



# Modernisation And The Effect On Silviculture

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- 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

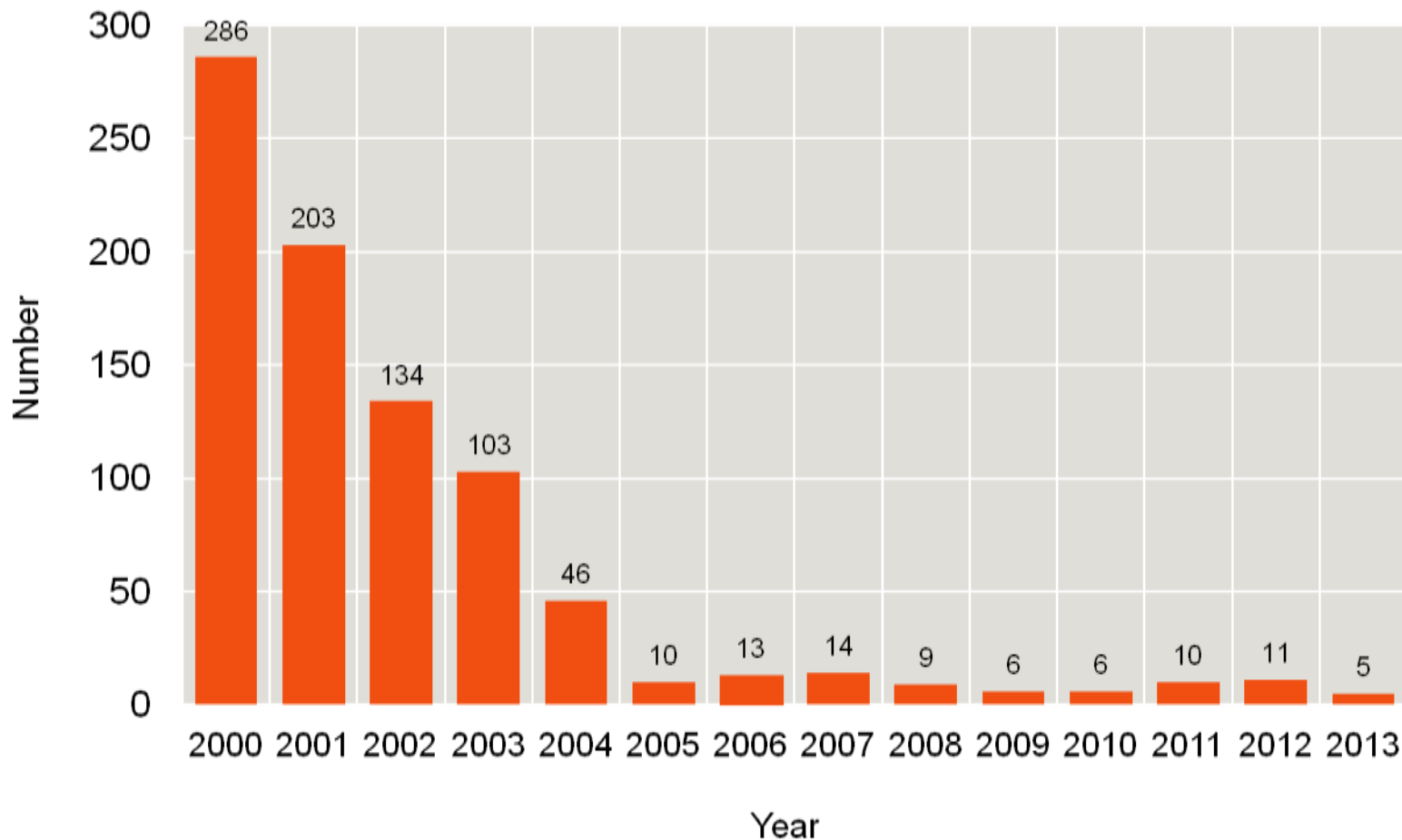


(R. Morkel, October 2013)

# Safety



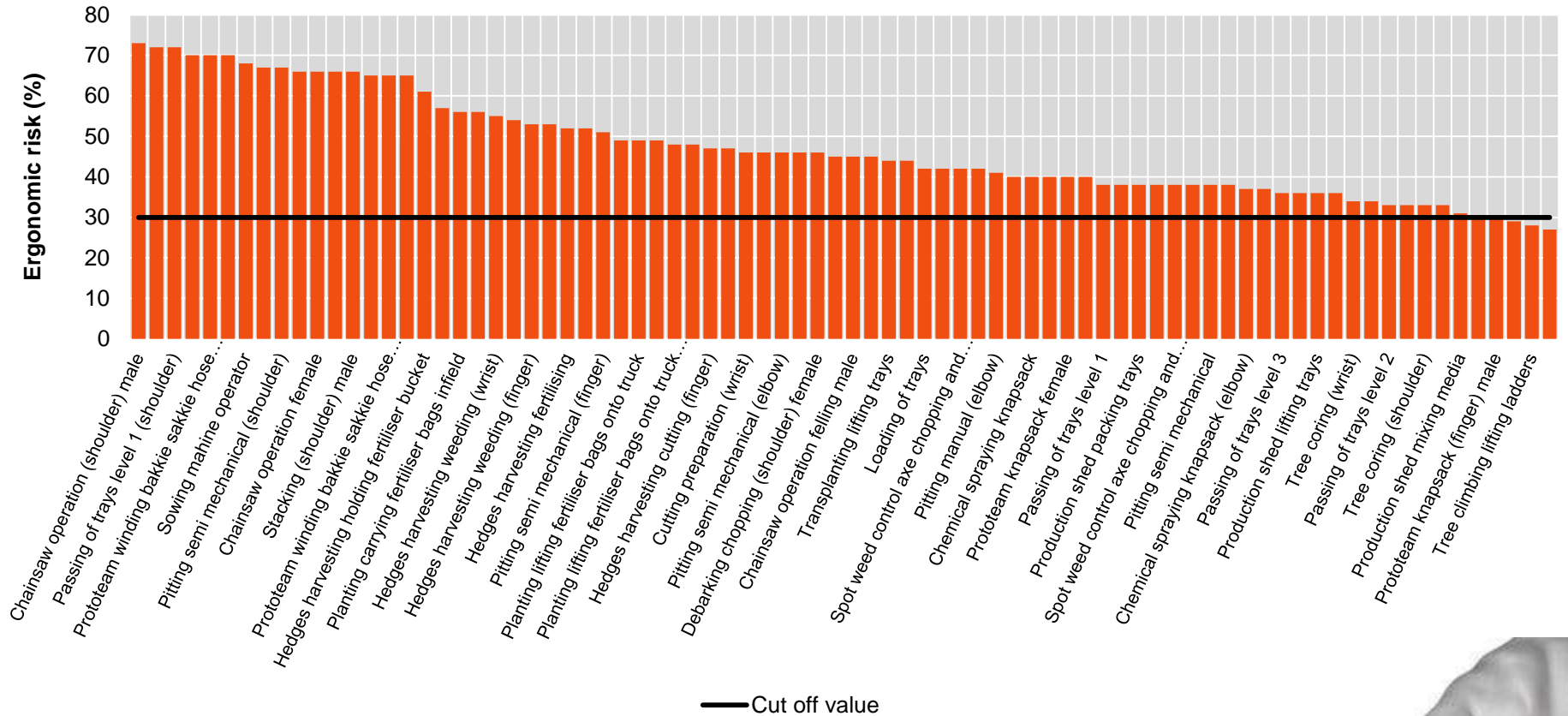
## Mondi Forests Lost Time Injuries during the period 2000 – 2013 YTD



(R. Morkel, October 2013)



# Ergonomic Risk By Job Description



Ergomax, July 2012

# Interventions To Meet The Mandate

# Identifying Tasks with Greatest Work Risk

Operation	Safety	Ergonomics	Quality	Productivity
Slash management & stumps	Medium	Low	Medium	Low
Mark and pit	Low	High	High	High
Weed control	Medium	Low	Low	Medium
Planting and watering	High	High	High	High
Fertilise	High	High	High	High
Coppice	High	High	Medium	Medium
Fire protection	High	High	Medium	High



# Residue Management



# 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



Current



Proposed



- 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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