

Harvest Systems

Objectives for the Day

- Begin reviewing the harvest process
- History of harvesting

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Thursday Lab

- **Lab report is due on the following Monday in class.**
- **I expect a well written summary of the field visit.**
- **It should be about 2 pages, double-spaced, 12 font.**
- **In order to write a good report you need to pay attention and ask questions.**

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The Harvesting Process

- Must be viewed as a system:
 - a system can be defined as a group of inter-related persons, objects, and events that all contribute to a common objective
 - for harvesting systems, the system objective is log transportation.

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Differences In Harvesting Systems

- There are many different types of harvesting systems and few systems are adaptable to all harvesting areas
 - type and amount of timber
 - terrain associated with that site
 - acceptable level of capital investment
 - supply of skilled labor
 - silvicultural prescription

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Classification of Harvesting Systems

- material form hauled to delivery point
 - *pulpwood* systems
 - *sawtimber* systems
 - *chipping* systems
 - combination
- degree of mechanization
 - *partially mechanized* - at least one function that is performed manually or with hand tools
 - *fully mechanized* - all functions are performed by machines

Classification of Harvesting Systems, continued

- equipment used to transport from stump to landing
 - *ground-based* systems
 - *cable* systems
 - *aerial* systems

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Phase

Function

Element

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The Four Phases

1. Processing
2. Moving
3. Loading
4. Hauling

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The Processing Phase

- Function of Felling
 - chainsaw felling (manual)
 - feller-buncher (mechanical)
 - harvesters (mechanical)
- Function of Delimiting
 - chainsaw delimiting (manual)
 - stroke-delimiter (mechanical)
 - harvesters (mechanical)
- Function of Bucking & Topping
 - chainsaw bucking and/or topping (manual)
 - slasher (mechanical)
 - harvesters (mechanical)

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Elements

- Each function can be subdivided into elements.
- Elements correspond to the activities that are repeated each time a function is carried out.
- Elements describe a single cycle of the function.

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Example Elements

- Function of Felling
 - move to tree
 - plan direction of fall
 - start saw
 - swamp out
 - cut notch
 - cut backcut
 - delays
- Function of Skidding
 - travel empty
 - make-up/hook-up load
 - travel loaded
 - unhook
 - delays

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The Moving Phase

- Function of Skidding (dragging the “logs”)
 - Horses
 - Crawler Tractors
 - Rubber Tire Skidder
 - cable skidder
 - grapple skidder
 - clam-bunk skidder
- Function of Forwarding (carrying the “logs”)
 - Wagon
 - Forwarder
- Function of Yarding
 - Cable Yarding
 - highlead
 - skyline
 - Aerial Yarding
 - balloon
 - helicopter

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The Moving Phase

- Wheeled equipment 30% slope limitation
- Tracked machines can work up to 50%
- Forwarders have high center of gravity and limited to 30%
- Clambunks are most stable, can go to 60%

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The Loading Phase

- Mobile Loaders
 - Front-end loaders
- Hydraulic Loaders
 - Knuckleboom
 - Heelboom

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The Hauling Phase

- Trucking
 - Tandem-axle
 - Tri-axle
 - Tractor-trailer combination
 - pole trailer
 - chip vans
 - Off-highway trucks
- Rail
- Water

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