Design and development of cabinet for wireless embedded silage sensor

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The concept

Sensor

Silage

The concept

Feed Mixer
The concept

Feed bunk

Silage

Preliminary investigations

- The first cabinet
  - 130€

H x L x W = 52 x 75 x 20 [mm]
Preliminary investigations

- Challenges
  - Feed mixers
  - Excavators
  - Acidic material
  - Moisture

- Deciding size of cabinets
  - Rapid prototyping
    - Evaluating sizes through experiments

- Deciding material
  - Comparing material properties with environmental challenges
    - Experts had the final word
Preliminary investigations

Requirements

1. Don’t break in mixer
2. Don’t be eaten by cow
3. Don’t dissolve in silage
The design process

- **Innovative process**
  - 5 Stages

1. Idea
2. 3D drawings
3. Discussion
4. New design
5. Final design

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**Final Design**

- **Price for new cabinet**
  - 1/10 cost compared with old cabinet
  - 16€

- **Soft mould (aluminum)**
  - Up to 250 cabinets
Testing prototype

- **Feed mixer test**
  - Still running
- **Crush test**

Testing prototype

- 14 times through mixing process
- No significant damage
Testing prototype

Average pressure ≈ 30.96 kN

Testing prototype

Average pressure ≈ 14.12 kN
Testing prototype

- Conclusions on tests
  - No problem with feed mixer (so far)
  - Further test in paddle mixer needed
  - Problems found during crush test
  - Change in design is needed
  - Quick solution: 4mm bolt through both cabinet parts

Project status

- Sensors in large scale experiment
  - Test of concept as whole

- New project application
  - New sensor
  - New cabinet
Thank you

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