus: Planning & Layout

- Winch-assists harvesting “system”
  - Equipment available
  - Felling, bunching, extracting phase
  - Planning tools (e.g. LiDAR)
- Planning considerations
  - Road and landing locations
  - Top access trails
  - Anchor points and rub trees
  - Decking space
  - Corridor lengths



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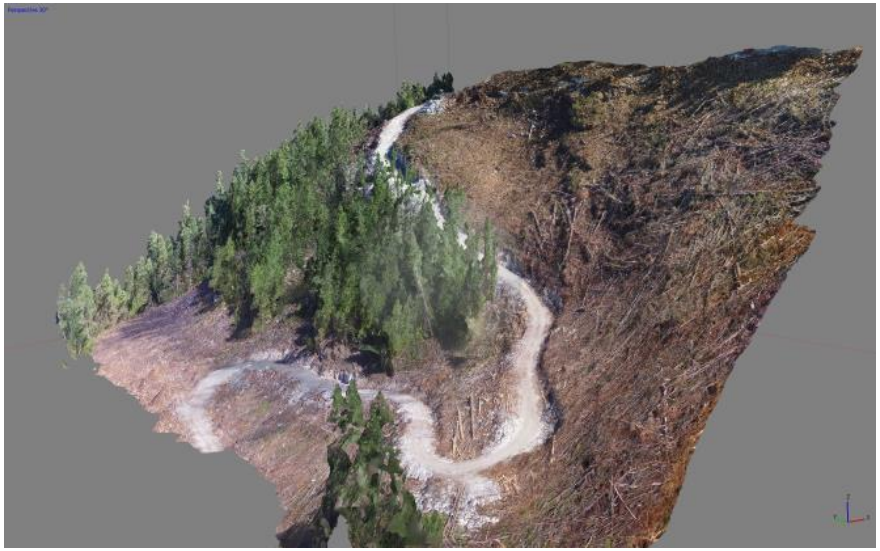
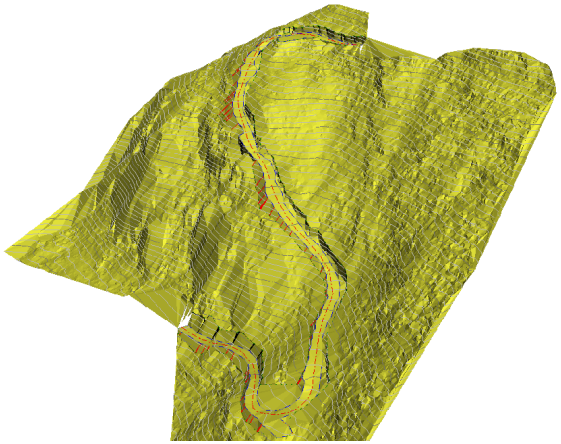
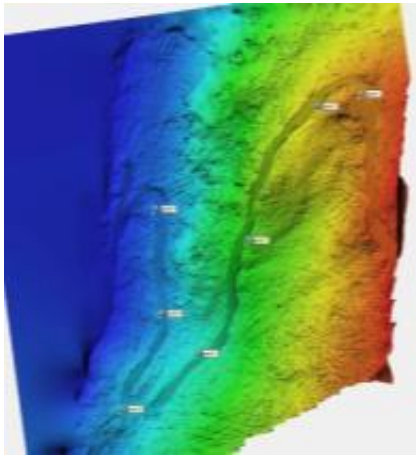
Research focus: Remote Sensing

- LiDAR and UAV assessing safety and hazards
- Steep slope road construction







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Research focus: Developing Standards

- Participate in ISO Committee
- Engaged with major international expertise on winch-assist
  - Forest Growers Research (New Zealand)
  - University of Canterbury (New Zealand)
  - Oregon State University (USA)
  - BOKU University (Austria)
  - University of Padova (Italy)
  - Manufacturers and distributors from Canada, Europe, New Zealand, USA.

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Research focus: Timber Supply

- Importance of steep slopes for utilizing full harvest profile.
- Made-in-BC solutions to accessing more fibre are evolving.
- New layout and planning are coming on-line.

Initially netted down as inoperable, but harvested with winch-assist

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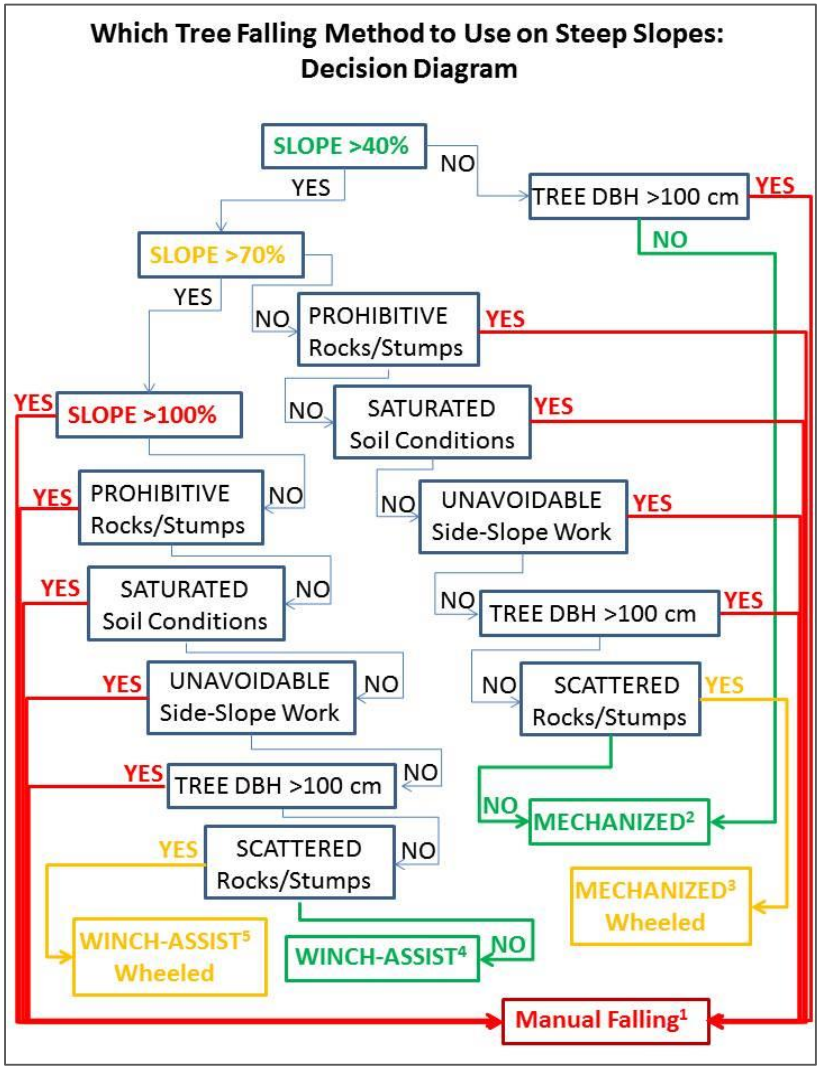
WorkSafeBC Contract:

- Analysis of challenges
  - Operator training
  - Adequate BMPs
- Comparison of methods
- Training programs



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BCFSC Units of Competencies

- Government funded
- Worker training focus
- Competency-based
- Forestry activities
  - Falling and yarding ready
  - Road building, transportation, mechanized harvesting started
  - FPInnovations assists development for winch-assist operations

Unit of Competency

Title	**Operate Feller Buncher**
Code	1092

Description	This unit is about: • Pre-work activities related to operating Feller Bunchers; • Operating Feller Bunchers; • Completing tasks post operations; and • Feller Buncher attachments.

Regulatory Requirements	It is always the responsibility of any person using these materials to inform him/herself about the Occupational Health and Safety Regulations related to the work being conducted. A full list of OHSR related to this unit can be found in the relevant package.

Prerequisite(s)	This unit has the following prerequisites: • 1002 – Describe Forest Industry • 1003 – Describe Safe Work Practices • 1004 – Communicate in the Workplace • 1008 – Describe and Apply Workplace Attributes • 1005 – Recognize, Evaluate and Control Hazards related to General Forestry • 1006 – Describe Workplace Documentation • 1007 – Describe Emergency Preparedness • 1036 – Describe Regulations and Standards

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Steep Slope Initiate Road Map Update

2015-16 Accomplishments to date

- Introduce new equip, field tests, regulator & international engagement

2016-17 Ongoing work

- Commercial availability, field tests, communications, comparison matrix, stability & traction modeling, regulator support

2017-18 Current focus (ever expanding)

- Planning & layout, science for safe operations & standards, operator training support

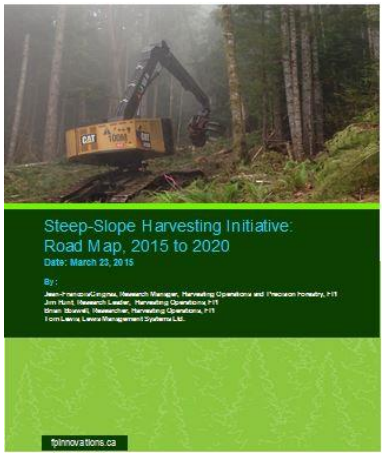
2018-19 Next year

- Decision-support tools, enhancing productivity

2019-20 and Beyond

- Automation, robotics and teleoperation introduced

Communications Strategy – ongoing



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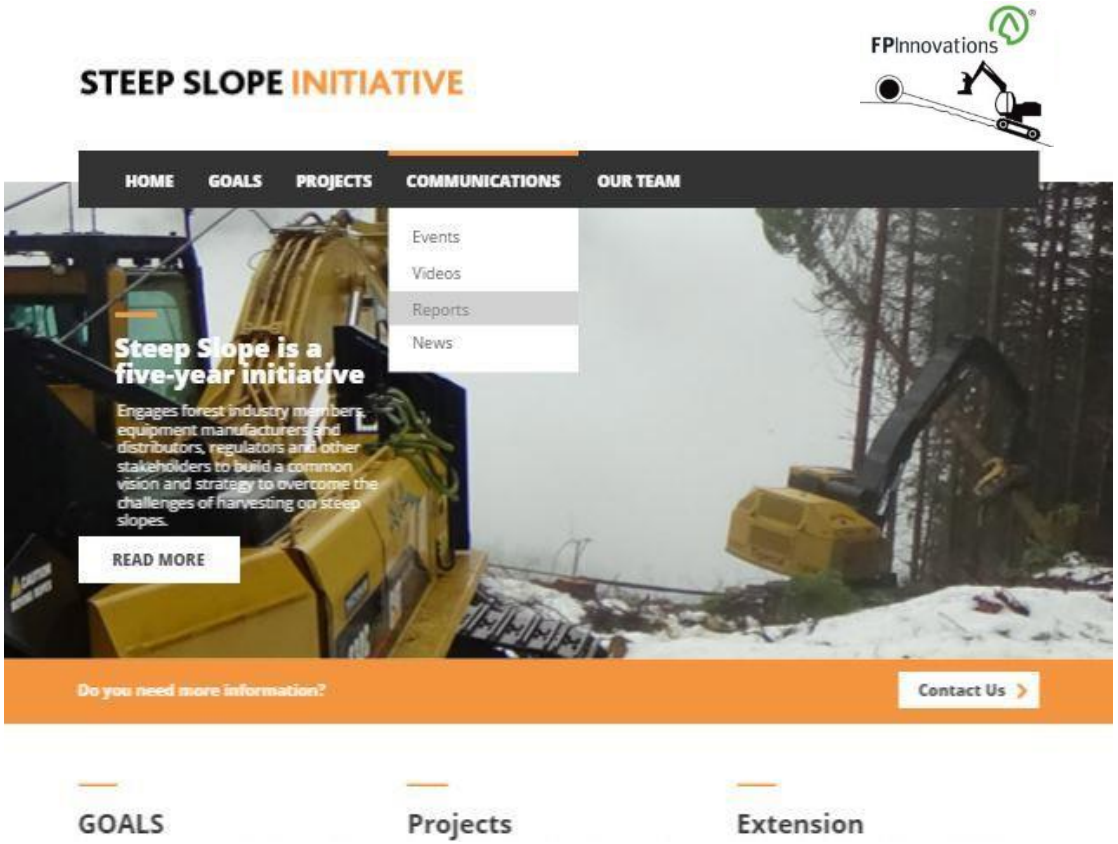
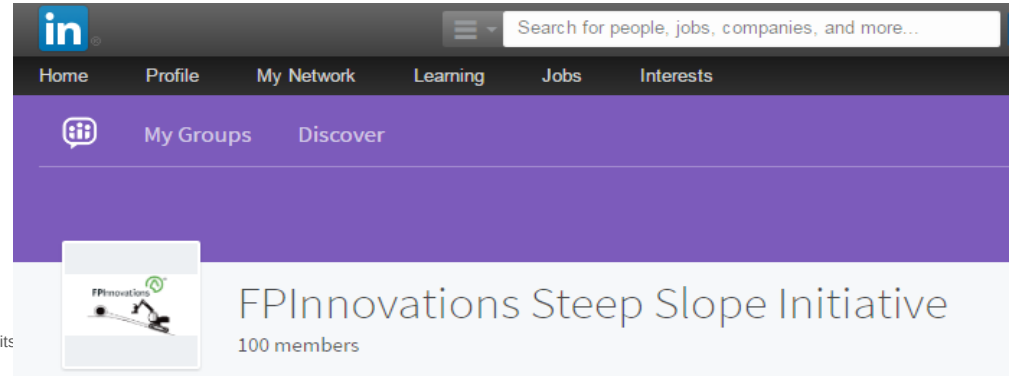
Communications



- Industry Advisors
- Website
- Newsletter
- Social Media
- Demos
- Workshops
- Videos
- Researcher presentations
- International

http://steepslopeinitiative.fpinnovations.ca/



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SUMMARY

- Winch-assist technology is evolving
- Safe practices/due diligence vital
- FPInnovations facilitates:
  - Continuous improvement
  - Information sharing
  - Develop Best Management Practices
  - Training programs
- Will provide for a **safer** industry!

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Thank you

dzhamal.amishev@fpinnovations.ca

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