A FINNISH APPROACH TO FOREST MANAGEMENT FOR PULP AND PAPER INDUSTRY

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BLANDIN PAPER COMPANY

GRAND RAPIDS, MN

"IMPROVING FOREST PRODUCTIVITY FOR TIMBER"

DECEMBER 3, 1998

DULUTH, MN  December 3, 1998
"A FINNISH APPROACH TO FOREST MANAGEMENT FOR PULP AND PAPER INDUSTRY

1. INTRODUCTION

2. FOREST MANAGEMENT AND PULP & PAPER INDUSTRY IN FINLAND

3. INTRODUCING UPM-KYMMENE

4. MILL CASE = JÄMSÄNKOSKI & KAIPOLA

5. SUMMARY
**FINLAND AND MINNESOTA,**
**SOME STATISTICS ...**

<table>
<thead>
<tr>
<th></th>
<th>FINLAND</th>
<th>MINNESOTA</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>POPULATION</strong></td>
<td>5,100,000</td>
<td>4,700,000</td>
</tr>
<tr>
<td><strong>TOTAL AREA</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- sq. Kilometers</td>
<td>304,000</td>
<td>220,000</td>
</tr>
<tr>
<td>- sq. Miles</td>
<td>117,000</td>
<td>84,000</td>
</tr>
<tr>
<td><strong>FORESTRY LAND</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>- sq. Kilometers</td>
<td>263,000*</td>
<td>-</td>
</tr>
<tr>
<td></td>
<td><strong>86% of total area</strong></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>90% of Minnesota, Michigan and Wisconsin Combined</strong></td>
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</table>
METEOROLOGICAL PARAMETERS IN FINLAND

- AVERAGE TEMPERATURES
  - Annual: 3°C (37°F, -40°F...+85°F)
  - February: -10°C (14°F)
  - July: +16°C (61°F)

- GROWTH SEASON: 170 Days

- AVERAGE ANNUAL
  - Precipitation: 500 mm (20 inches)
  - Evaporation: 400 mm (16 inches)
  - 1/3 of precipitation falls down as snow
FOREST MANAGEMENT IN FINLAND

Felling methods:
- Thinnings 46%
- Clear-Felling 29%
- Seed-Tree Method 13%
- Removal of Seed-Trees 10%
- Other Felling Methods 2%

Forest Regeneration:
- Planting 55%
- Pine Seeding 16%
- Natural Regeneration 29%

Source: Finnish Forest Association
FAMILY FORESTRY

- 400,000 foest holdings (whole country) (30 ha forestry land)
- 30,000 forest owners
- The birth of the family forestry goes back to the year 1542 (wilderness areas declared crown land) and to the year 1749 (general reallocation)
- The birth of the silviculture goes back to the year 1886 - act prohibiting destruction of forest came into effect
- First national forest inventory conducted 1921 - 24
# Production and Export of Finnish Pulp & Paper Industry

<table>
<thead>
<tr>
<th></th>
<th>Production (as 1,000 tons)</th>
<th>Export (as 1,000 tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1997</td>
<td>1998(E)</td>
</tr>
<tr>
<td>Chemical Pulp</td>
<td>6,600</td>
<td>6,700</td>
</tr>
<tr>
<td>&quot;Mechanical Pulps&quot;</td>
<td>4,500</td>
<td>4,700</td>
</tr>
<tr>
<td>Pulp Total</td>
<td>11,000</td>
<td>11,400</td>
</tr>
<tr>
<td>Paper</td>
<td>9,500</td>
<td>10,250</td>
</tr>
<tr>
<td>Board</td>
<td>2,600</td>
<td>2,650</td>
</tr>
<tr>
<td>Paper &amp; Board</td>
<td>12,100</td>
<td>12,900</td>
</tr>
<tr>
<td></td>
<td>(88%)</td>
<td>(88%)</td>
</tr>
<tr>
<td></td>
<td>8,000 MUSD</td>
<td>9,500 MUSD</td>
</tr>
</tbody>
</table>
FINNISH FOREST CLUSTER

PULP & PAPER COMPANIES:
  • Stora Enso
  • UMP-Kymmene
  • Metsa-Serla & Myllykoski

FOREST RELATED METAL INDUSTRY:
  • Valmet (or Valmet-Rauma)
  • Rauma (or Valmet-Rauma
    • Sunds Defibrator
    • Neles
  • Ahlstrom

FOREST RELATED CONSULTING:
  Jaakko Poyry Co
<table>
<thead>
<tr>
<th>SPECIE</th>
<th>PULPING PROCESS</th>
<th>END USE</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Hardwood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Birch</td>
<td>-Kraft pulping (50...55% yield)</td>
<td>-Fine paper</td>
</tr>
<tr>
<td>2. Softwood</td>
<td></td>
<td></td>
</tr>
<tr>
<td>• Pine</td>
<td>-Kraft pulping (45...50% yield)</td>
<td>-Reinforcement pulp</td>
</tr>
<tr>
<td>• Spruce</td>
<td>-Mechanical pulping (ca. 95% yield)</td>
<td>-Magazine paper</td>
</tr>
<tr>
<td></td>
<td>-Kraft pulping (45...50% yield)</td>
<td>-Newsprint pulp</td>
</tr>
<tr>
<td></td>
<td></td>
<td>-Reinforcement pulp</td>
</tr>
<tr>
<td>Product</td>
<td>Million</td>
<td>Tons</td>
</tr>
<tr>
<td>---------------------------------</td>
<td>---------</td>
<td>------</td>
</tr>
<tr>
<td>CHEMICAL PULP (cons.)</td>
<td>ca.</td>
<td>3</td>
</tr>
<tr>
<td>MECHANICAL PULPS</td>
<td>ca.</td>
<td>2.7</td>
</tr>
<tr>
<td>RECYCLED FIBER</td>
<td>ca.</td>
<td>0.4</td>
</tr>
<tr>
<td><strong>PULP CONSUMPTION, TOTAL</strong></td>
<td>ca.</td>
<td>6.1</td>
</tr>
<tr>
<td><strong>PAPER PRODUCTION, TOTAL</strong></td>
<td>ca.</td>
<td>7.2</td>
</tr>
<tr>
<td></td>
<td>Capacity</td>
<td></td>
</tr>
<tr>
<td>----------------</td>
<td>-----------</td>
<td></td>
</tr>
<tr>
<td>Magazine Grades</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Coated (LWC, MFC)</td>
<td>260,000 +/- a</td>
<td></td>
</tr>
<tr>
<td>- Uncoated (SC)</td>
<td>560,000 +/- a</td>
<td></td>
</tr>
<tr>
<td>Newsprint</td>
<td>200,000 +/- a</td>
<td></td>
</tr>
<tr>
<td>TD Paper</td>
<td>180,000 +/- a</td>
<td></td>
</tr>
<tr>
<td>TOTAL</td>
<td>1,200,000 +/- a</td>
<td></td>
</tr>
</tbody>
</table>

- **LWC** = "Lightweight Coated"
- **MFC** = "Machine Finished Coated"
- **SC** = "Supercalandered"
- **TD** = "Telephone Directory"
JÄMSÄNKOSKI AND KAIPOLA ...

- PULPING CAPACITIES:
  - TMP (4 plants)  700,000 t/a
  - RCF (1 plant)   150,000 t/a
  - TOTAL          850,000 t/a

- WOOD DEMAND:
  - Spruce logs    ca. 1,800,000 s-m3/a
  - Spruce sawmill chips ca. 200,000 s-m3/a
  - TOTAL          ca. 2,000,000 s-m3/a
                  ca.  800,000 cords/a

TMP = “Thermomechanical Pulp”

RCF = “Recycled Fiber”
WOOD

Wood procurement/framework

- Spruce demand 2 million m3/a, 5,800 m3/day
- Spruce raw material sources
  - Private family forest 85%
  - Company forests 10%
  - State forest 5%
  - Community forests 3%
- Purchase's from private forests
  - Standing timber companies harvesting 90%
    contract 500 m3 (avg), spruce 65%
  - Delivered timber at roadside 10%
    forest owners harvesting
    contract 50 m3 (avg), spruce 80%
WOOD

WOOD PROCUREMENT/FRAMEWORK

- Harvesting
  - Thinning
  - Regeneration fellings
    Natural regeneration
    Planting combined with natural regeneration
  - Mechanisation grade in cuttings 90%
  - Resources for 2 million m3
    40 Harvesters (one-grip)
    50 Forwards
    50 Lorrys
    100 Wage earners
    100 Salaried employees

- Wood balance
  20% surplus on our wood procurement area
- Transport
  - Lorry transport
  - Railway transport
  - Floating
WOOD QUALITY

The quality of wood raw material is important, 90% of total costs of TMP pulp consist of:

- wood costs
- energy costs
- bleaching costs
How the fresh wood is managed?
WOOD QUALITY

Quality of wood raw material affects:

**Costs**
- reinforcement pulp demand
- bleaching chemical consumption
- paper machine runnability

**Quality**
- strength properties
- shives content
- brightness

Best raw material for TMP-wood is:

**FRESH SPRUCE!**
WOOD QUALITY

How the wood quality is managed in UPM-Kymmene?

Wood supply to the mill is organized by UPM-Kymmene Forest.

Prerequisites in management

• Good co-operation between Forest Department and papermakers

• Clear wood procurement and trade policy and targets ISO 9002 and ISO 14001
WOOD QUALITY

Wood quality requirements

- fresh and healthy spruce
- not decayed wood, no signs of rot or fungi
- minimum diameter 8 cm (3 inches)
- no soot, no charcoal
- straight logs, cut length 3 m (10 ft) or around 5 m (17 ft)
WOOD QUALITY

HARVESTING

- winter-cut felling from October to April
  (the rest season for the tree)

- spring-cut felling from May to June
  (the growing season, early wood)

- summer-cut felling from July to October
  (the growing season, late wood and the tree prepares itself for the rest season)
WOOD QUALITY

The supplies of the stock to the mill

- winter-cut fellings are supplied at the latest on June 5
- spring-cut fellings in one week
- summer-cut fellings in two weeks
WOOD QUALITY

Wood Storing

- target to minimize storing both at the roadside and on the woodyard

- how storing in the woodyard is managed?
  - well managed storage rotation
    Woodyard is divided to ten individual sections.
    Stock is unloaded to one section and discharged from the other section. First in, first out.
  - water spraying of log piles like rain
    Target to keep the moisture content of the wood unchanged.
    Automatically controlled by temperature and by relative humidity
WOOD QUALITY

The usage of stock in the mill:

- winter-cut stock is used by the end of July
- spring-cut stock only one week in the woodyard
- summer-cut stock only one week in the woodyard
- at all times during summer the woodyard turn around must be planned and maintained
WOOD QUALITY

How the wood supplies are controlled at the mill site?

- Every bundle of pulpwood logs delivered to the mill is weighted and volume is measured

- The green density of each bundle is calculated and the wood raw material is divided into five groups

- Wood green weight density must be over 770 kg/m^3, otherwise it is rejected as dry

- Green density values ensure that fresh wood is supplied to the woodyard
SUMMARY:

"YOU CAN ALWAYS TELL A FIN, BUT YOU CAN'T TELL HIM MUCH"
SPECIAL THANKS TO:

UPM

BLANDIN PAPER:  
John McCoy
Jim Marshall

UPM-KYMMENE,  
FOREST DEPARTMENT:  
Seppo Paananen

UPM-KYMMENE,  
JAMSANKOSKI & KAIPOLA:  
Timo Kalliola

UPM-KYMMENE,  
R & D:  
Taisto Tienvieri