

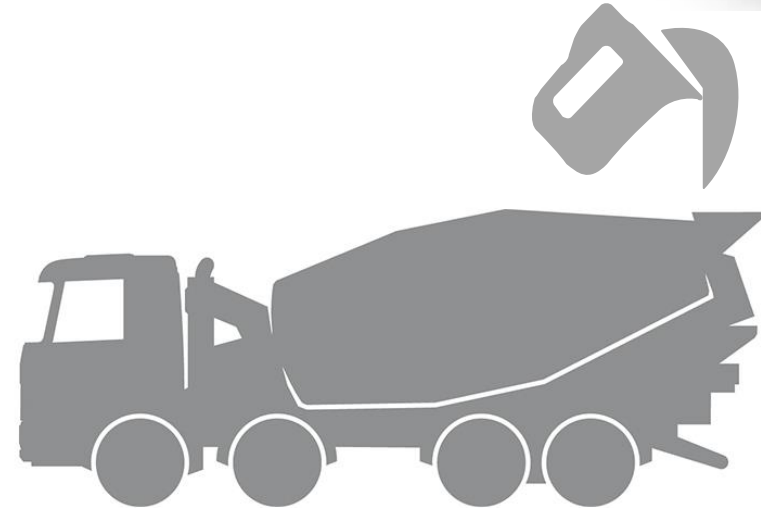


New telematics and water control system for truck mixers

Philipp Fleischer, **LIEBHERR**

Concrete Quality

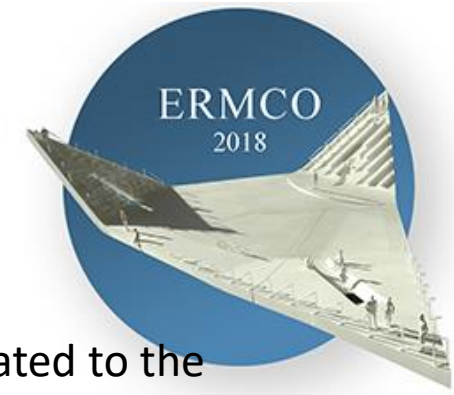
- Most popular method for increasing workability of fresh concrete
 - Add water into the truck mixer
- But adding water means
 - Change the water-cement-ratio (w/c) ↑. This means
 - less strength
 - less durability
- What standards do we have
 - EN 206-1: no addition of water into the truck mixer is allowed
 - Different national standards (e.g. Germany DIN 1045-2 to EN 206-1)
 - after producing concrete with less water, it is allowed to add only the missing amount of water at the construction site into the truck mixer (necessary mixing time is described)



Responsibility to ensure Concrete Quality



- Who is **responsible** for the concrete quality?
 - The **producer** of the concrete is responsible for the ordered concrete
- Problem:
 - The producer **does not know what happens** during the transport and at the construction site
 - Even if the concrete is produced very well at the ready mix factory, probably the hauliers or the workers can make the concrete worse without any notes on the delivery papers and the producer of the concrete is responsible
- How can you **solve** this problem?
 - Gain **transparency** about water adding by **using telematics**



Idea background

To ensure concrete quality at the job site **operating data** of truck mixers as well as **process data** related to the concrete quality become more and more important.

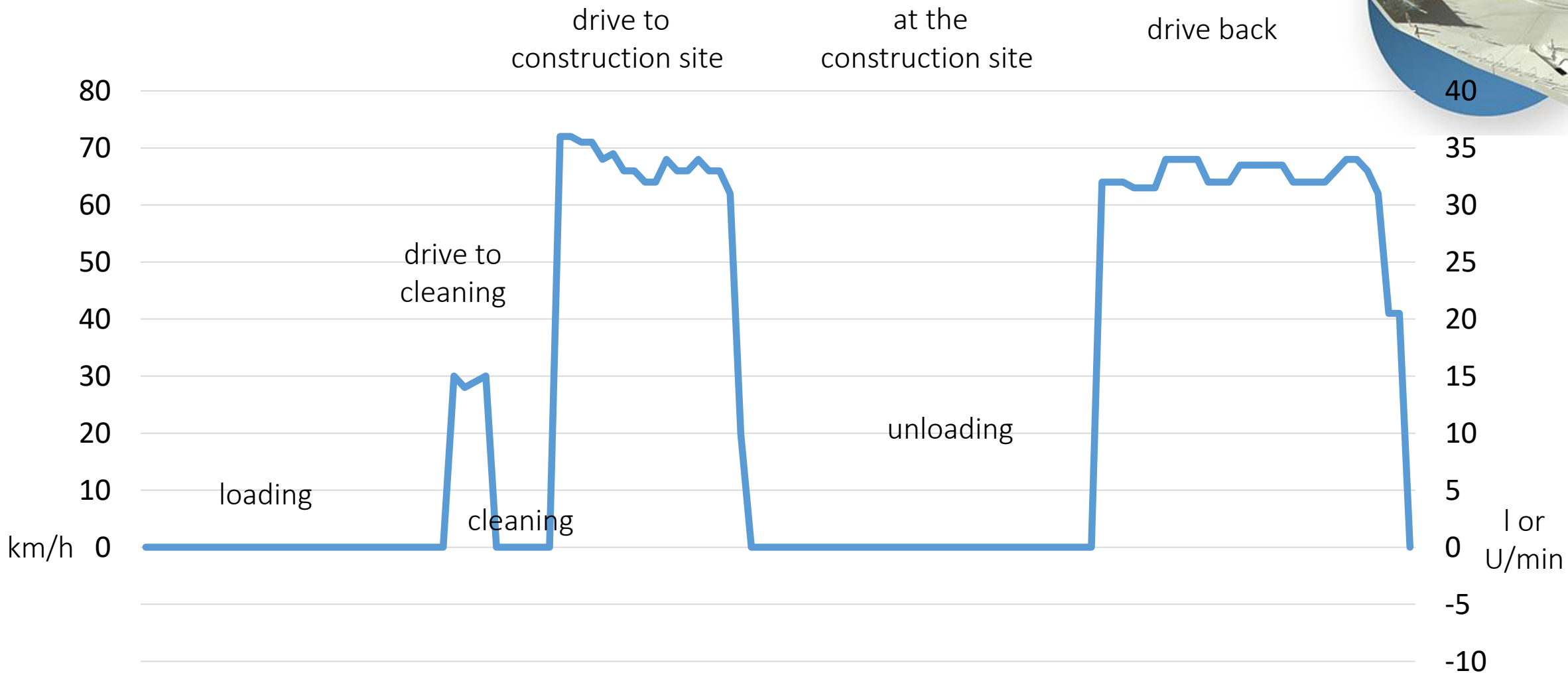
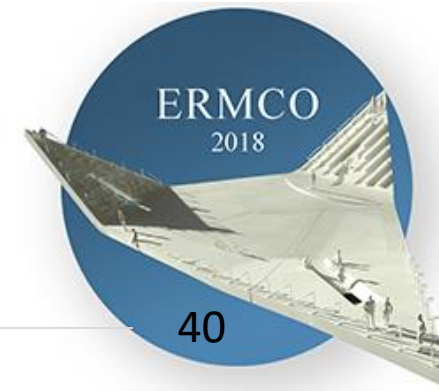
Generally we classify data in 3 categories

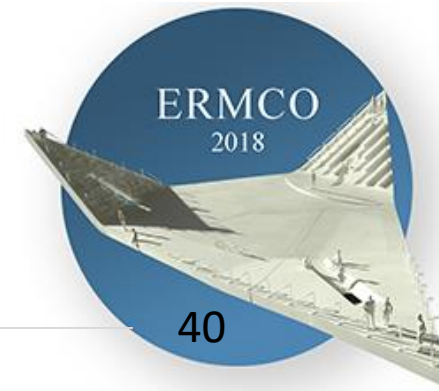
- **operating data** → What is the truck mixer doing right now?
 - current rotation direction (loading/ unloading), current rotation speed, fuel consumption, etc.

- **process data** → What may influence the concrete?
 - water added?, is the concrete mixed up correctly?, etc.

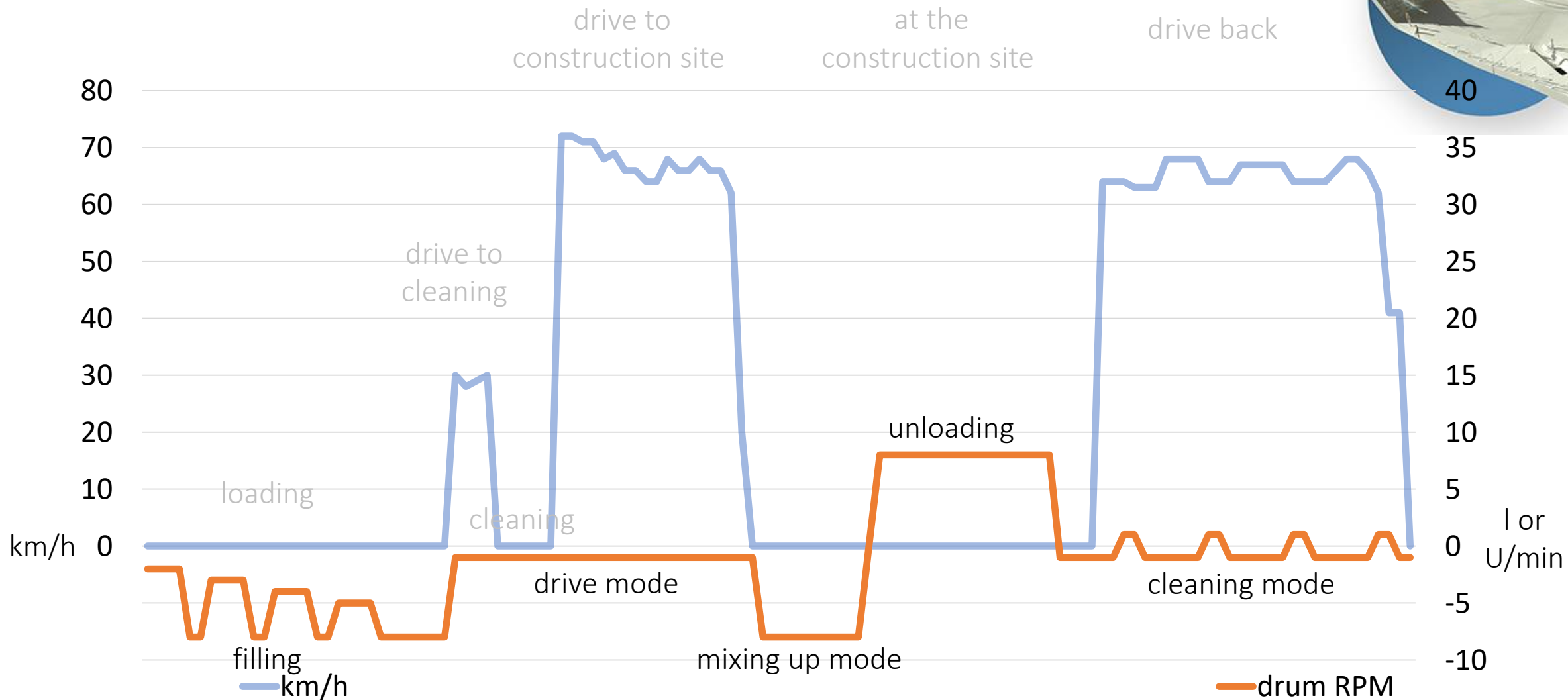
- **machine data** → What is the overall status of the truck mixer?
 - Overall rotations, oil temperature development, etc.

Truck speed during one cycle

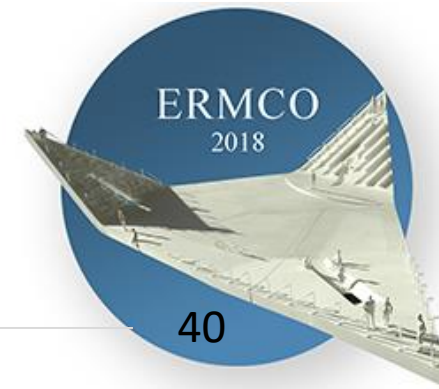




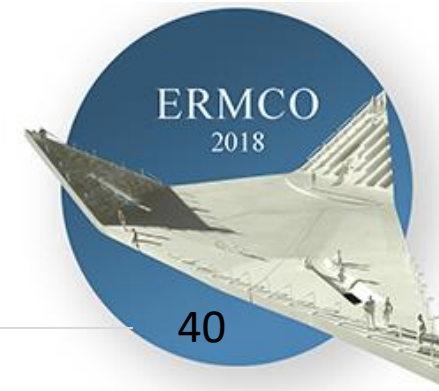
Drum rotation speed and direction during one cycle



Water usage for cleaning

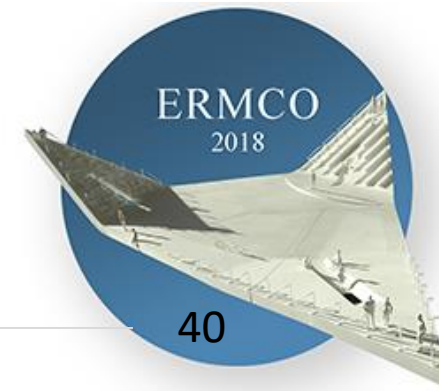


26.07.2017

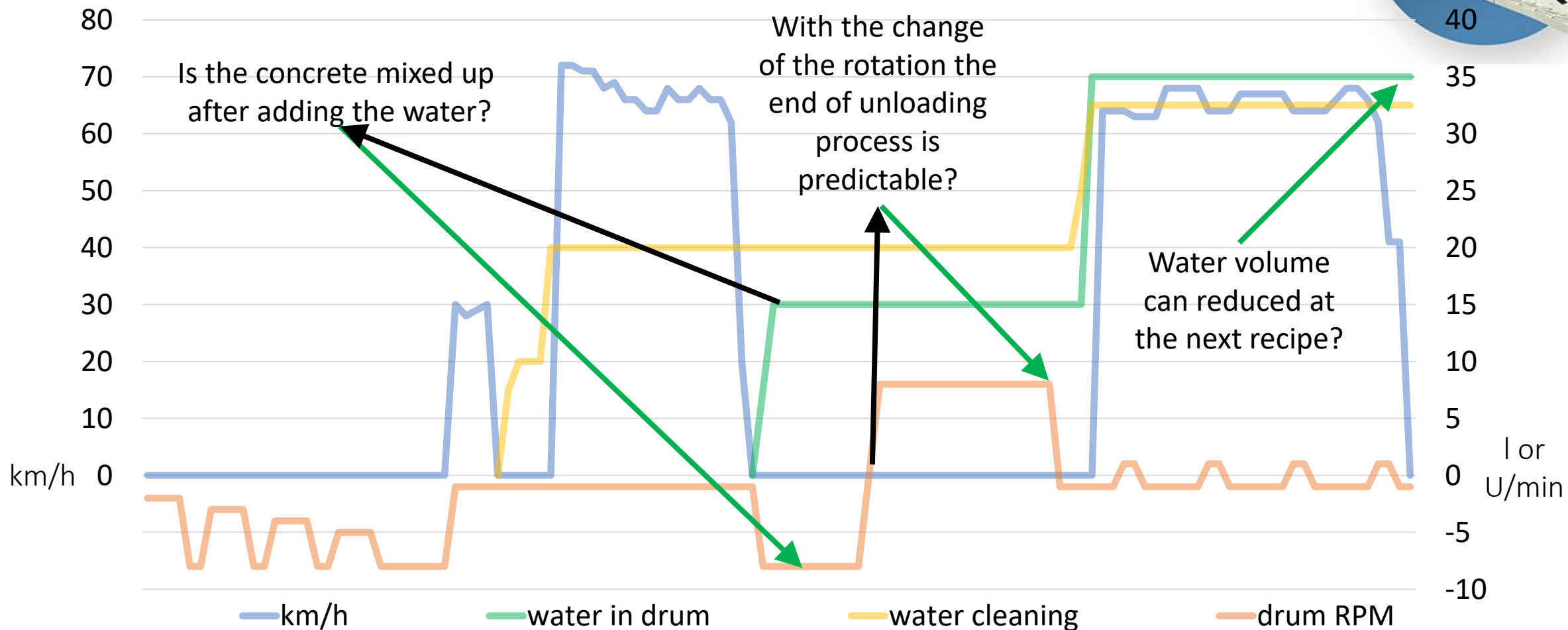


Water used in the truck mixer drum → critical for the concrete quality





Additional information/ indirect data during one cycle



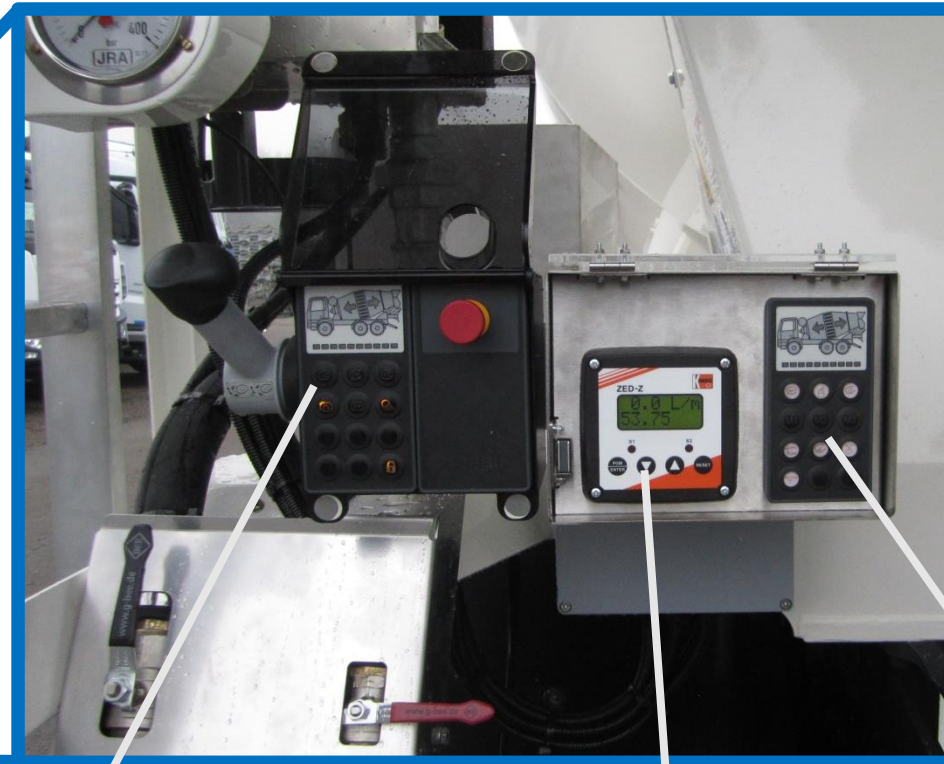
Technical realization and integration in the truck mixer



- Water dosing unit (incl. heating)



- Control station at the back



Litronic-EMC control panel to control the mixer

display for water dosing unit

control panel for water dosing unit

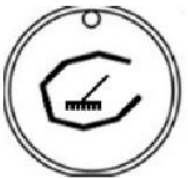
additional comfort features of the Liebherr telematics-water system



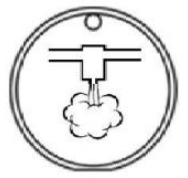
- Adding of a predefined **quantity of water**: 5l, 8l, 10l, etc.



- Mixing up the concrete for a **predefined time**



- Cleaning Mode: **Complete water** is added into the drum and the cleaning mode (left/ right) is activated



- All valves are opened and tubes are cleaned with compressed air “winter cleaning mode”





**THANK YOU
FOR YOUR ATTENTION!**

philipp.fleischer@LIEBHERR.com