Evaluation of the educational influence on forwarding planning capacity

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Forwarding

The challenge in seemingly simple work, but…

• Load fast in the forest, and be slow when unloading?
• Be fast with this load, and be slow in the next?
• Try to adapt planning between stands, or use simple standard rules?
Forwarding performance

- Environmental conditions
- Machine features
- Operator’s capacity
  - to handle the machine
  - to plan the work

How does education influence the operator’s capacity to plan the work?
Case study

POPULATIONS

- 2 vocational schools compared
- 15 students per school
- Age ca. 18 years
- At least ca 50 hours of actual forwarding
- Various forwarder simulator experience
Case study

EXECUTION

- Ponsse’s Forwarding game
  http://www.ponsse.com/media-archive/ponsse-forwarder-game

- Given conditions and machine behaviours
- Work planning gives variation in results (time, distance)

- All students in a school played simultaneously, without previous experience of the game
- 1 warm-up game
- 2 actual games – same track, different complexity
Introduction game

- 3 assortments
- 41 m³ (at least 3 loads)
Evaluation games

- 150 m³ (at least 10 loads)
- Game 1: 4 assortments
- Game 2: 8 assortments
Results

Mean number of assortments per load

Load number
Results

![Box plot showing total distance driven (m) for School X and Y in Game 1 and Game 2.](diagram.png)
Results

Productivity (m$^3$/PMh) vs Total distance driven in game 2 (m)
Results

School X was 7-12% more productive!
Work strategies

School X
- Many assortments/load
  - Slow unloading
  - Short driving distance
  - High productivity

School Y
- Few assortments/load
  - Fast unloading
  - Long driving distance
  - Low productivity
Conclusions

Large differences in forwarding planning = large differences in forwarding costs

Education matters – even (or rather especially) in forwarding!

Important to develop knowledge on situation adapted forwarding (and load per load)
New project: Optimize the routing – before the felling starts

Thank you!
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