High availability in difficult application conditions
Rotational speed detection in mobile machines

Application example HOLMER exxact harvester

RHEINTACHO
Facts

Established:	1901 in Cologne, Head office in Freiburg since 1922
Employees:	95 (2020)
Turnover:	16,7 Mio. € (2019)
Qualification:	Design, production and sales of systems for measurement, control, display and diagnostics of rotation speed

RHEINTACHO
Products

We design, manufacture and distribute:

- Speed sensors (pick up‘s)
- Stationary and portable stroboscopes with LED technology
- Stationary and portable stroboscopes with XENON technology
- Digital and mechanical hand-tachometers

- Switching devices and converters
- Electrical and mechanical indicators
- Tacho-generators
- Customized solutions

Application

HOLMER sugar-beet harvester Terra Dos

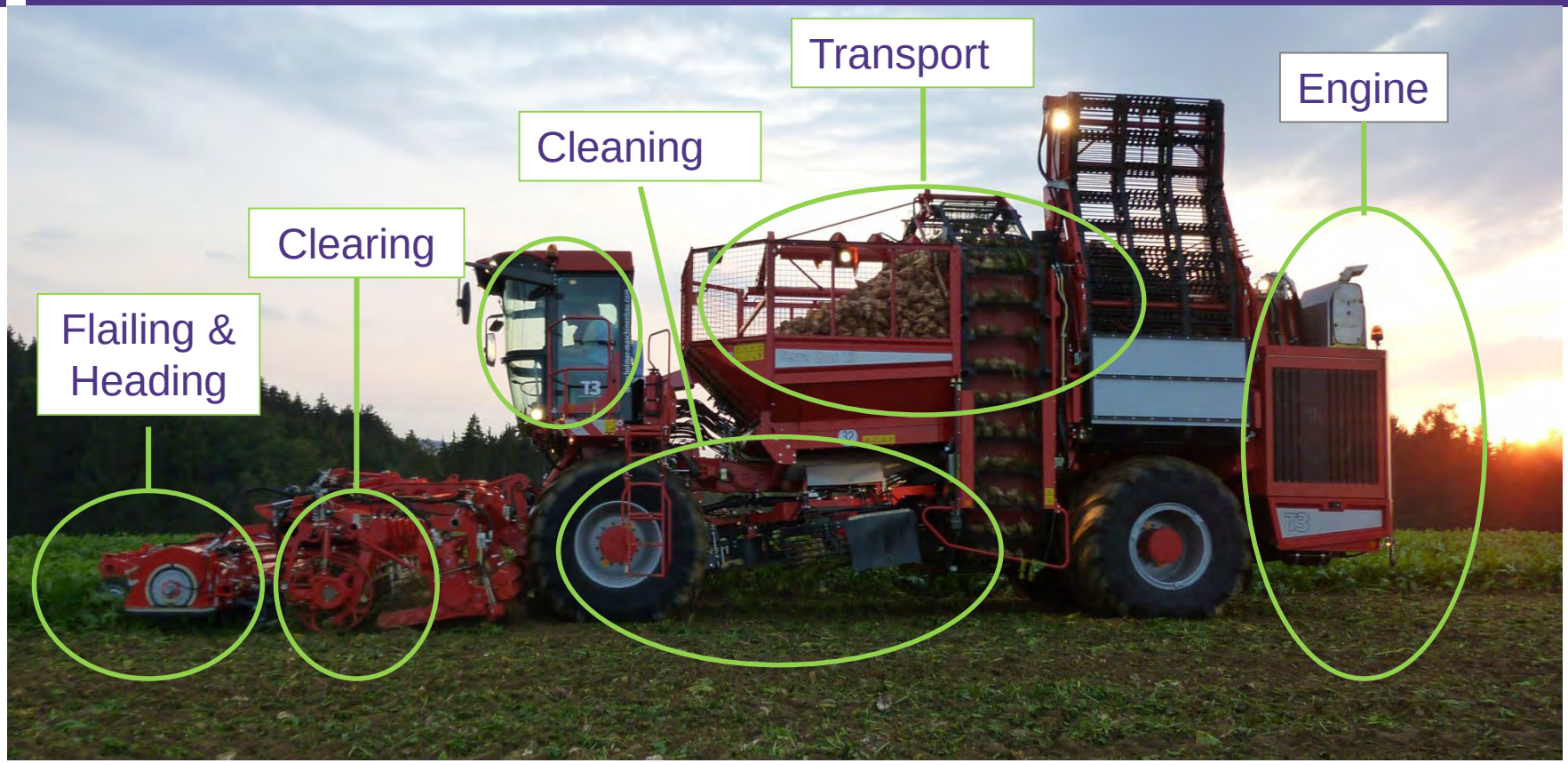
Task: - Harvest sugar beets without any loss
- Best possible cleaning of leaves and earth

HOLMER exxact

History:	HOLMER Maschinenbau GmbH founded by Alfons Holmer in 1969 Owned by Exel Industries (Fam. Ballu) since 2013 as HOLMER exxact
Employees:	330 (2014)
Turnover:	115 Mio. € (2014)
Qualifications:	Development, production and sales of self-propelled harvesting machines (focus: beet harvest technology)

Application

HOLMER sugar-beet harvester Terra Dos

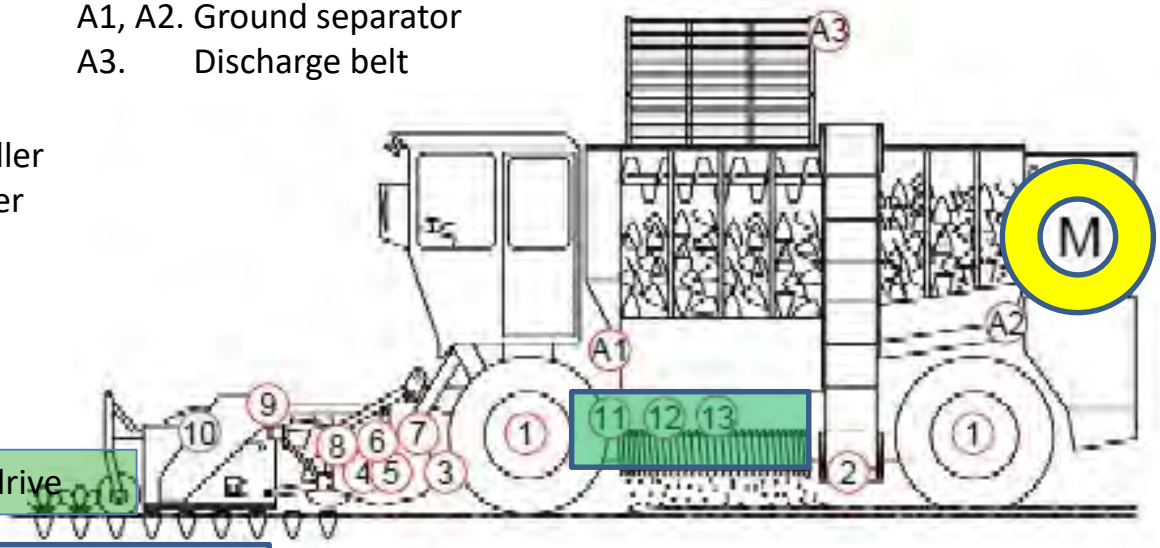


Power Train devided component drives

1. Travel drive
2. Elevator
3. Screen belt
4. Short right clearing roller
5. Short left clearing roller
6. Paddle drive
7. Rolling pass drive
8. Forced feeder
9. Vibroridger
10. Topper drive

11. 12. 13. Screening star drive

A1, A2. Ground separator
A3. Discharge belt



M Diesel engine

Hydraulic component drive

Challenge: Harvest quality

Different conditions require different settings!

-> different loads on the components
-> different rotational speeds on the components

Challenge: Drive technology

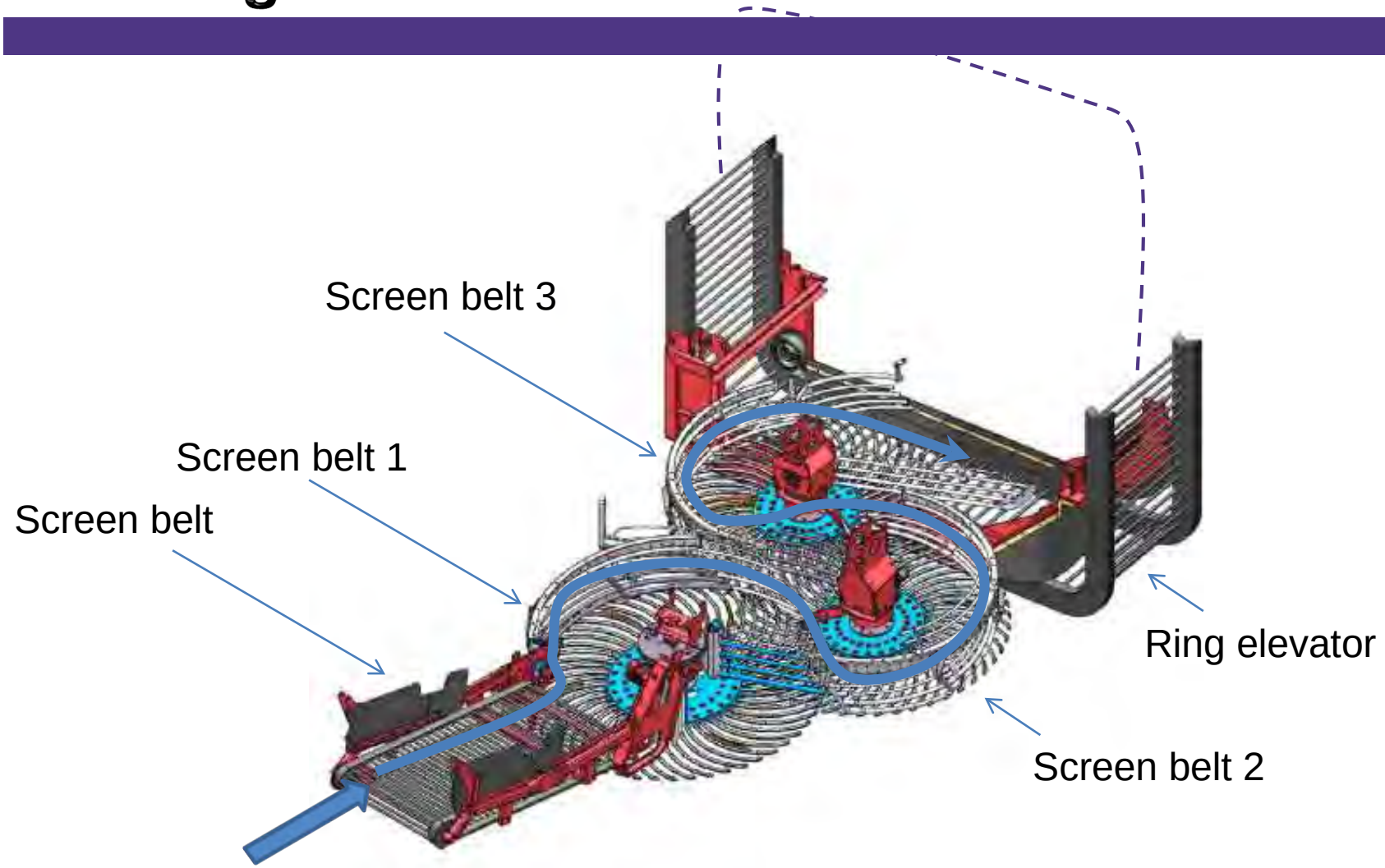
- **Non-stationary, flexible operating points**
    - Rotational speed used to parameterize the machine
    - Load requirement from process

    => Feedback of rotation torque and rotational speed to monitor process

-„Drive train management“ in the harvest machine requires the **integration** of **several components** (control and feedback)

- **Requirements on „mobile“ operation**
    - Protection class / Sealing
    - Performance weight
    - Temperature resistance
    - Mechanical loads

Structure / Function of the screen belt cleaning



Drive with screen belt cleaning

Practical requirements:

- Total performance peak of approx. 90 kW
- Stable rotational speed with differing loads as a basis for process safety
- Adjustable rotational speed differences between the screen belts
- Self-adjusting behavior at limits (overload)

Drive screen belt cleaning

Drive solution:

- Closed circuit with electrical load sensing
- Electro hydraulic adjustment pumps, 4 Orbital motors
- Elektro magnetic proportional valves BUCHER LVS 12
- For stable start-up, software-controlled flow-matching, between pump and user.
- Rotational speed control of all individual component drives
- Overlapped pressure monitoring of all individual component drives
  => Automatic rotational speed adaptation at threatening overload

HOLMER adaptive cleaning

Why?

- Relieves driver of monitoring tasks
- Makes existing capacity usable
- Avoids breakdown interruptions due to too high rotational speeds

Better efficiency > higher turnover > higher profitability!

Money makes the world go round …

… and the rotational speed is detected by …

RHEINTACHO **!**

Thank you for your attention!