Modern forest operations: a forest and human health perspective

Francisca Belart, OSU FNR Extension

State of the State 2020 Forest Health Conference
Oregon State University, February 2020
New technologies and forest health

Forest health???
- Healthy workers
- Healthy soil
- Healthy water
- Healthy trees
Tool to improve tree health?

Thinning

Why?
- Tree growth and economic value
- Species selection
- Resistance to insects and disease
- Forage production
- Forest ability to survive wildfire

Source: EC 1573-E
Thinning equipment

ASV- 12 inch diameter max cutting head

3-4 psi

Image: Youtube user https://www.youtube.com/watch?v=TuvcFUM6KAA

Photo: Davco manufacturing Ltd.
Thinning equipment

Photo Courtesy: Intermountain Wood Energy
But what if we are on steep terrain?
Tether-assist harvesters

- Harvesters usually limited to 30% slope in the past
- An effort to reduce safety hazards for timber fallers working on steep terrain and increase productivity.
- Works by connecting a mechanized harvester to an anchor using wire rope.
Tether-assist harvesters

• The anchor can be a stationary base machine with a winch or a fixed structure (stump or tree), in which case the harvester has an internal winch.

• The wire rope provides traction and gradeability assistance allowing these equipment to work in steeper terrain.

• High productivity - Pre-bunching.
SAFETY CONSIDERATIONS

• Pros
  • Less exposure to falling trees, protected in cab.
  • More access to steep terrain and improved productivity.

• Cons
  • Potential sliding, toppling hazard.
  • Need experienced operator.

SOIL AND SITE CONDITIONS

• Pros
  • Potential to reduce soil impacts with cable assistance.
  • Potential to improve equipment mobility.

• Cons
  • Heavy equipment on slopes can result in more disturbance, compaction and rutting if not careful.

A Balancing Act of Priorities

 Courtesy: Ben Leshchinsky
Series of field tests performed, monitored ground pressures.
No Tension

Facing Downhill Boom In
Facing Uphill Boom In
Facing Uphill Boom Out
Facing Uphill Leveling
Facing Downhill Boom Out

Pressure (psi)

Time (s)

Courtesy: Ben Leshchinsky
10 Tons of Tension

Facing Downhill Boom In
Facing Uphill Boom In
Facing Uphill Boom Out
Facing Uphill Leveling
Facing Downhill Boom Out

Pressure (psi)

Time (s)

Courtesy: Ben Leshchinsky
Trees, soil and water

- We know new technology can help us manage the forest
- We are still learning about effects on soil in steep terrain mechanized harvesting
  - pressure
  - disturbance
  - it is highly dependent on soil type
- Work is being done to learn about the effects on water quality (Woody Chung)

How about people?
Timber Faller Safety on Integrated Mechanized Operations in Steep Terrain

Francisca Belart, Mandira Pokharel

Oregon State University
Background

Timber falling fatal occupation

73-85% of the fatal occupational injuries within logging workers in the U.S.*

Mechanization on steep terrain

- Replaces hand falling
- Helps with labor shortage

Background – logging workforce

Washington State

1992
- 11% 14-24
- 18% 25-44
- 10% 45-54
- 1% 55-64
- 60% 65-99

2017
- 8% 14-24
- 39% 25-44
- 23% 45-54
- 7% 55-64
- 23% 65-99

Before

Now

Source: U.S. Census Bureau, Center for Economic Studies, LEHD data extracted 5/8/2019
We still need people on the ground!
What do we want to know?

Are timber fallers consistently working in more difficult terrain when working in mixed tether operations?
How we want to do it?

- **Before**
  - Slope (percentage)
  - Tree diameters (inches)
  - Soil (shallower? Rockier?)
  - Timber hazards, snags?

- **After**
  - Harvesting equipment
What do we expect?

How much is being hand felled?
Why? (too steep, soil too shallow, sensitive area, etc)
Are hand felled areas steeper?
Do hand felled areas present more hazards?
Are there any measures that need to be implemented in BMP’s?

What’s next?

Worker fatigue, specific hazards
Thanks for your attention!

Francisca Belart, OSU FNR Extension

State of the State 2020 Forest Health Conference
Oregon State University, February 2020