Wireless Crane Scale to Improve Round Wood Transport Efficiency

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Background

- Driver is responsible
  - for keeping the load limits
  - to utilize load capacity

- Currently mostly done
  - by the driver during loading on the fly
  - just by visual estimates

- Difficult to estimate
  - load weights with different assortments
  - at varying conditions

- EU directive 2015/719 in 2021!
Utilizing Load Capacity

- Transport cost simulation
  - Legal limit (AUT) 44 t
  - Empty weight 19.6 t
  - Load capacity 24.4 t
  - Time consumption per load
  - Hourly costs for truck & trailer unit with driver
Solution – Prototype
Wireless Crane Scale

- Wireless Crane Scale
- Separate oil circuit: 10ml
- Adapted joint: EPSILON
- Weighing technology: TAMTRON
- Additional length: approx. 13 cm
Transport Unit – Truck & Trailer

- **Configuration:**
  - Truck with 6x6, 335 kW
  - Trailer with tandem axle
  - Configuration for roundwood transport

- **Empty weight - Capacity:**
  - Tuck & trailer: 19,600 kg
  - Capacity limit (AUT): 24,400 kg
Loading Unit

- Epsilon M120 Z96
- Display from wireless crane scale is fixed at the high seat
- Different preconfigured settings and weighing mode available – weighing in motion was chosen
- Periodic calibration with known weight
Load & time consumption data were recorded before & after the wireless crane scale was mounted

Additional data was taken from a fleet management portal

Comparison of load data with customer’s weigh bridges
Data Pool

- 59 loads - 74 hours without crane scale
  - 28 loads including detailed data of logs
  - 20 loads with weights from customer
- 73 loads – 93 hours with mounted crane scale
  - 36 loads including detailed data of logs
  - 44 loads with weights from customer
Main Results

- Weights from crane scale compared to data from customers:
  - 820 kg (3.44%) at loading
  - 1,127 kg (4.22%) at trans-loading
  - 1,208 kg (4.65%) at unloading

- Internal comparison of weights (loading & unloading)
  - 123 kg (0.26%)

- Loading efficiency does not differ significantly with/without mounted crane scale

- Cost gap due to under-loading could be halved
Costs – Crane Scale

- Purchase costs – prototype
  - 7,000 Euros
  - 2.5% from 285,000 for new truck & trailer system
  - Over 7 years with 210 days the crane scale amounts in average 4.8 Euros/day
Digital Data – Potential Use