Workload benefits of using synthetic ropes in cable yarder rigging in Norway

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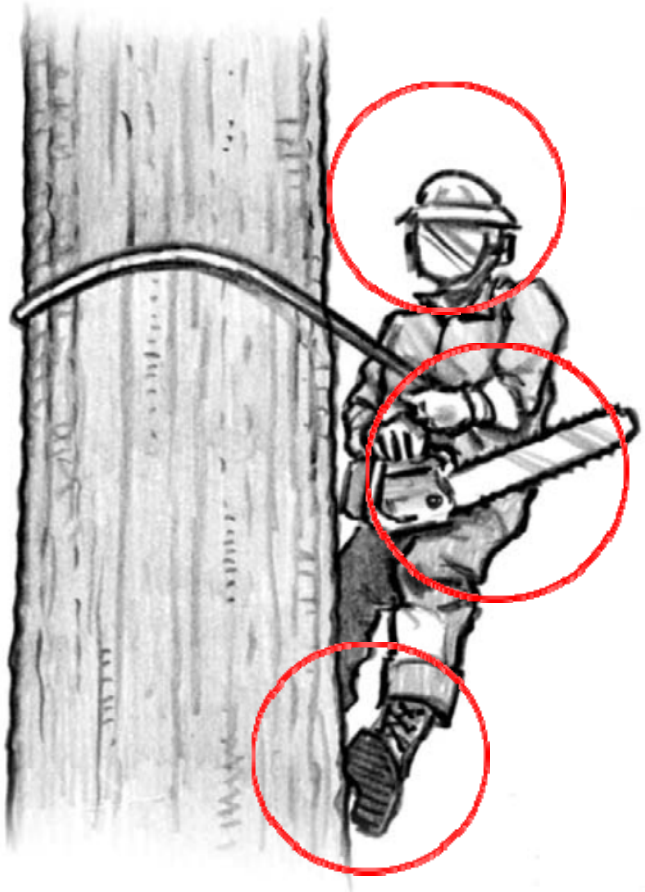

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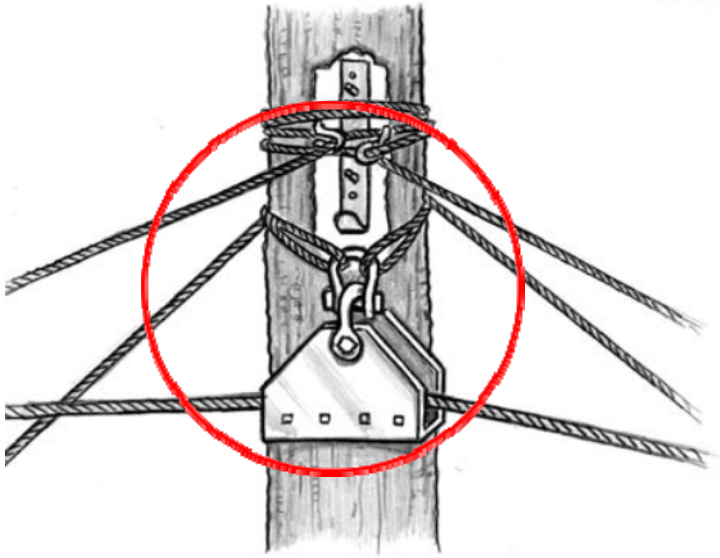

3,5 mm steel wire,
39 g/m

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4 mm fibre rope,
11g/m

QUESTION

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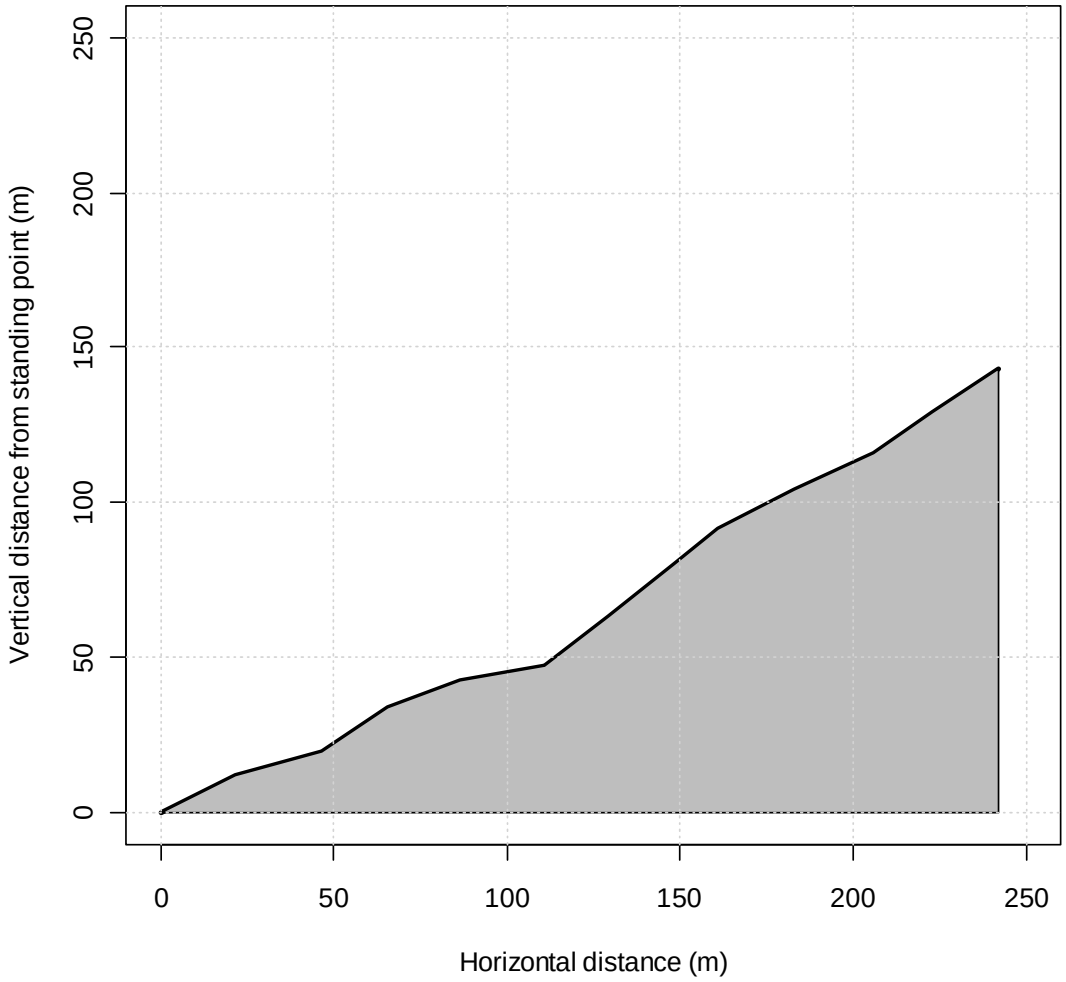
Can we quantify the ergonomic benefit, if any, gained by using a synthetic rope instead than a steel cable in the rigging task while setting up a skyline?

THE TRIAL'S SITE

The site was located on a west facing slope outside the town of Kvam in central Norway. A 300m trail on an active logging site (an actual corridor that had been logged) was marked out in twelve 25 m segments.

THE PROFILE



The terrain profile was captured using a Haglöf Vertex® clinometer. The mean inclination from first to last point was 65%

THE OPERATORS

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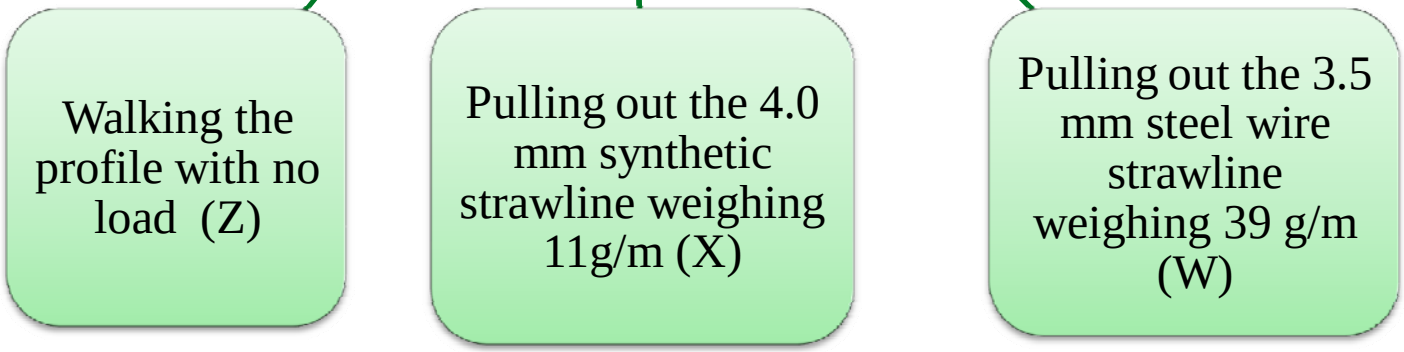
TREATMENTS



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THE DATA

COLLECTED:

1. Gradient (%)
2. Distance (m)
3. Heart rate (Beats/sec)
4. Force (N)
5. Velocity (m/s)
6. Time (s)

DERIVED:

1. Work (Joule)
2. Rate of work (W)
3. Altitude (m)

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THE MAIN VARIABLES

FORCE (N)

WORK (J)

RATE OF WORK (W)

HEART RATE (Bpm)

THE GENERAL ANALYSIS

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ERGONOMIC ADVANTAGE?

FORCE, WORK DONE, WORK RATE and HEART RATE

DIFFERENCE BETWEEN TREATMENTS

GO1

FORCE MONITORING

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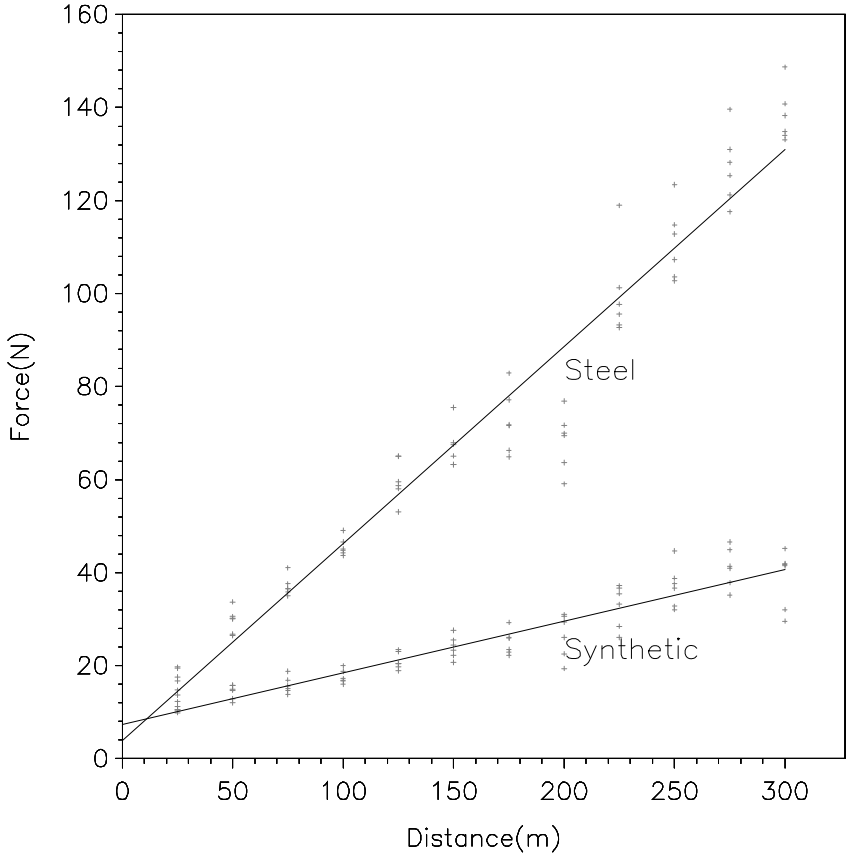

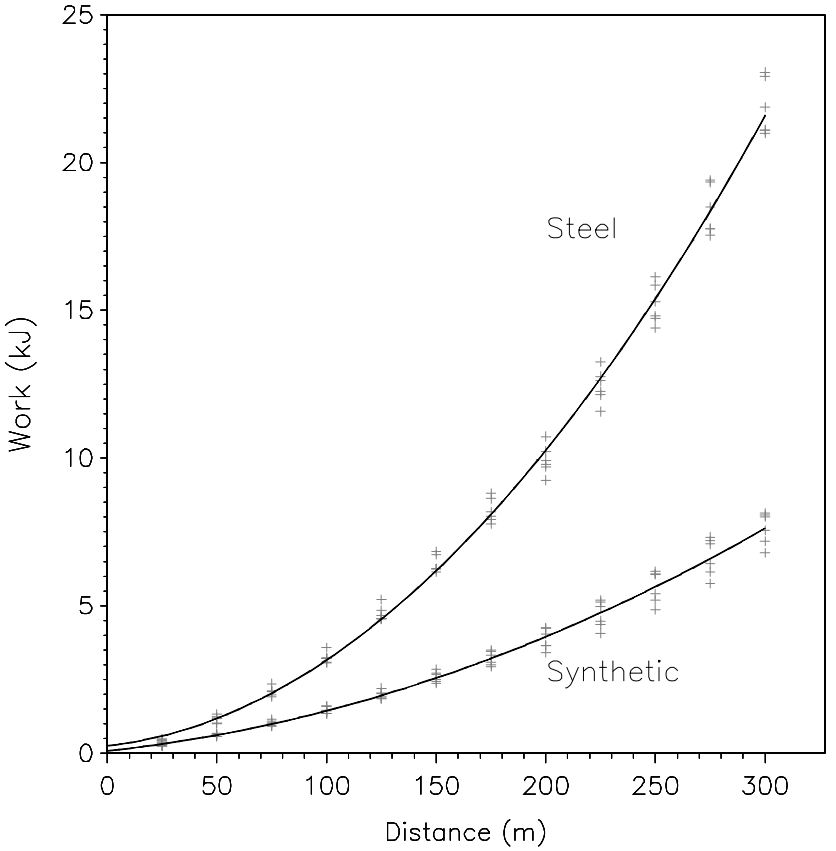

GO1 Put the model regression equation

Giovanna Ottaviani; 31.03.2011

THE RATE OF WORK

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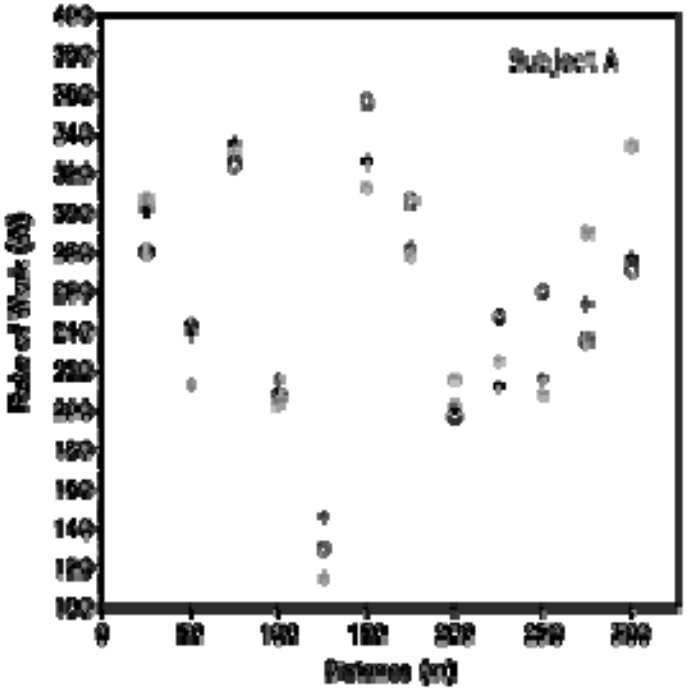

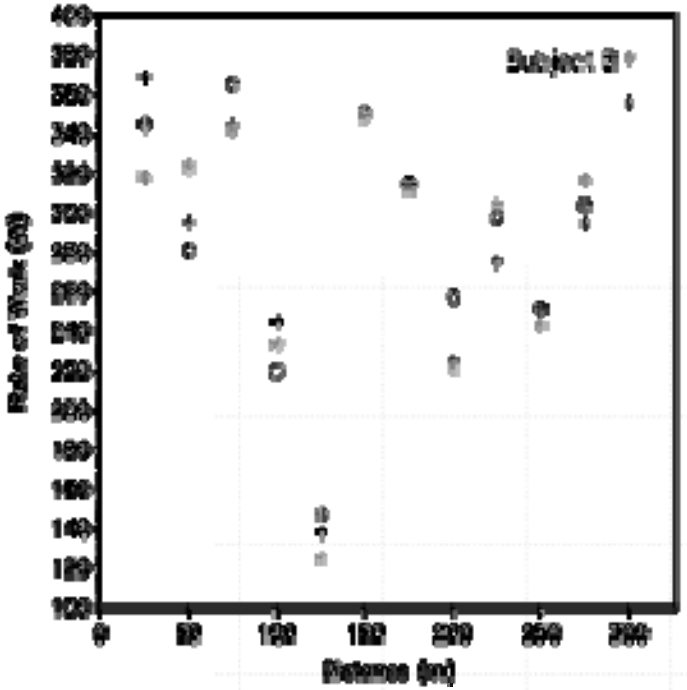

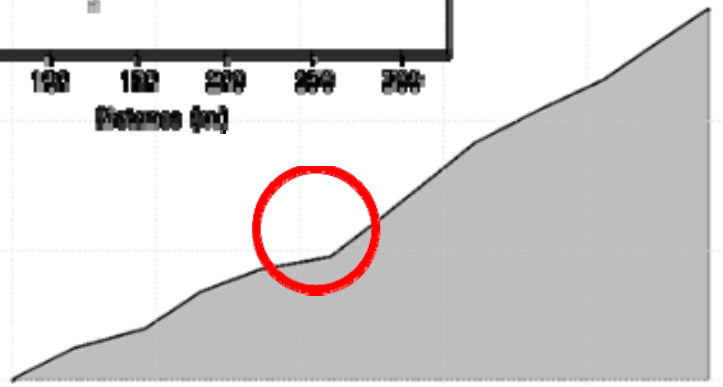

PHYSIOLOGICAL MEASUREMENTS

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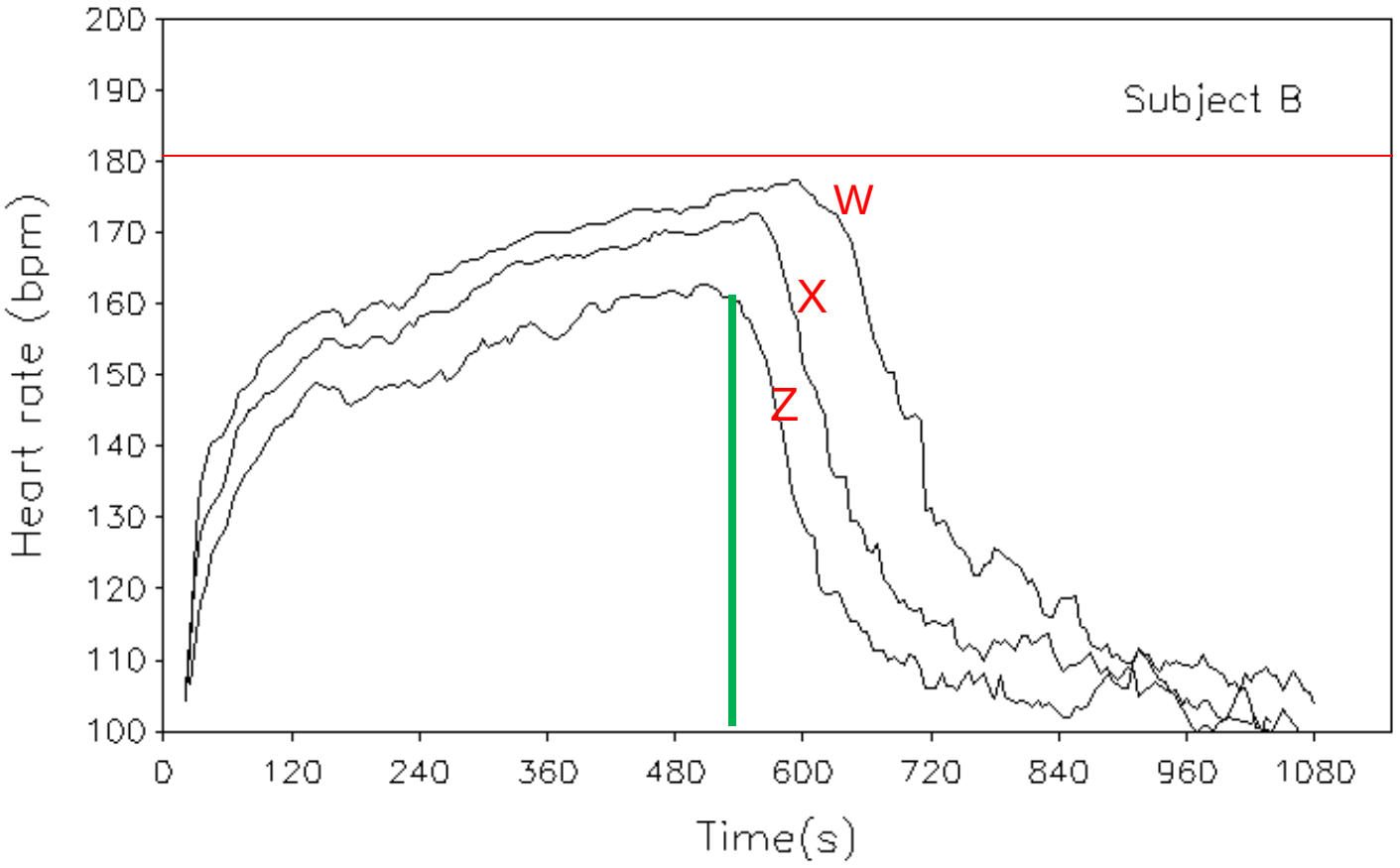
Heart rate monitoring.

THE HEART RATE



CONCLUSIONS

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The use of the synthetic rope in the rigging task results in an **ergonomic advantage** because:

- The force needed to pull the synthetic rope up to 300 m is 25% of the force needed for the steel wire.
- 140N was the maximum possible pulling force exerted by the subjects.
- Beyond 300m two workers would be necessary to pull the steel wire. The 140N barrier for the synthetic rope would only be reached at 1200m.

This finding is illustrated by the heart rate pattern.

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Dank für ihre Aufmerksamkeit

(Thank you for your attention!)