Labour requirement for feeding of dairy cows by automatic feeding systems

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Introduction

• The conventional feeding of cows is one of the most time-consuming activities in dairy farming.
• Automatic feeding systems (AFS) are expected to optimize the feed management, improve the labour efficiency, and increase the flexibility of the dairy farmers.

Material and Methods

Analysis of labour input on farms

Labor studies (survey, observation, and recording of time taken to accomplish individual tasks)

To determine the influence factors and to obtain the labour input time for required work elements

Data evaluation

Analysis - using of programs Meza (Drigus), MS Excel, SigmaPlot

To generate the standard times/standard time formulas for required work elements

Creation of calculation models

- Using of MS Excel
  For semi AFS
  - filling of silage bunkers in a conventional way by different implements for tractor (front loader bucket, silage grip bucket, silage cutting bucket, silage block cutter)
  For fully AFS
  - automatic silage pick up with rotary cutter from tower or deep silos

Results

The calculation models:

• include following tasks:
  – filling of bunkers for roughage (silage, straw, and hay)
  – filling of the storage units for other components (e.g. mineral)
  – cleaning of feeding table and space around storage bunkers, removing of forage remains
  – pushing the feed towards the feeding fence (when not automatically)
  – others (makeready tasks, ratio management, maintenance works, etc.)
• are valid for three AFS (Triolet, Mullerup, and Pellon)
• over 100 influence factors can be modified
• calculations can be performed for existing farms as well as for fictive farms

Example model calculations:

Assumptions for example model calculations:

| Distance between bunkers and silo (m): | 50 |
| Capacity of pick up and transport equipments (m³): |  |
| Front loader bucket | 1.15 |
| Silage grip bucket | 1.15 |
| Silage cutting bucket | 2.00 |
| Slagle block cutter | 2.50 |

Pushing feed against the feeding fence: automatically

Effect of the frequency and filling technique of silage bunkers depending on herd size:

Effect of the distance between silos and silage bunkers by different filling technique depending on herd size:

In conclusion:

• The calculation models can be a helpful tool for dairy farmers by the choice of the feeding technique for their specific farm situation.
• They enable to calculate labour time requirement for the feeding applying selected semi and fully AFS also for fictive farms (without knowing of exact farm design).
• Further measurements will be performed to expand the standard time database and improve calculation models.

Aim of the study

• To create calculation models for estimation of labour time requirement for feeding of dairy cows with different AFS as a support tool for dairy farmers by the choice of feeding equipments