Structural Thinning

a thinning strategy for conversion of even age forests to permanent forests

DI Dr. Eckart Senitza
Ingenieurbüro Waldplan
Poitschach 2
9560 – Feldkirchen i.K.
starting situation – stand types

- Mixed Stands: Fi/Lä, Fi/Ta/Bu, Fi, LH
- History of stand and site: former farmland
- Afforestation of meadows
- Unevenaged Mixed Stands
- Afforestation – nature regeneration – combination
- Highly or very low structured Stands
- What is Structure and what is in needed for ???
starting situation – stand types

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- Vertical and horizontal differentiation and irregularity
- Broader diameter distribution
- Different growth dynamics (Types, species)
- Microclimate
- Light effects down to the ground
starting situation – stand types

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Microclimate
Light effects down to the ground
Structural thinning is a kind of selection thinning (with low number of future trees) with permanent opening of crown cover until the beginning of target diameter harvesting (after age 70 years) (Reininger 2000)

"Structural thinning is a thinning method, that should help to make future thinning needless !"

"Structural thinning is the switch on the way to automatic production"
Comparism of diameter distribution

Even with 40 years of low thinnings you find strong self differentiation!

Secondary trees react as strong as those from the main stand (+50% increment)

Pruning = important precondition
Comparism of diameter distribution

<table>
<thead>
<tr>
<th>Niederdurchforstung</th>
<th>Auslese durchforstung</th>
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Quelle: Reininger H. 1990

5 Durchforstungs-eingriffe

Z-Bäume

300 Z2

300 Z1

BHD

Stammzahlen
Selection and Marking

- **Future Tree?**
  - Check from bottom to top
  - Negative criteria on bottom
  - Positive criteria on top
  - "Questions to the tree"?
  - Criteria of Future Trees?

- **Concurrent Tree**
  - Relation of BHD (1:16)
  - Crown size and quality
  - Mixture of species
Goals

- Concentration of increment to the Value Trees
- Support and Saving of Mixed species
- Improve Stability of the single tree (H/D-Relation)
- Improve Stability of the whole stand (vertical structure)
- Maintain the structure and Diameter Distribution
- Preservation of Microclimate + secondary trees

⇒ Combination of shorthand and longterm goals of the measurement
Decision of Skidding system and Skidding lines

Selection of Future Trees (180-200 /ha)
within a Distance of (5) 6 – 9 Meters

Selection of Concurrents (1 to 3 / Future Tree)

low Intervention in the additional stand

BHD of concurrent x 16 = minimum Distance (angle 1:16)
example 3 – Blauwald

- Stem number: 2000-2500 St. /ha
- Mixed stand: raw pine, larch, silver fur, beech and spruce
- Big differences in quality, bark damages from deer
- 55 Jahre, OH: 24m, FiBru: 10 dGZ100
### Structural Thinning

#### example 3 – Blauwald

<table>
<thead>
<tr>
<th>Status</th>
<th>Stz/ha</th>
<th>Anteil</th>
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<tbody>
<tr>
<td>Z-Bäume</td>
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<td>68,6</td>
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<tr>
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<td>150</td>
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comparism of variants

A)

B)

C)

D)
Structural Thinning

microclimate— "hot spots"

- Trail distance 14m – trail width 3m => 20% open area
- Trail distance 20m – Trail width 2m => 10% open area

- higher evaporation
- loss of increment
Teaching Methods

- Establish permanent example stands
- Teach the principles + Decision Matrix
- Marking exercises in small groups (max. 6)
- Discussion + exchange of experience
- Cutting the trees - Thinning
- Evaluation + Discussion
- Iterative Learning to find the best solution according to the site and the stand!
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Key Facts

- Number of future trees / ha: 180-200
- Minimum distance of future trees: 6-9 m
- Effort for marking: 6-8 hrs./ha ~ 200,- €/ha => 2,- €/cbm
- Support (EU supported) for 1st Thinning: 300,- €/ha
- Cost for the thinning: 20-25-(30) €/fm
- Sortiments – Income: Media 16 cm ~ 50-55 €/fm; Media 14 cm ~ 41 €/fm
- Marginal return – Motormanuell – Harvester: ~ rel.similar (23,-€/fm)

Marking + Quality of Work = crucial

Costtrap: big maschines, high harvest volume, no marking

Loss of increment, structure, substance, stability + future chances
Summary

Strukturdurchforstung = effiziente Durchforstungsmethode mit optimalen Erlösen und Kosten unter Beachtung von Bestandesklima und Zuwachs (auf dem Weg zum Dauerwald)

Sometimes
You need a hard head to push something through!