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

https://www.for.gov.bc.ca/hre/standman/images/92201_unthinned.jpg

https://bugwoodcloud.org/images/768x512/0976027.jpg

Thinning equipment

ASV- 12 inch diameter max cutting head

Photo: Davco manufacturing Ltd.

Image: Youtube user https://www.youtube.com/watch?v=Tuvc5FUM6KA

3-4 psi

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.


Herzog Synchrowinch


PONSSE

A Balancing Act of Priorities

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.

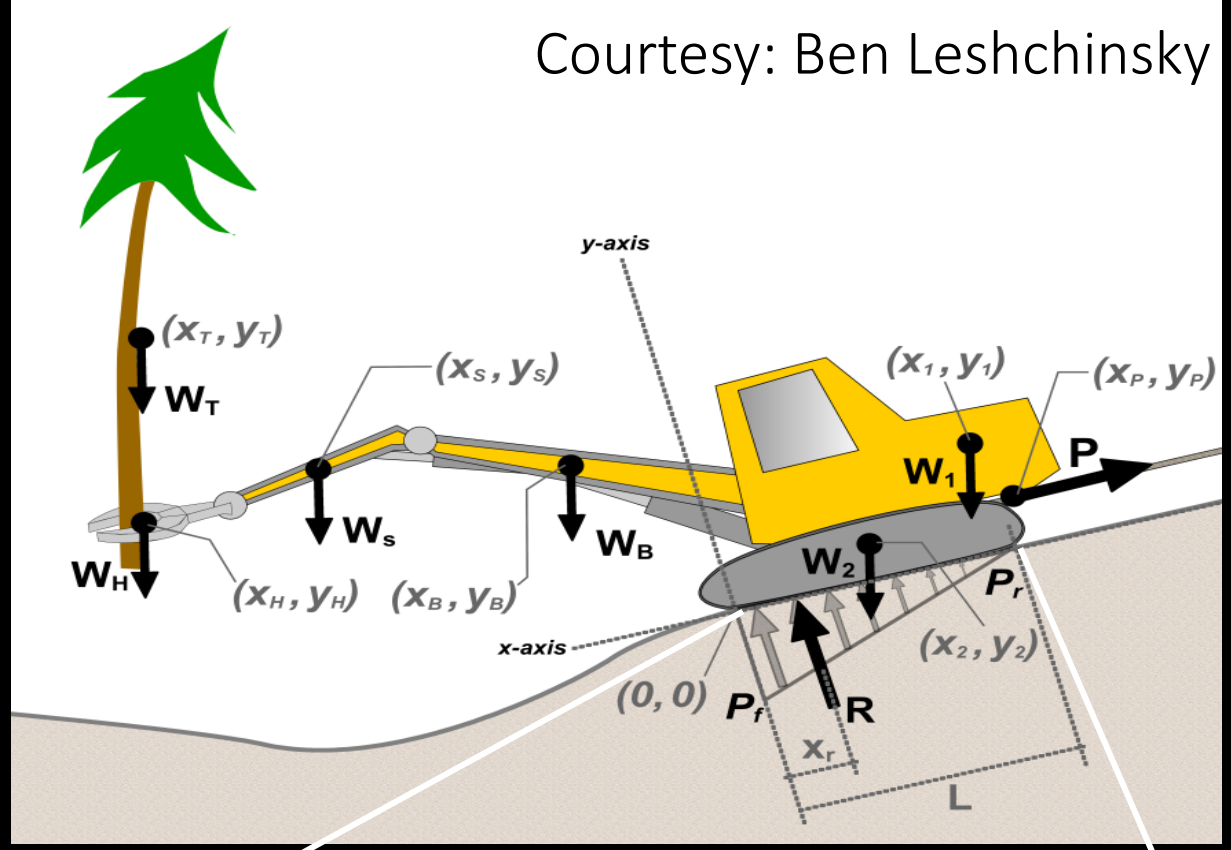
SOIL AND SITE CONDITIONS

- 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.

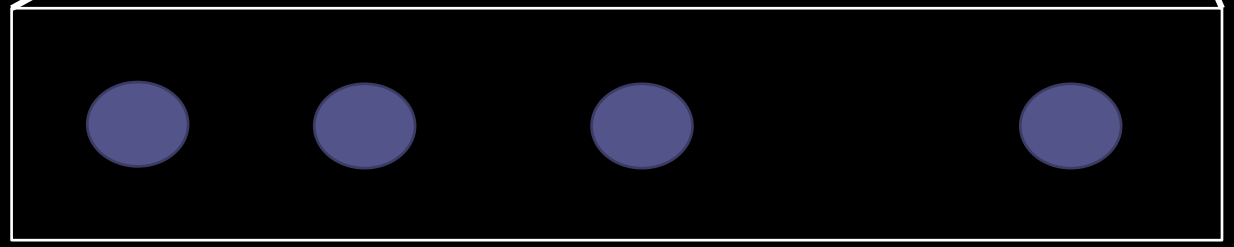
Courtesy: Ben Leshchinsky

Series of field tests performed, monitored ground pressures.

Courtesy: Ben Leshchinsky



Pressure Cell Layout



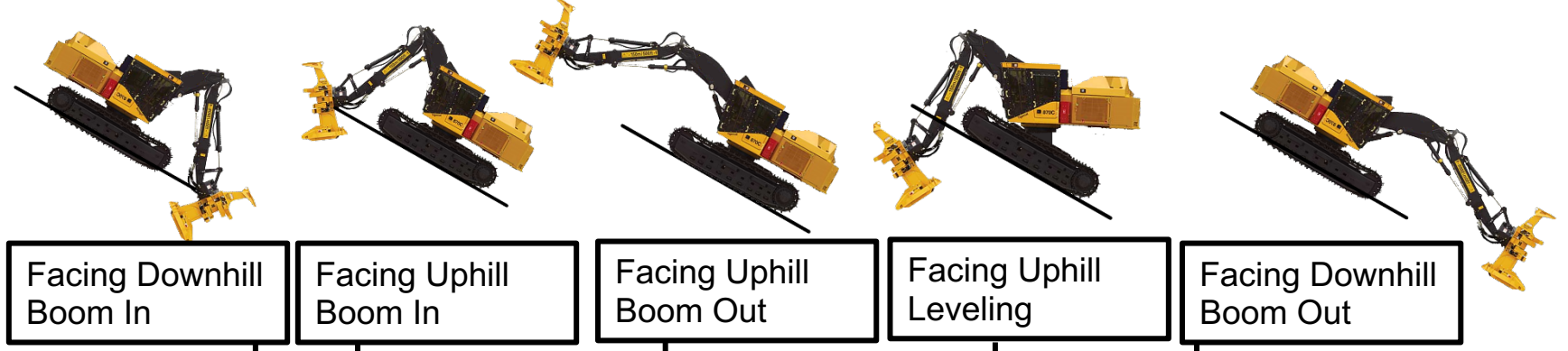
Bottom

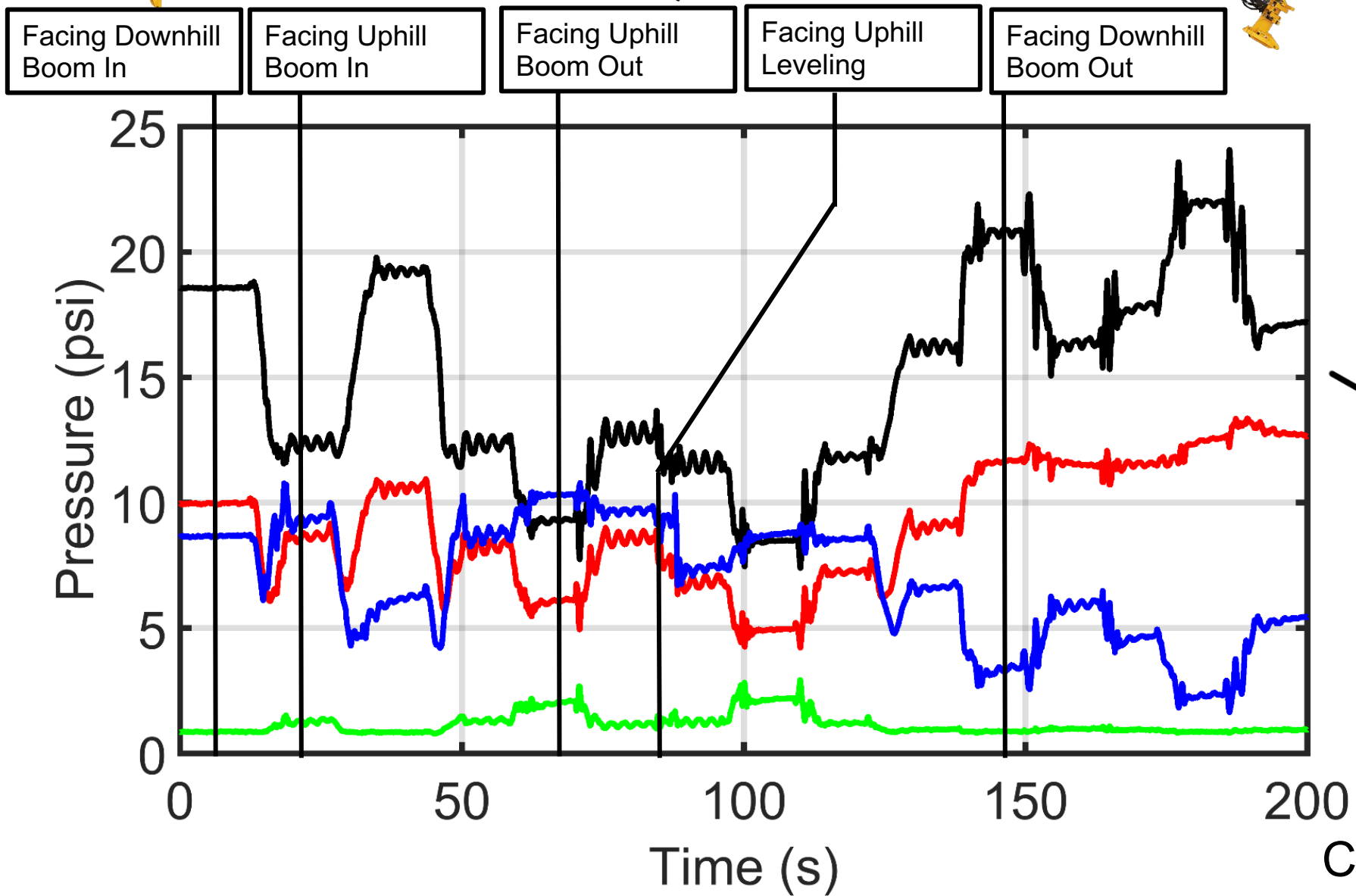
Mid-Top

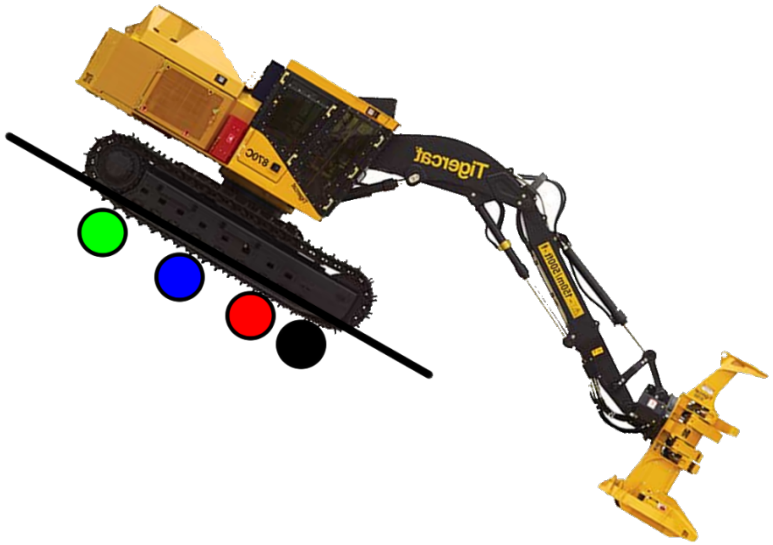
Mid-Bottom

Top

No Tension

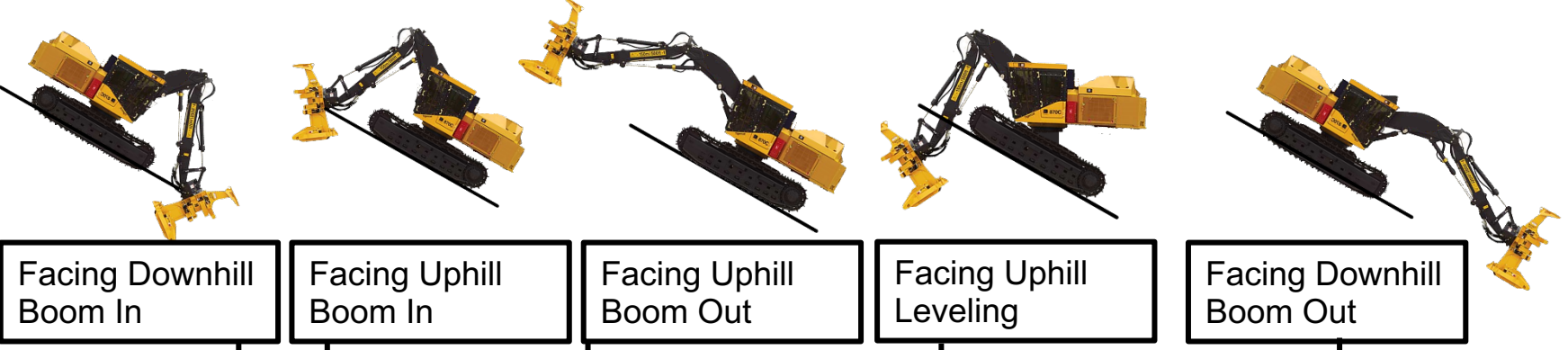


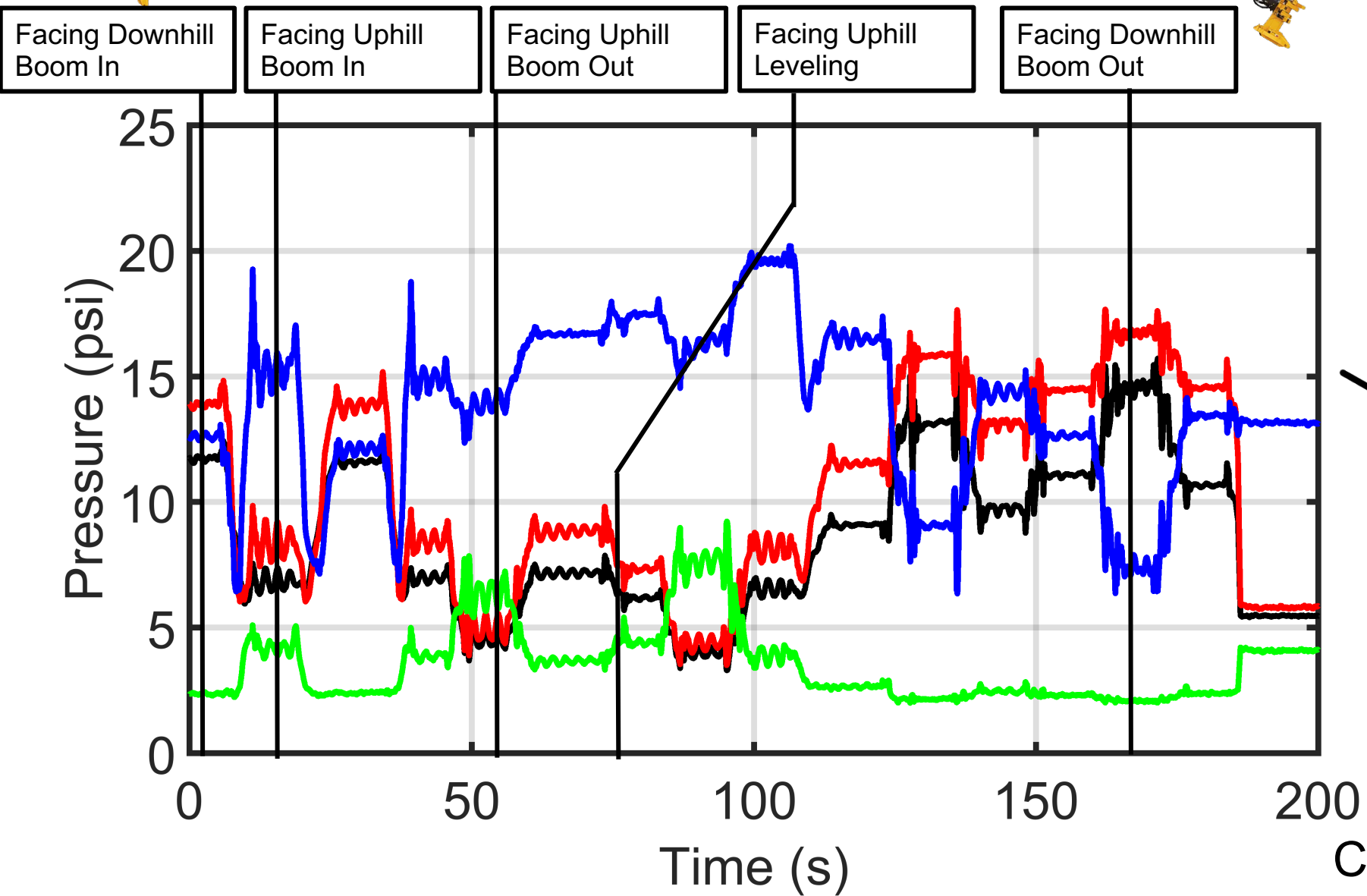


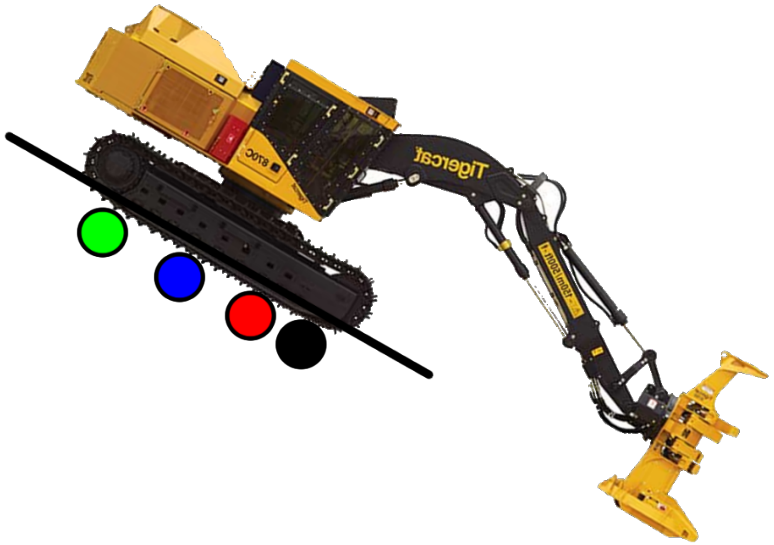


Courtesy: Ben Leshchinsky

10 Tons of Tension







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

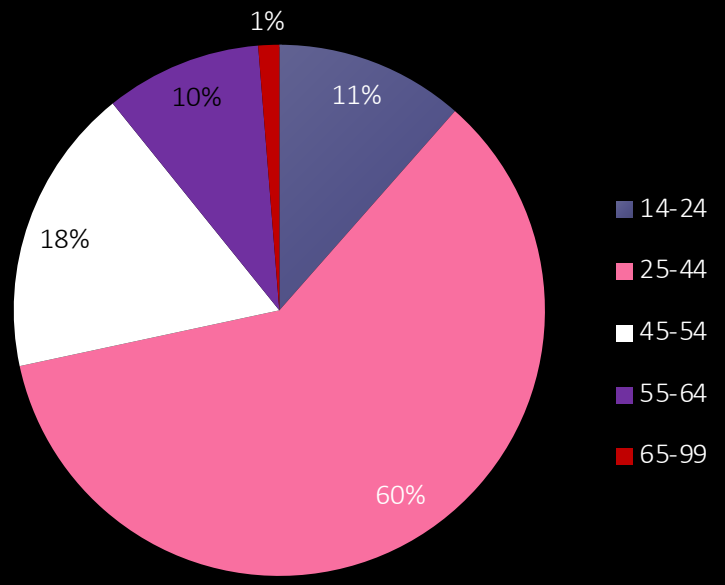
- *Replaces hand falling*
- *Helps with labor shortage*

*Source: BLS database, 2019. Period 2011-2017.

Background – logging workforce

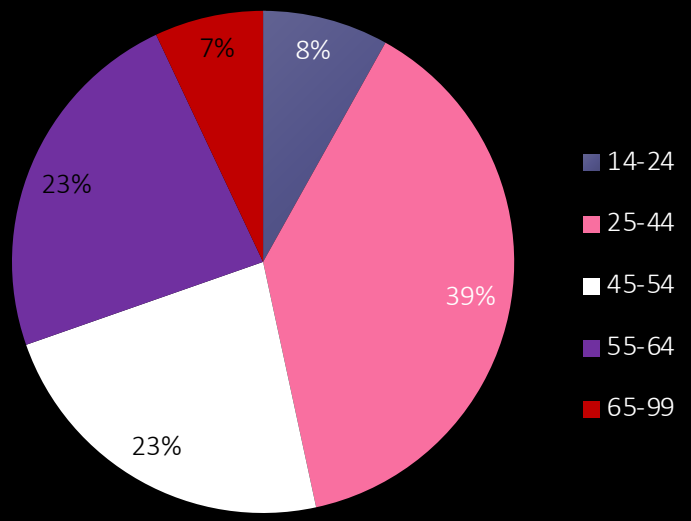
Washington State

1992



Before

2017



Now

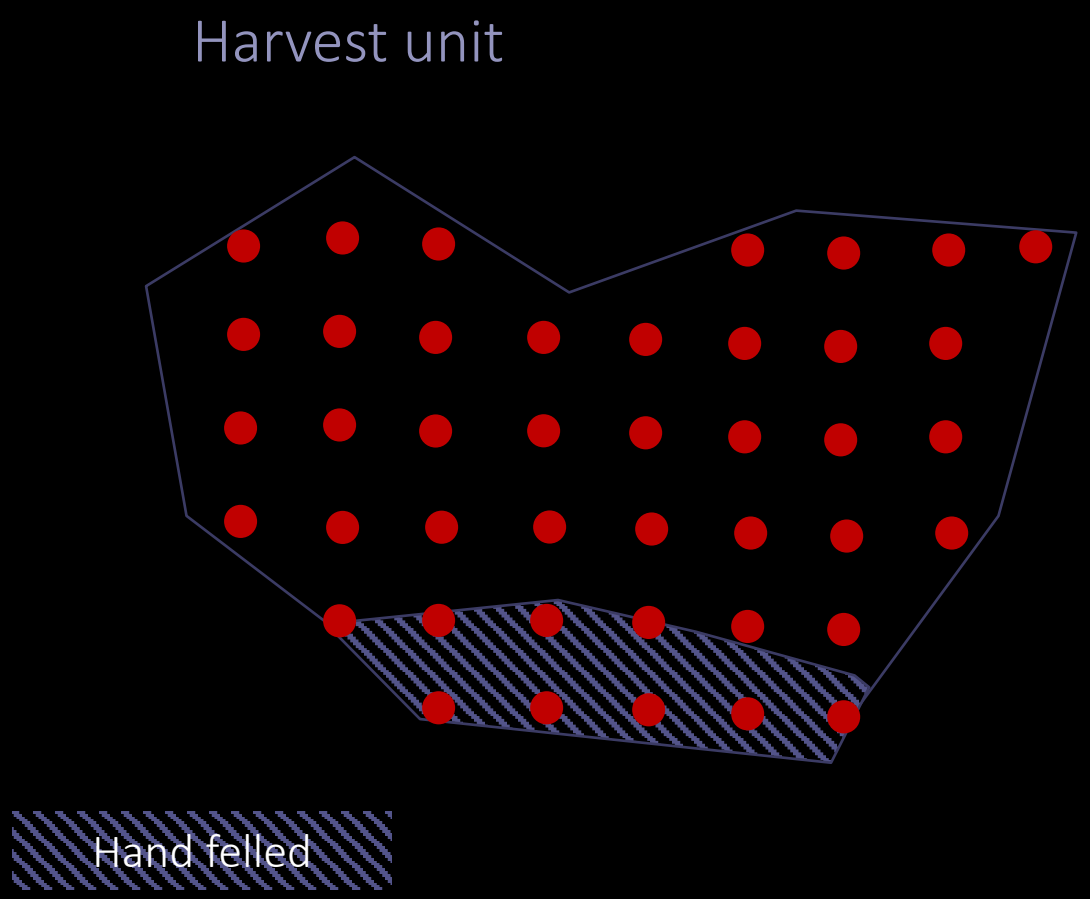
Source: U.S. Census Bureau, Center for Economic Studies, LEHD data extracted 5/8/2019


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!

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