



Raw Timber Production - overview

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Contents and Goals

- After this section you will know:
 - What are the phases of timber production process
 - What happens during which phase of the timber production process
 - What happens on which harvesting location
 - How timber harvesting methods differ from one another
 - How to choose an optimal technology for particular conditions

Forest Harvesting

- Deals with extracting and marketing of products from forests
- Includes logging, extraction, haulage, conversion and marketing of forest products
- Includes ALL forest products (e.g. non-timber forest products)
- Application of silviculture and management into practice
- Provides income for the forest enterprise
- Most demanding activity regarding technology, machinery, economy, and work organization

Timber Production Locations

- Stump
- Skid trail
- Roadside Landing
- Conversion depot



- Production phases and operations
 - Logging
 - Felling, Limbing, Debarking, Bucking
 - Extraction
 - Removal, Skidding (yarding, forwarding), Piling
 - Haulage
 - Loading, Driving, Unloading
 - Handling
 - Scaling, Grading, Sorting, Bucking, Splitting, Piling

Timber Harvesting Methods

- Whole Tree Method
- Tree Length Method
- Cut-To-Length Method



CTL Method: Operation Localization

- Stump
 - Logging: Felling, Delimiting,
 - Handling: Scaling, Grading, Bucking,
 - Extraction: Removal (H tech.) – Bunching at the skid trail
 - Product: Assortment
- Skid trail
 - Extraction: Skidding (Yarding, Forwarding, etc.)
 - Product: Assortment
- Roadside
 - Haulage: Piling, Loading, Driving, Unloading
 - Product: Assortment
- Conversion depot
 - Handling: Scaling, Grading, Sorting, Bucking, Splitting, Piling
 - Product: Assortment

CTL Method: Technologies

Motor-manual

- Felling, Delimiting
 - Chain Saw
- Removal
 - Horse, Iron Horse, Winch
- Extraction
 - Horse (small distances), Skidder
- Haulage
 - Logging Truck

Fully mechanized

- Felling, Delimiting
 - Harvester
- Removal
 - Harvester, Forwarder
- Extraction
 - Forwarder
- Haulage
 - Logging Truck

WT Method: Operation Localization

- Stump
 - Logging: Felling
 - Product: Full tree
- Skid trail
 - Extraction: skidding (yarding)
 - Product: Full tree
- Roadside
 - Haulage: Delimiting, Bucking, Piling, Loading, Driving, Unloading
 - Product: Full tree, Assortment
- Conversion depot
 - Handling: Delimiting, Bucking, Scaling, Grading, Sorting, Piling, Splitting,
 - Product: Assortment

WT Method: Technologies

- Felling, Delimiting
 - Chain Saw, Feller Buncher, Feller Skidder
- Removal
 - Horse (small volumes), Iron Horse, Winch
- Extraction
 - Horse (small distances, small volumes), Skidder
- Haulage
 - Logging Truck

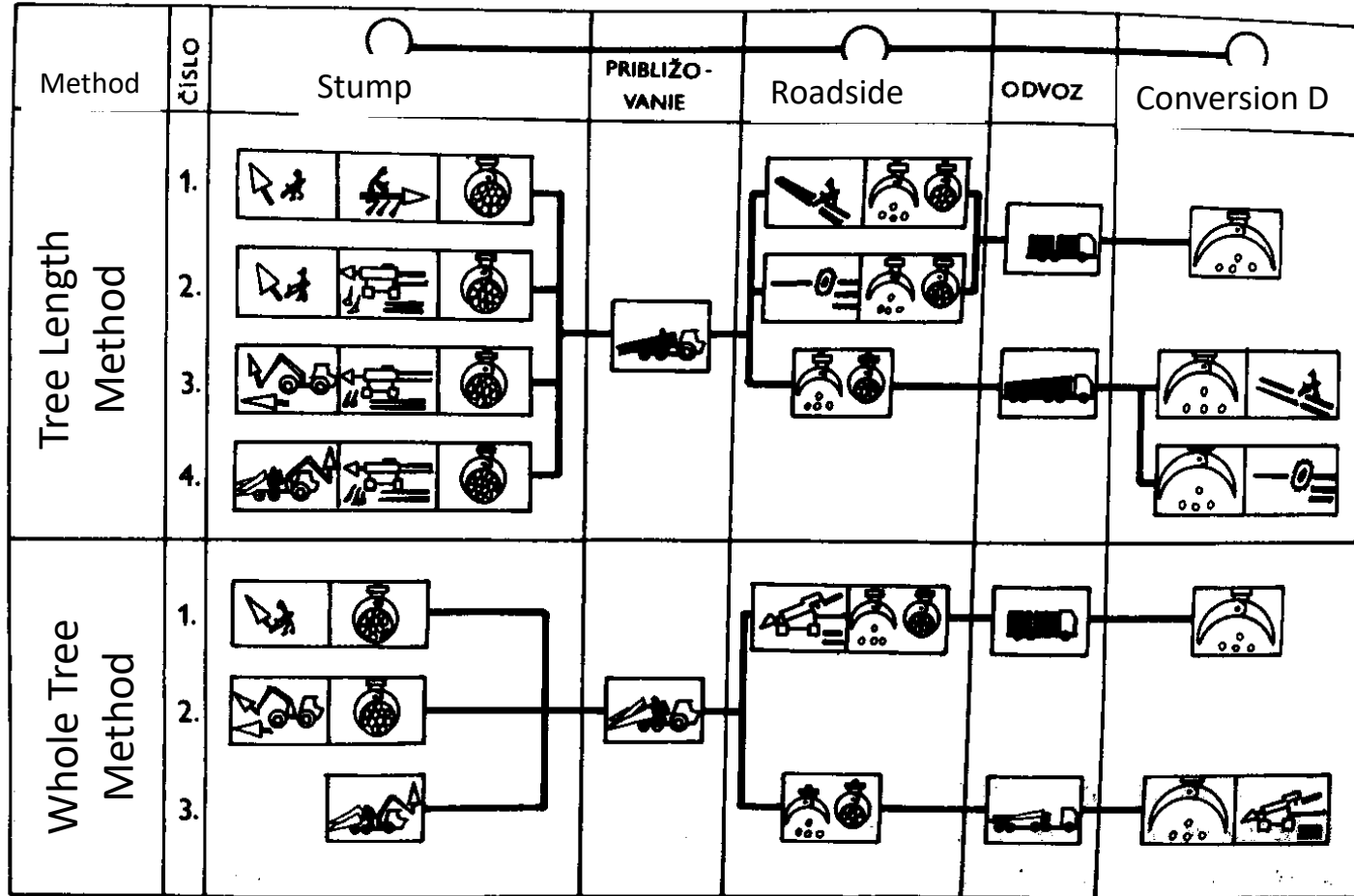
TL Method: Operation Localization

- Stump
 - Logging: Felling, Delimiting
 - Product: Stem (topped)
- Skid trail
 - Extraction: Skidding (Yarding)
 - Product: Stem (topped)
- Roadside
 - Haulage: Piling, Bucking, Loading, Driving, Unloading
 - Product: Stem (topped), Assortment
- Conversion depot
 - Haulage: Unloading
 - Handling: Bucking, Scaling, Grading, Sorting, Splitting, Piling
 - Product: Assortment

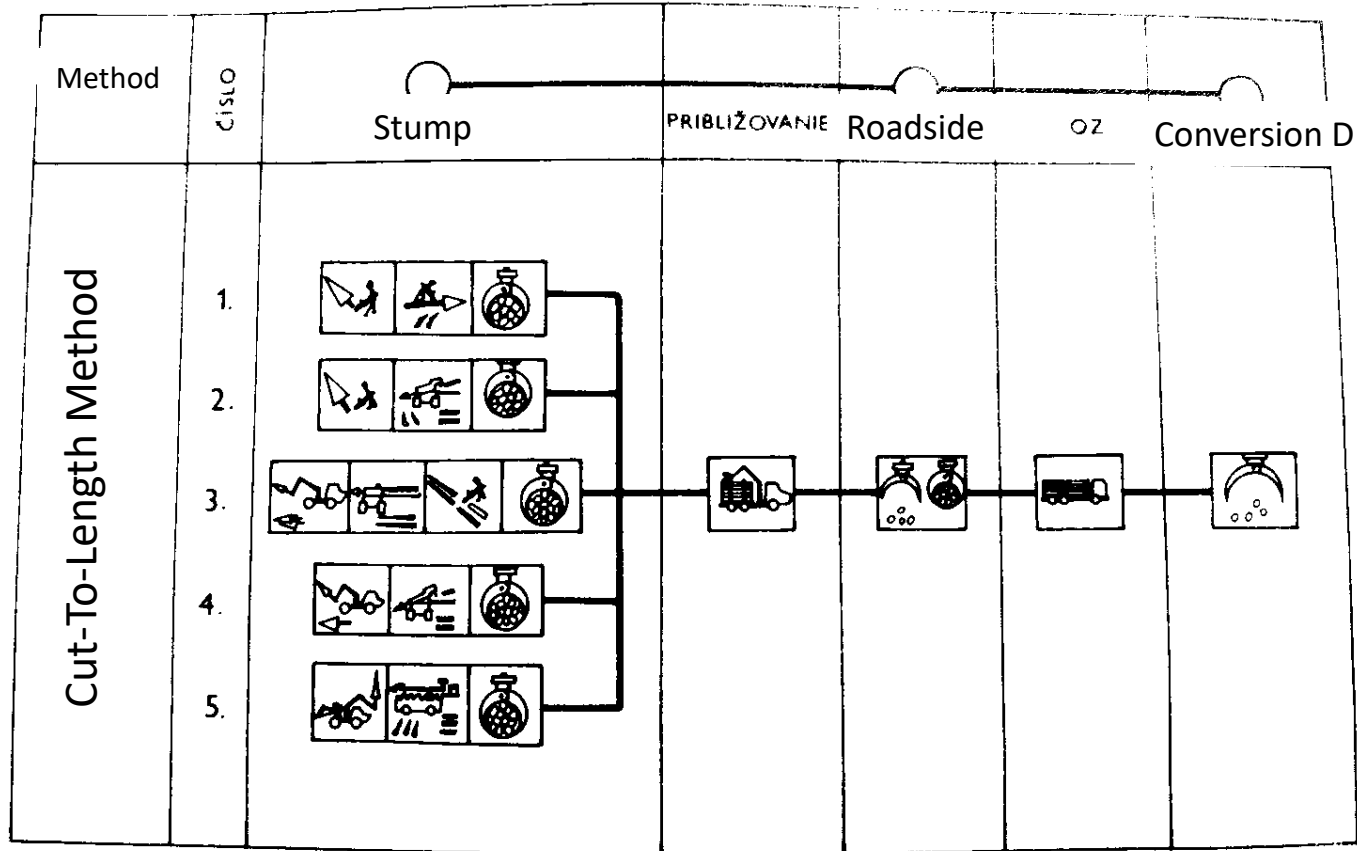
TL Method: Technologies

- Felling, Delimiting
 - Chain Saw, Feller Buncher, Feller Skidder
- Removal
 - Horse (small volumes), Iron Horse, Winch, Forwarder
- Extraction
 - Horse (small distances, small volumes), Skidder, Forwarder
- Haulage
 - Logging Truck

A Handy Chart for Technology Selection



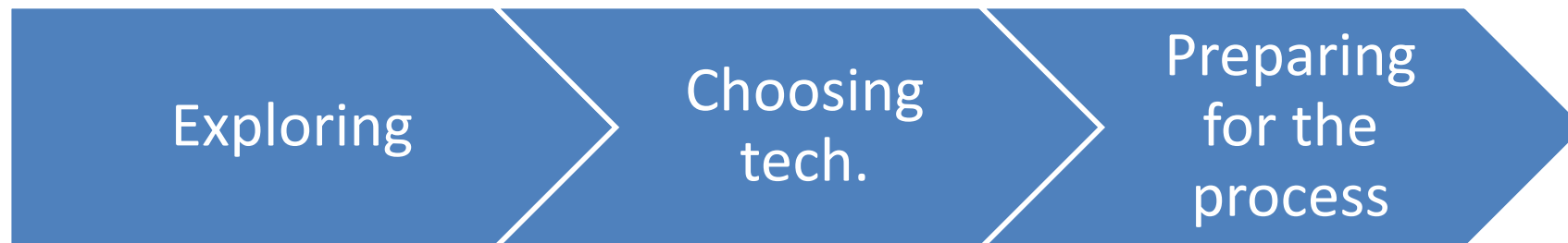
A Handy Chart for Technology Selection



OPTIMIZING THE PROCESS

Preparation of the production

- We prepare to:
 - Choose the optimal technology
 - Prepare the stand for the technology
 - Choose the optimal squad size and composition
 - Prepare a timetable



Logging Exploration

- Fixed factors
 - Slope,
 - Terrain,
 - Climate (season, precipitation, wind)
- Long-term variable factors
 - Intensity of the cut,
 - Timber concentration, Workplace concentration
 - Tree species, size, shape
- Short-term variable factors
 - Road density and quality,
 - Extraction distances,
 - Landing localization

Technology for particular natural conditions

Slope (%)	Surface			Obstacles
	Bearable		Unbearable	
	Permanently	Conditionally		
<=10	Farm Tractor, Skidder Forwarder	Forwarder	Yarder	Yarder
11-20		Forwarder	Yarder	Yarder
21-33		Forwarder	Yarder	Yarder
	Forwarder, Horse, Yarder, Heli + combination			
34-50	Horse		Yarder	Yarder
51-70	Forwarder, Horse, Yarder, Heli + combination			
>=71				



End of section 1

DISCUSSION

