Why Condition Monitoring?
Success case on Blow Moulding Machine

Eng° Waldir Vianna Junior
Argo-Hytos AT Fluid Power Systems ltda.
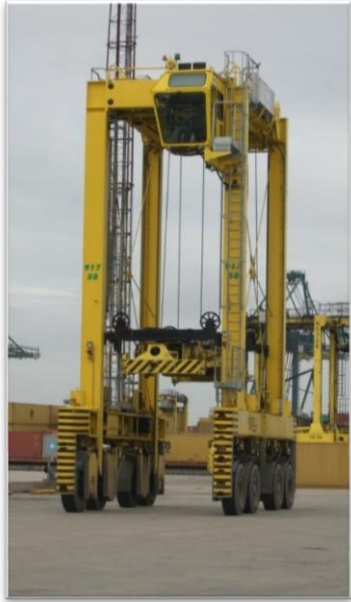
Motivation

"When availability is the difference between life and death, on humans or companies"

FPNI Ph.D. Symposium on Fluid Power
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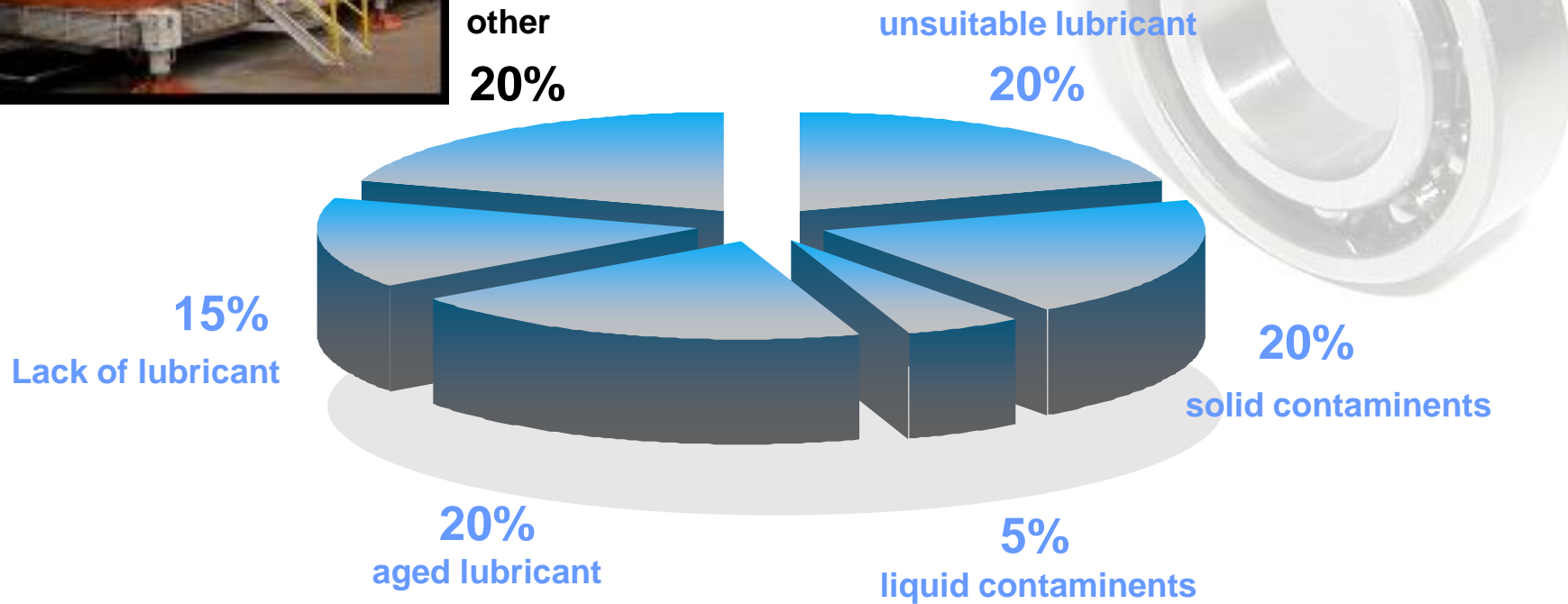
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ICU Conditions

- Heart rate
- Blood pressure
- Blood oxygen saturation
- Breathing
- Respiratory rate
- Diabetes
- Temperature
- Parenteral feeding
- Catheterization
- Hemodialysis
- ......

Condition Monitoring in a ICU - Increases substantially the chances of survival!!!

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Failure causes

other
20%

unsuitable lubricant
20%

15%
Lack of lubricant

20%
solid contaminents

20%
aged lubricant

5%
liquid contaminents

Source: *Prof. Gold: IME RWTH-Aachen*

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Conclusion

80% of the failure causes can be detected by the condition of the lubricant!

other
20%

unsuitable lubricant
20%

Lack of lubricant

20%
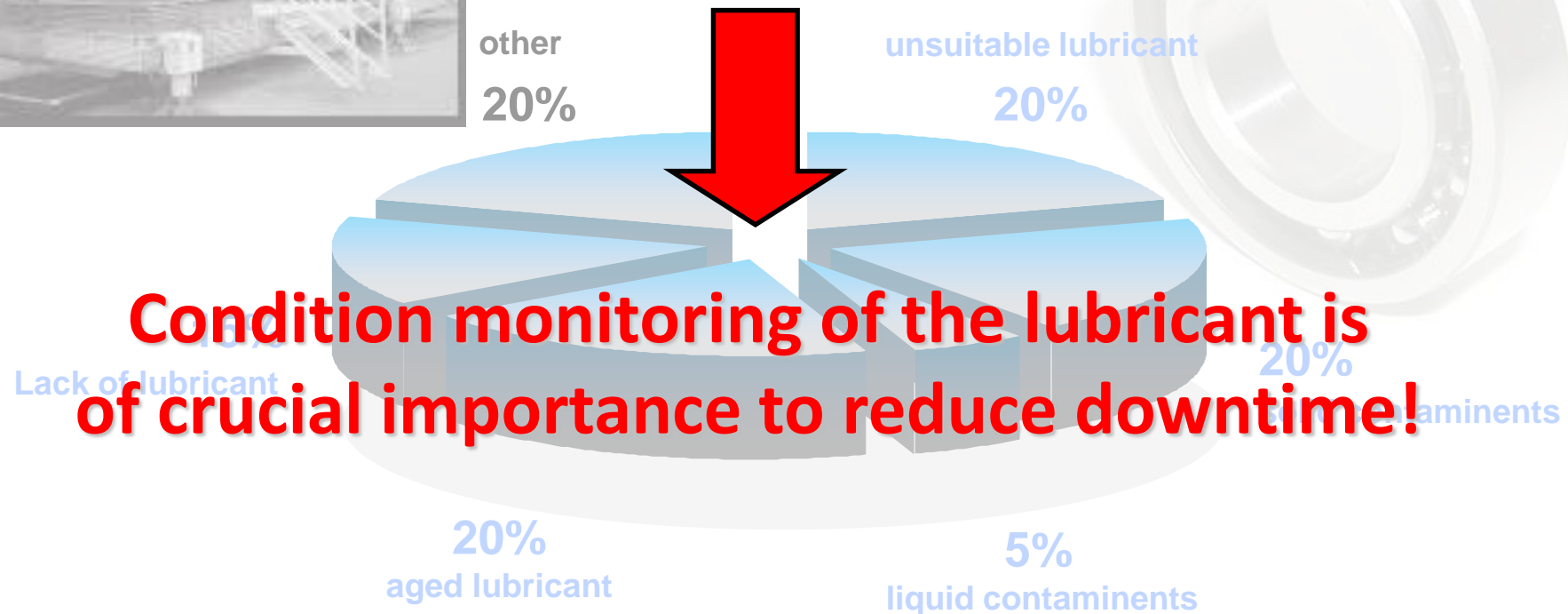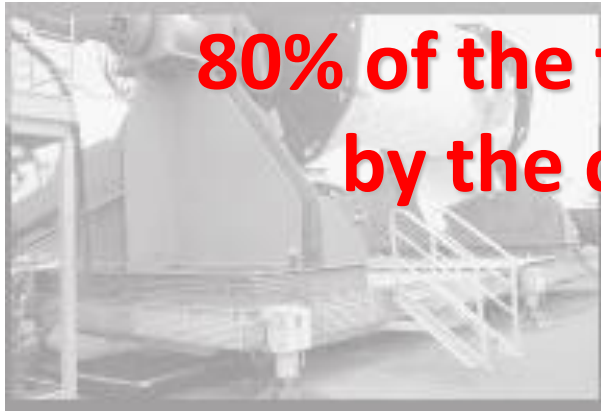
Condition monitoring of the lubricant is of crucial importance to reduce downtime!

aminents

20%
aged lubricant

5%
liquid contaminents

Source: *Prof. Gold: IME RWTH-Aachen*

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Properties of intelligent sensors
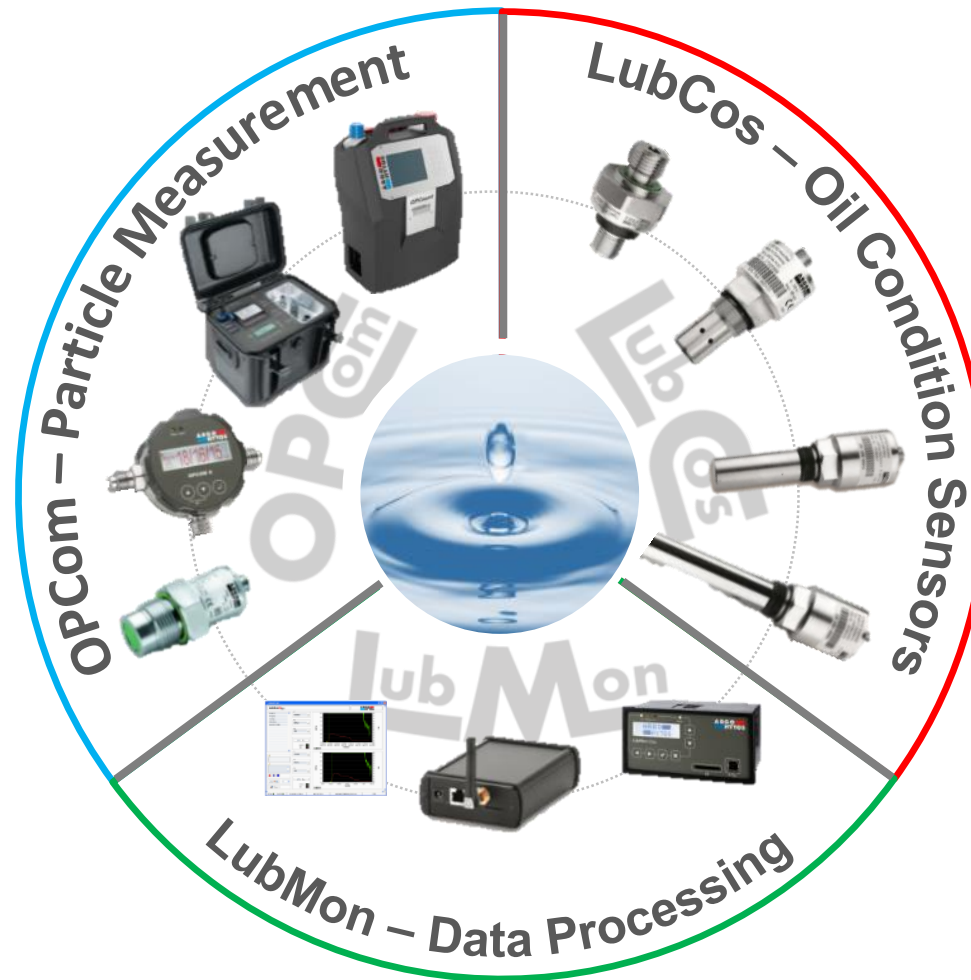
› Automatic processing of measurement data

› Execution of decentral logical functions

› Automated learning and creation of profiles

› Selfdiagnostic and status messaging

› Direct communication with decentral actuators and PLCs

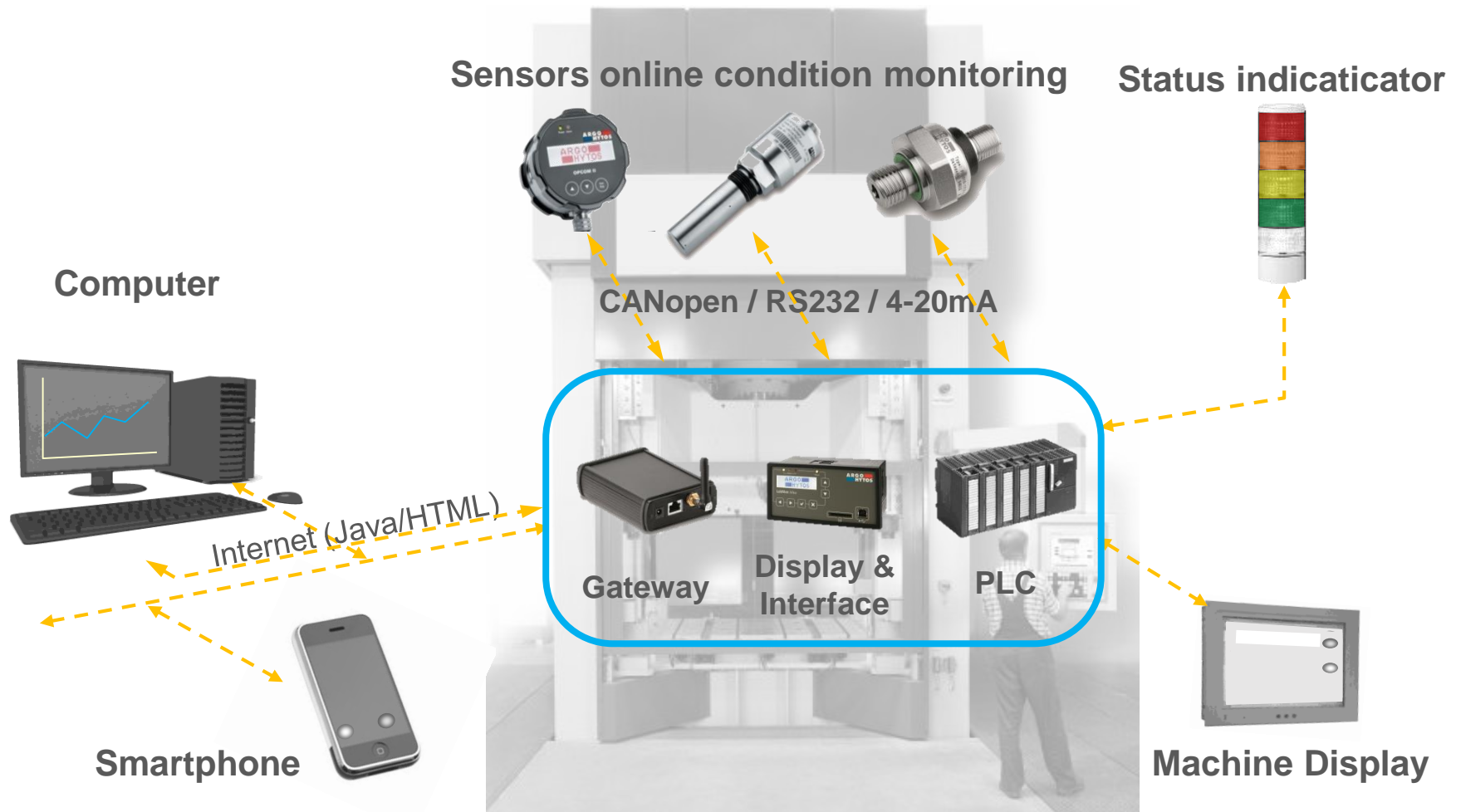Data processing
and displays
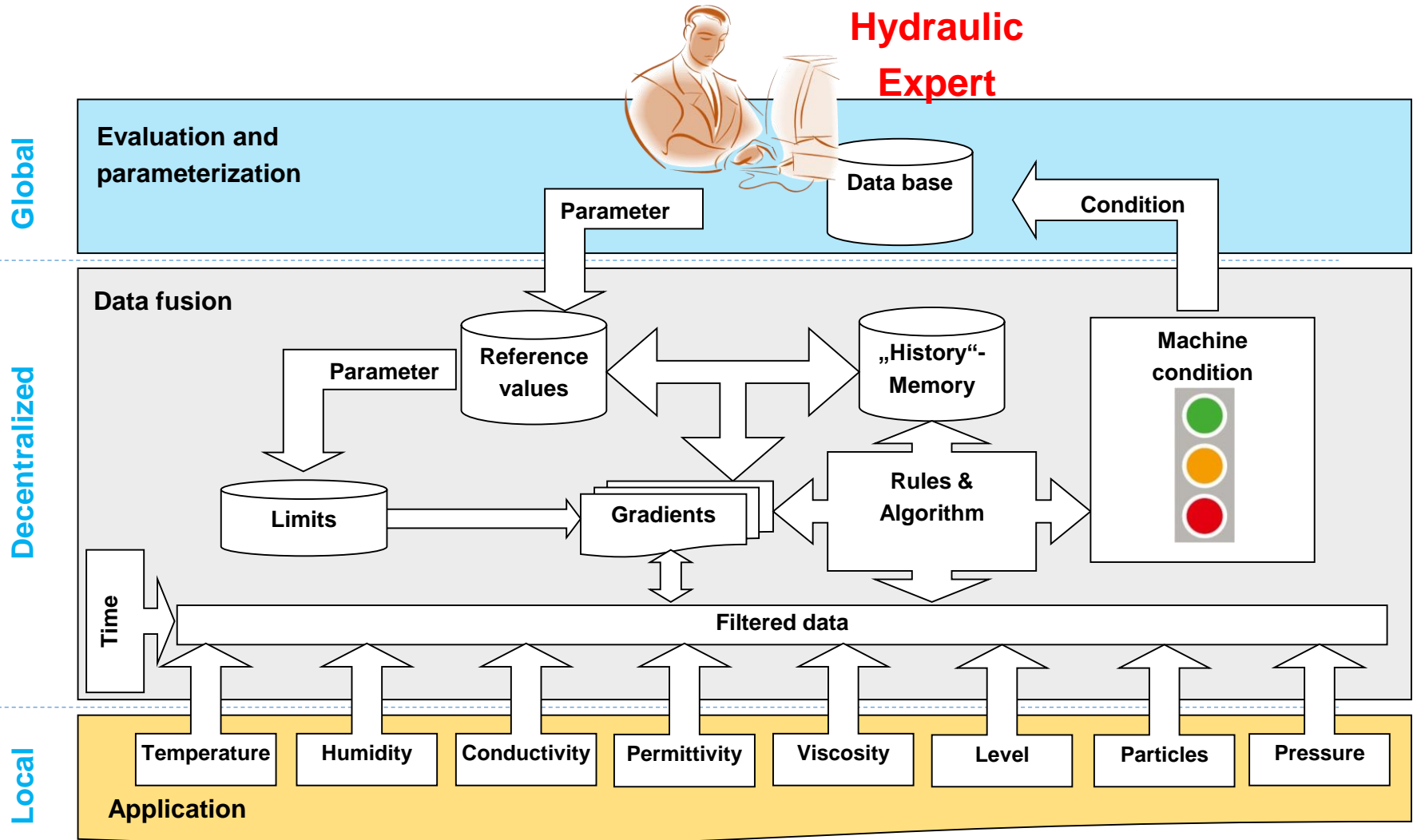
Particle monitor

Wear sensors

Oil
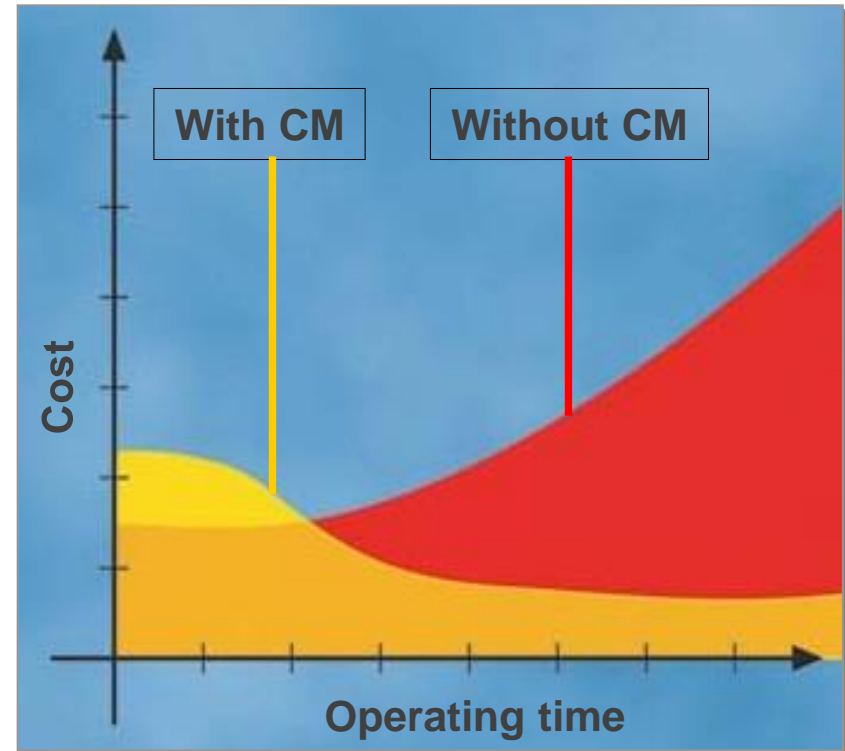condition sensors

Pressure sensors

Oil dignostic systems

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Online monitoring connections

Sensors online condition monitoring

Status indicaticator

Computer

CANopen / RS232 / 4-20mA

Internet (Java/HTML)

Gateway

Display & Interface

PLC

Smartphone

Machine Display

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Condition Monitoring Structure

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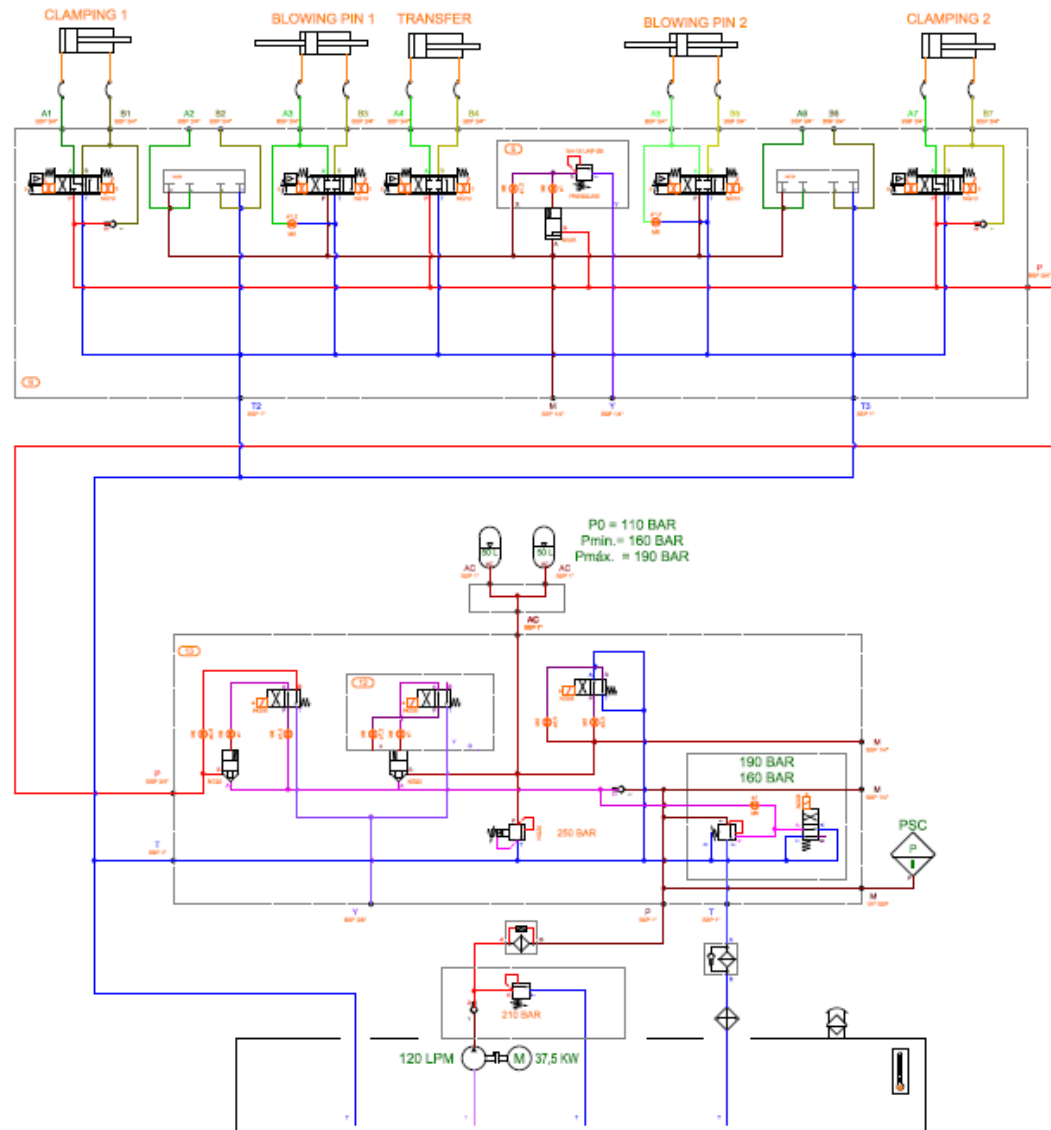
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Condition Monitoring Benefits & Costs

- ❯ Avoid unplanned downtime
- ❯ Increase availability
- ❯ Improved planning of services
- ❯ Optimized spare part sourcing and stocking
- ❯ Longer machine lifetime
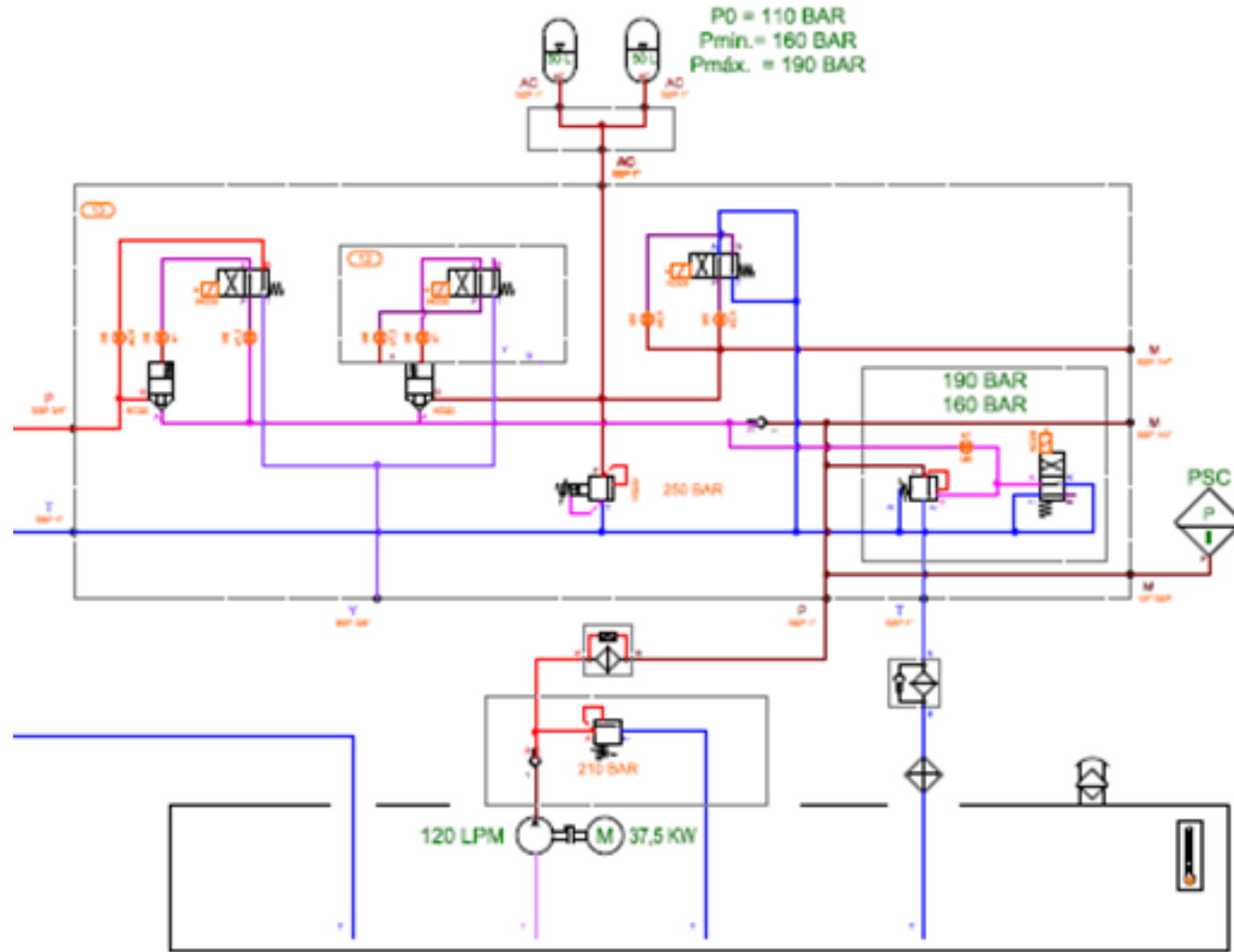- ❯ Increased safety for machine and operator

With CM   Without CM

Cost

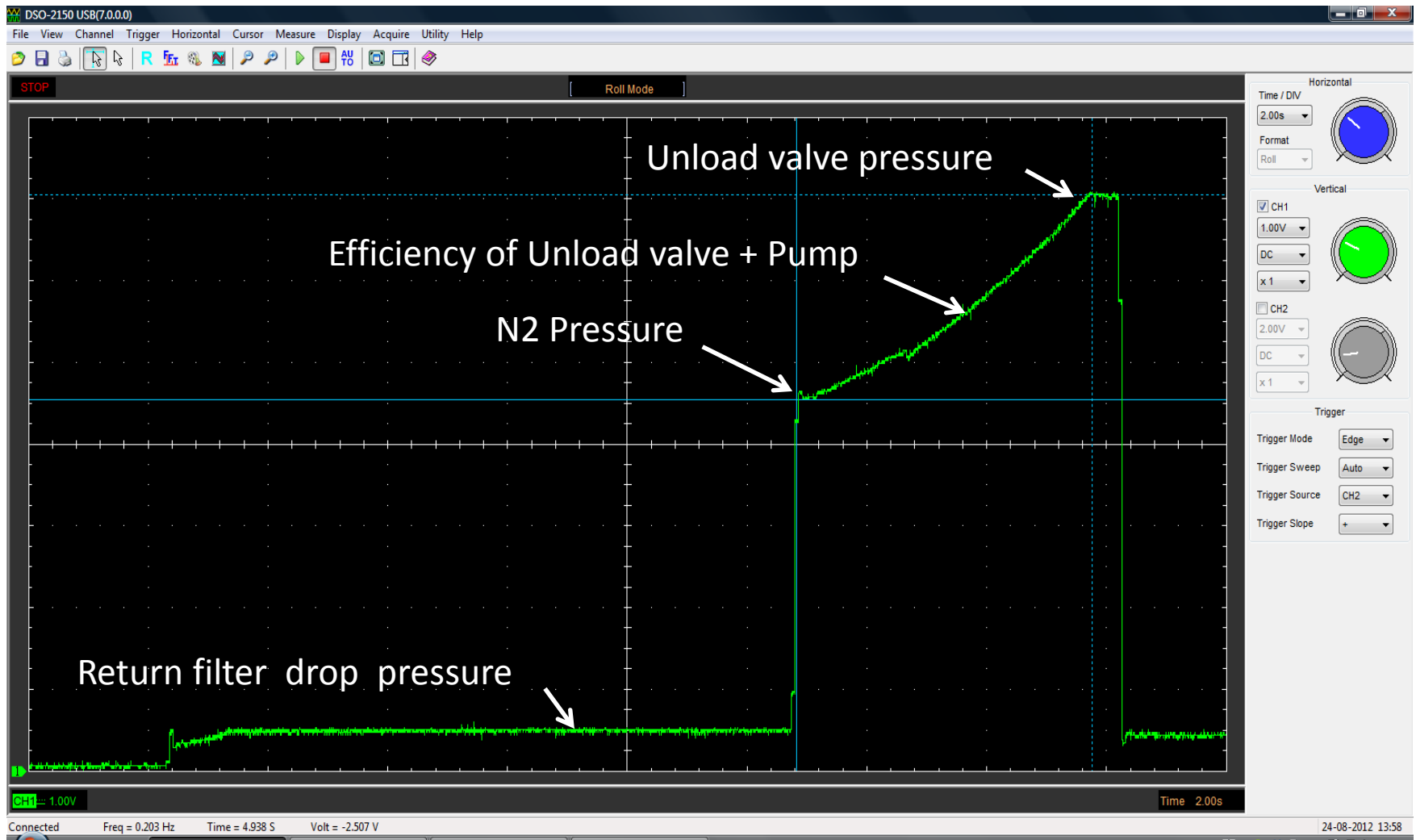Operating time

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Blow moulding machine

Argo-Hytos Pressure Sensor

PSC 250-1843 0 - 250 bar 4-20 mA

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Accumulator initial charging

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Problems pointed out by Condition Monitoring
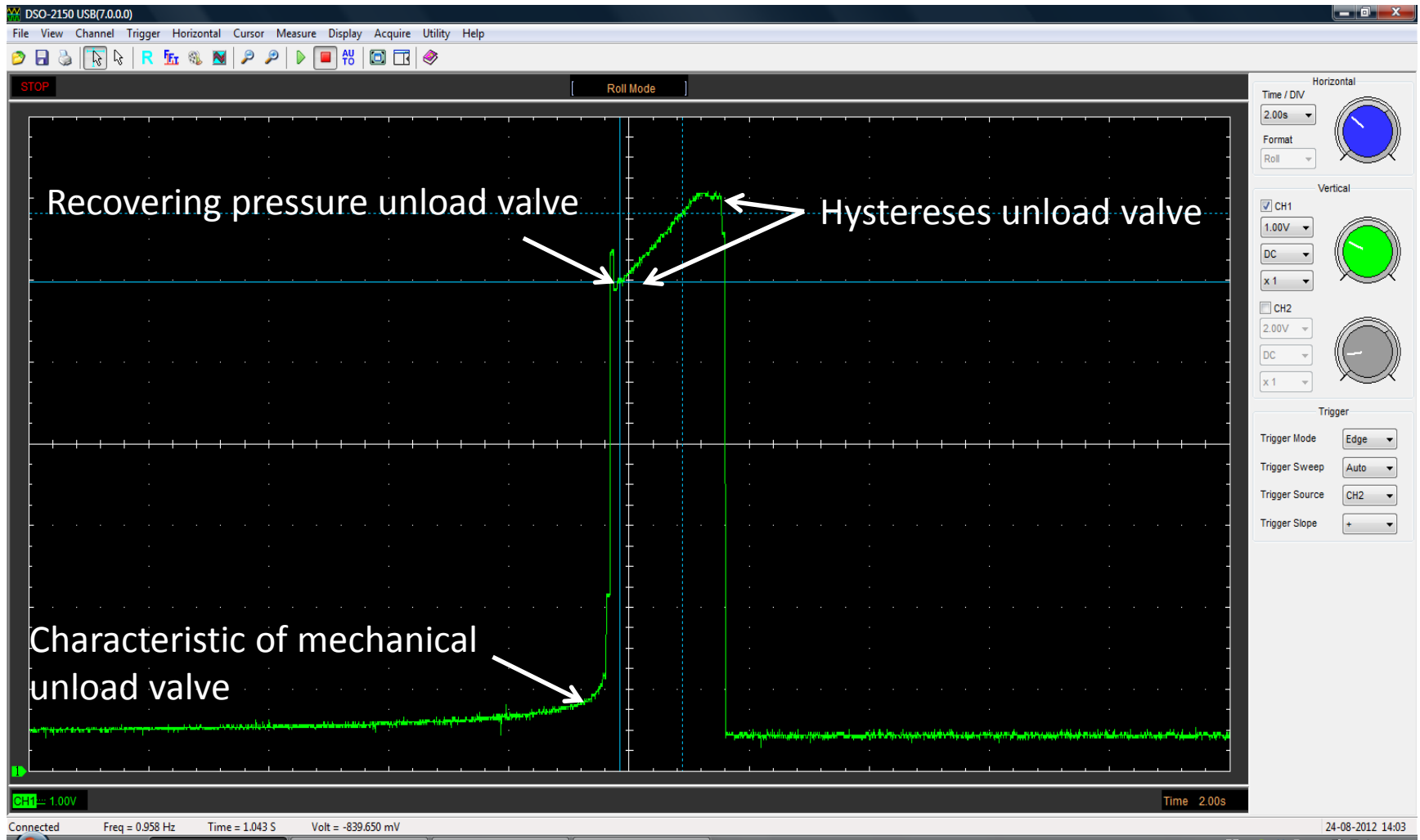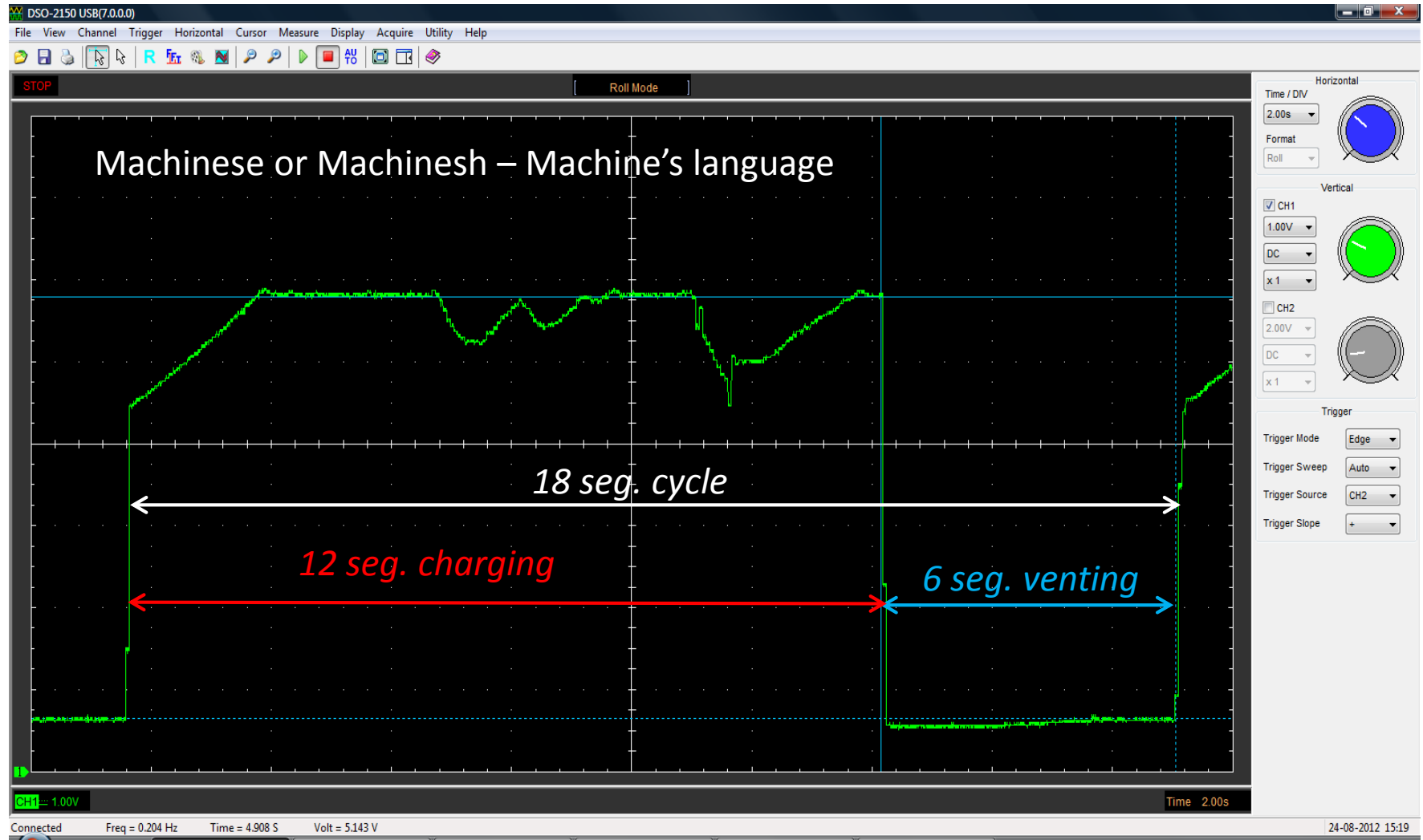
- *Low Nitrogen pressure;*

- *Low pump efficiency;*

- *Inadequate performance of unloading valve on closing point;*

- *Low efficiency of unloading valve on higher pressure;*

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Status before condition monitoring

- *Investments on new machines to recover total production;*

- *Hiring more operators;*

- *Conecting water circuit of heat exchanger to moulding chiller water;*

- *Investing on more chillers due high demand for water colling;*

- *Increasing maintenance team due aquisition of more equipments;*

- *Investing on new primary electric cabin due higher demand for power*

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Corrective maintenace pointed out by CM

- *Pump changing* **✓**

- *Mechanical unload valve changed for digital pressure switch + electric relief valve* **✓**

- *Nitrogen accumulator pressure adjusted* **✓**

- *Reconect water circuit of heat exchanger* **✓**

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Production cycle after condition monitoring

Status after Condition Monitoring
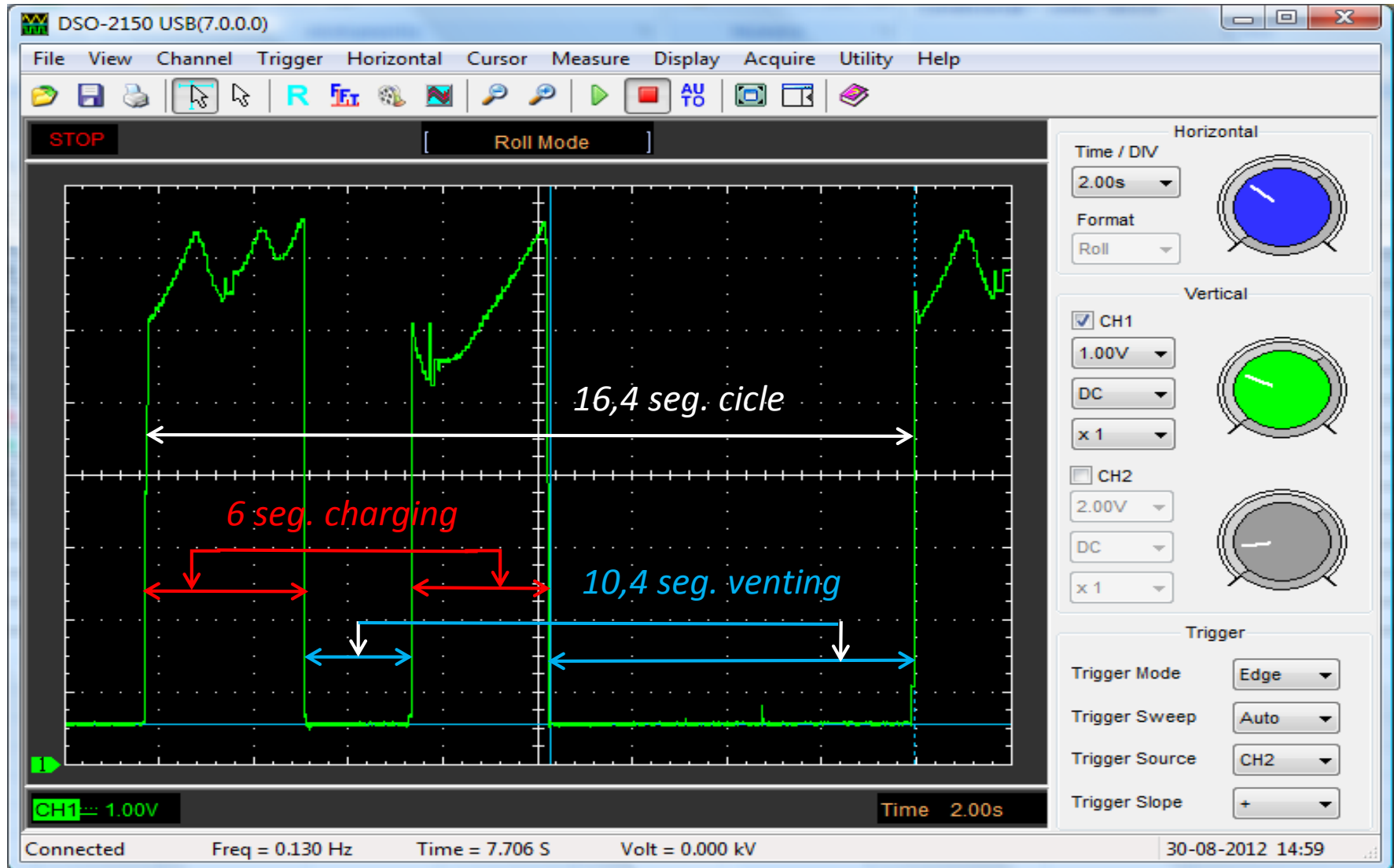
- Increasing 9,75% production;

- Decrease 33% of power consuption of main electric motor of hydraulic circuit;

- 12,5 Kw per machine on 3 shifts production, represents savings of US$ 100,00 per day per machine;

- Decreasing number of chillers and also their power consuption;

- Decreasing maintenance costs;

- Decreasing product costs;

- Increasing competitiveness;

- Increasing market share;

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Why Condition Monitoring?

- Muito Obrigado!

- Thank you very much!

- 謝謝

- Danke!

- Tack!

- Mange tak!

- Dziękuję!

- Merci!

Eng. Waldir Vianna Junior
w.vianna@argo-hytos.com.br
55 11 4016 8307
55 11 9 9994 5127

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