Modernisation And The Effect On Silviculture

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Terminology

- Modernisation and mechanisation are not synonymous terms.
- Modernisation is a more encompassing term that can best describe change.
- Modernisation can impact on existing manual, semi mechanised or fully mechanised operations.
- Modernisation can range from simple interventions such as an improved ergonomic tool.
- Mechanisation is simply a subset of modernisation.
Forest Industry Workforce Challenges

- **Aging rural workforce** & 5% annual decline in rural population.
- Increasing **labour costs**.
- High labour **turnover** (estimated 20-50%) and **absenteeism** (estimated 10-20%).
- Problematic **health issues**, impact of HIV/Aids (HIV infection >30%).
- **Productivity** and quality challenges of manual, unskilled labour.
- Poor working standards – **poor ergonomic practice**.
- **Safety challenges** with chainsaws and sharp tools.

(D. Laengin, February 2013)
Silviculture Focus and Mandate
Silviculture Focus Areas in Mondi

Exploit best science and technology to ensure sustainable plantations.

- Residue management
- Site preparation
- Establishment
- Coppice management
- Weed control
- Fire protection
Modernisation – Influencing Factors

Mandate: *Optimize land holdings by growing the correct trees, on a sustainable basis, at the lowest cost.*

Introduction of modernisation in silviculture influenced by the need for:

- Concept of decent work.
- Keeping abreast of best practices in international forestry.
- Improved ergonomic working conditions.
- Eliminate safety risks, especially sharp tools.
- Reduced exposure to harsh climatic conditions.
- Reducing exposure to monotonous work.
- More stable and educated work force.
- Improved productivity & quality of silviculture operations.

*We operate in a highly competitive international market!*
Current Silviculture Operations
Present Silviculture Status

- Silviculture operations labour intensive with very few interventions over last 20 years.
- Work is physically demanding, repetitive and poorly paid.
  - There is international recognition of the excessive physical demands placed on forestry workers globally (Professor Scott, December 2005).
- Supervisory skill levels rudimentary at best.
- Environmental conditions and exposure can be harsh.
  - Working outdoors exposes forestry employees to environmental stresses, such as heat, cold, humidity, wind and rain. These have a significant impact on work performance, occupational safety and perceived stresses, particularly when exceeding ambient levels (Professor Scott, December 2005).
- Working conditions can be hazardous under the best safety practices.
Mondi Silviculture Operations

(R. Morkel, October 2013)
Safety

Mondi Forests Lost Time Injuries during the period 2000 – 2013 YTD

(R. Morkel, October 2013)
Ergonomic Risk By Job Description

Cut off value

Ergomax, July 2012
Interventions To Meet The Mandate
## Identifying Tasks with Greatest Work Risk

<table>
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<tr>
<th>Operation</th>
<th>Safety</th>
<th>Ergonomics</th>
<th>Quality</th>
<th>Productivity</th>
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<td>Medium</td>
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</tr>
<tr>
<td>Fire protection</td>
<td>High</td>
<td>High</td>
<td>Medium</td>
<td>High</td>
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</table>
Residue Management

Risks to workers quite obvious!

Burning improves underfoot conditions. But...!
Silviculture Challenges - Stumps

One of greatest impediments to mechanised silviculture – Stumps!

Marshall Tree Saw
Pit Preparation – Old vs. New
Pit Preparation – Strip Cultivation

Very cost effective where stumps are not a problem
Pit Preparation - Steeper Terrain

• Motorised auger widely used in Brazil.
• 2 man team.
• Still experience operator fatigue and incidents of trip and slip.
• Pitting quality superior.
• Development of the frame mounted auger by Mondi.
• Some modernisation interventions are fairly simple.
Simple Planting Technology

Conventional planting as shown:

- Improved ergonomics.
- Hands not exposed to splinters, chemicals and water.
Semi Mechanised Planting – Silviculture Goes ‘High Tech’
Semi Mechanised Planting – Silviculture Goes ‘High Tech’

John Deere Skidder fitted with planting & spray tanks

Fiori Carrier to be fitted with gel tanks

Forestry and construction tool carriers modified for planting in steeper terrain areas.
**Fertiliser Applicators**

- Accurate application. Can be calibrated.
- Ergonomically superior to carrying a bucket.
Maintenance – Chemical Spraying
Proposed Modernised Coppicing Operations

- Single coppice operation instead of two.
- High degree of operator skill required.
- Trip and slip incidents still possible.
Fire Prevention and Fire Fighting
Modernisation Of Fire Fighting

- Are we entering the era of the specialist fire fighting role in S.A. forestry as never seen before?
- The need for skilled, fit and self motivated fire fighters will increase.
- Can we make the fire fighters incredibly tough job a bit easier with technology?
- Specialised fire fighting training and management essential at all levels.

Gehl RT210 Skid Steer

Polaris Fire Fighting Units
Modernised Fire Protection & Fighting Technology
International Forestry – Brazilian Benchmark

A BRICS Nation
Brazil 2013 – Silviculture Benchmarking

- Impressive operations across the value chain from stump to mill.
- Safety and ergonomics way of life.
- Variety of silviculture systems applied. Choices based on ergonomics, simplicity and high productivity standards.
- Silviculture systems range from manual with excellent ergonomic standards to semi-mechanised and fully mechanised planting machines.
- Silviculture operations outsourced & in-house.
- Detailed planning across silviculture operations.
- Attention to detail and focus on production.

(R. Morkel, April 2013)
Brazilian Benchmark

(R. Morkel, April 2013)
Brazil – Silviculture Operations
Brazil – Silviculture Operations

Strip cultivation

Watering

Liquid fertilizer application

Mechanised planting

(R. Muller, April 2013)
Future Considerations for Silviculture Modernisation
Mondi Training Requirements: 2013 And Beyond

- Move to multi skilled ‘operator’ type employee.
- Formal, intense training for all employees.
- Training continually reinforced.
- Productivity of modernised operations a key focus.
- Technical understanding and abilities of employees enhanced.
- Highest ergonomic standards and appreciation thereof.
- Highest safety training standards to significantly reduce safety risks.
- New roles and responsibilities for Supervisors.
Forestry Work In Mondi: The Future

The future forestry working environment in Mondi should be associated with:

- Decent working conditions.
- World-class ergonomic practices.
- World class safety standards.
- Decent living conditions.
- Focus and attention to detail and planning.
- High productivity and quality work standards.
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