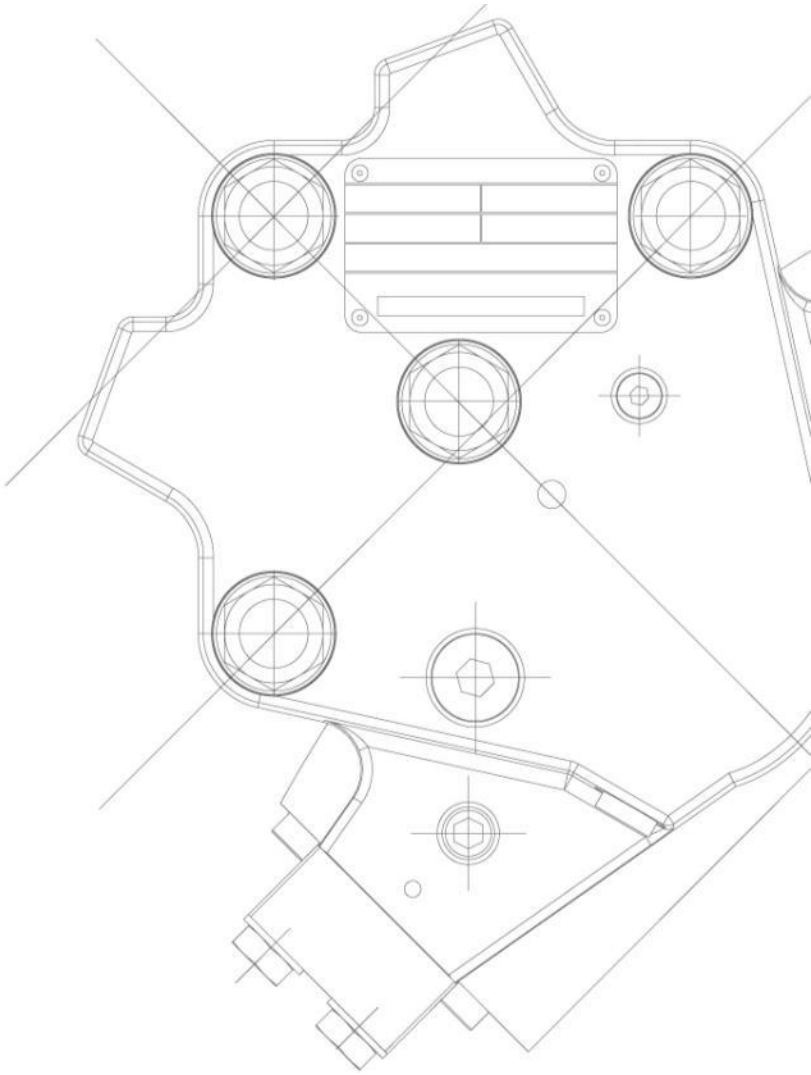
SVENDBORG BRAKES

INTELLIGENT BRAKING SYSTEMS FOR LARGE CONVEYORS

By Robin Schmidt, Svendborg Brakes USA, Inc. – Feb 2012

Agenda

- Introduction
- Low & high speed brake systems
- Overview of today's intelligent brake systems
- Conveyors with intelligent brake systems
- Examples of brake systems on large conveyors
- Intelligent brake system FEATURES
- Intelligent brake system BENEFITS
- Maintenance



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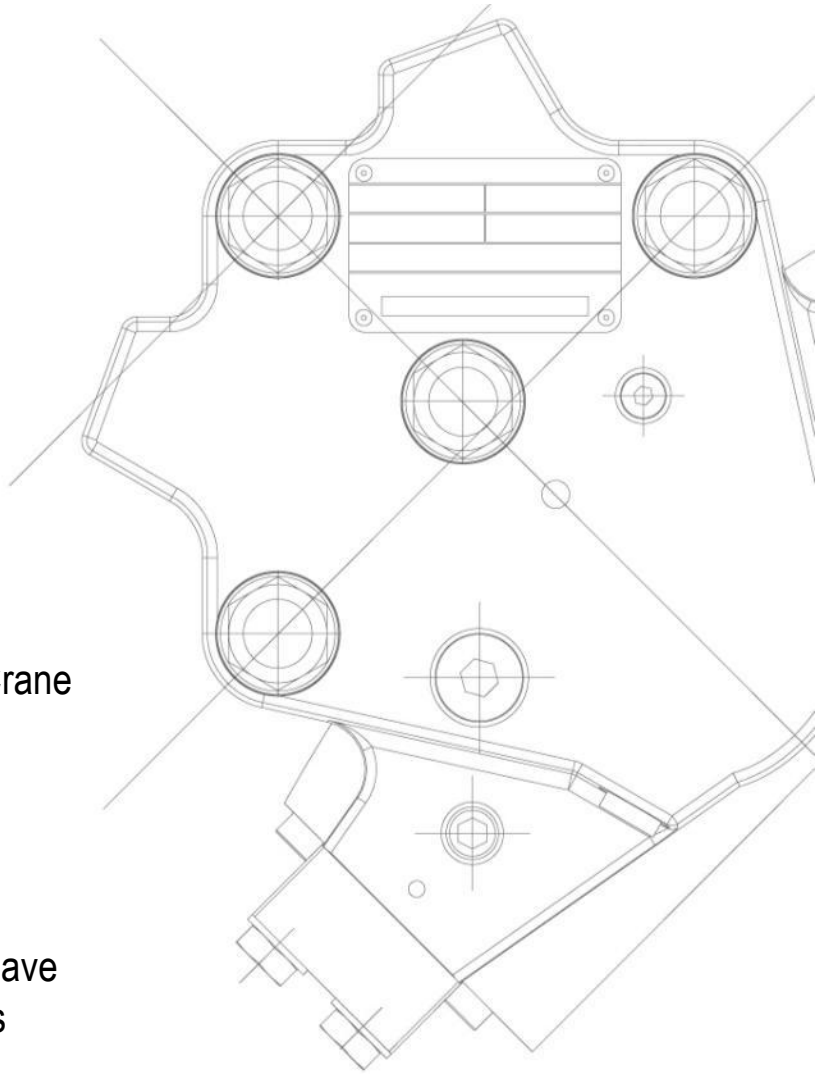
Introdution



Who?

- Robin Schmidt - Sales Manager Americas
  - 10+ years industry experience
  - Svendborg Brakes =250+ employees worldwide
  - Global Presence

What?

- Brake Systems for: Mining Industry, Oil & Gas Industry, Crane Industry, Wind Turbine Industry etc.

When?

- Svendborg introduced the frst intelligent brake system (SOBO®) back in 1998. During the last 14 years, there have been continuous product development and improvements resulting in the current advanced technology.

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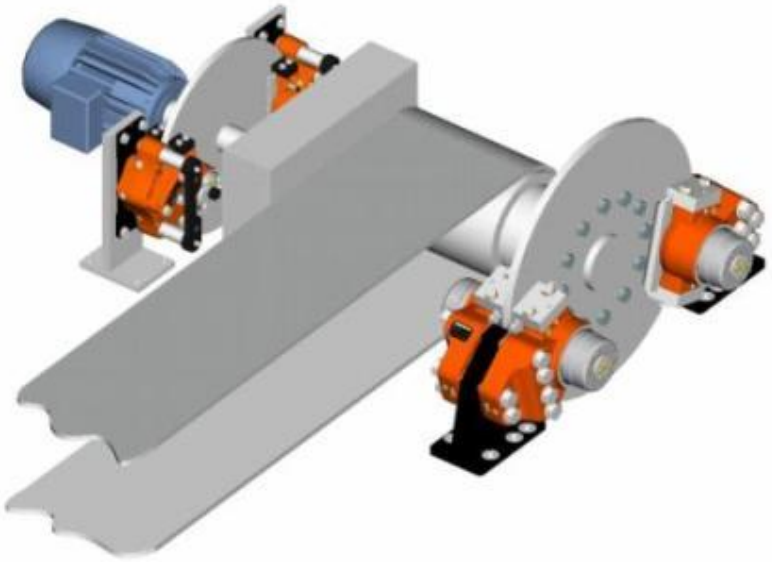
Low & high speed brake systems



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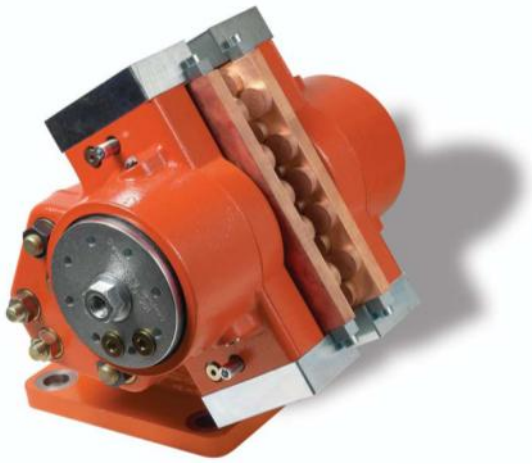
Overview of intelligent brake systems

- Brake System - Proportional Valve
- Brake System - Proportional and Digital
- Brake System - Pulse Width Modulated design (PWM)

All of the above Brake Systems are based on **DIRECT** Acting Brakes



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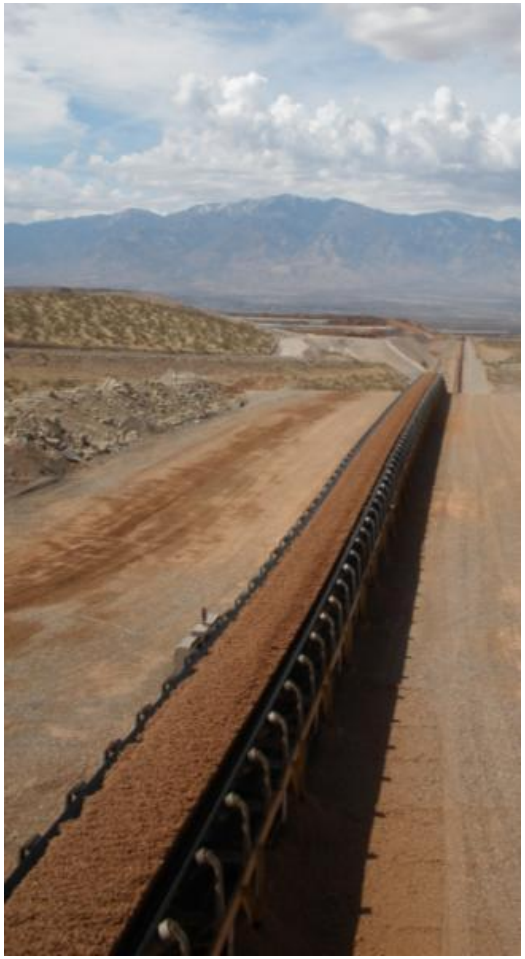
Conveyors with intelligent brake systems

- Large or complex conveyor designs typically require an independent intelligent brake system, but also smaller mobile conveyors with changing lengths and angles will benefit from the flexibility of an intelligent brake system.

- Factors such as drive setup, uphill/downhill sections, length, curves, angles, stopping time, environment and material conveyed play an important role in selecting the right technical brake system.

- Today's market is pushing the conveyor sizes and capacities to new limits, which have resulted in the brake systems having to adapt as well. It has become even more important than before to use an intelligent brake system. SAFETY, RELIABILITY and UPTIME are key words in today’s design, and helps maximize the production output.



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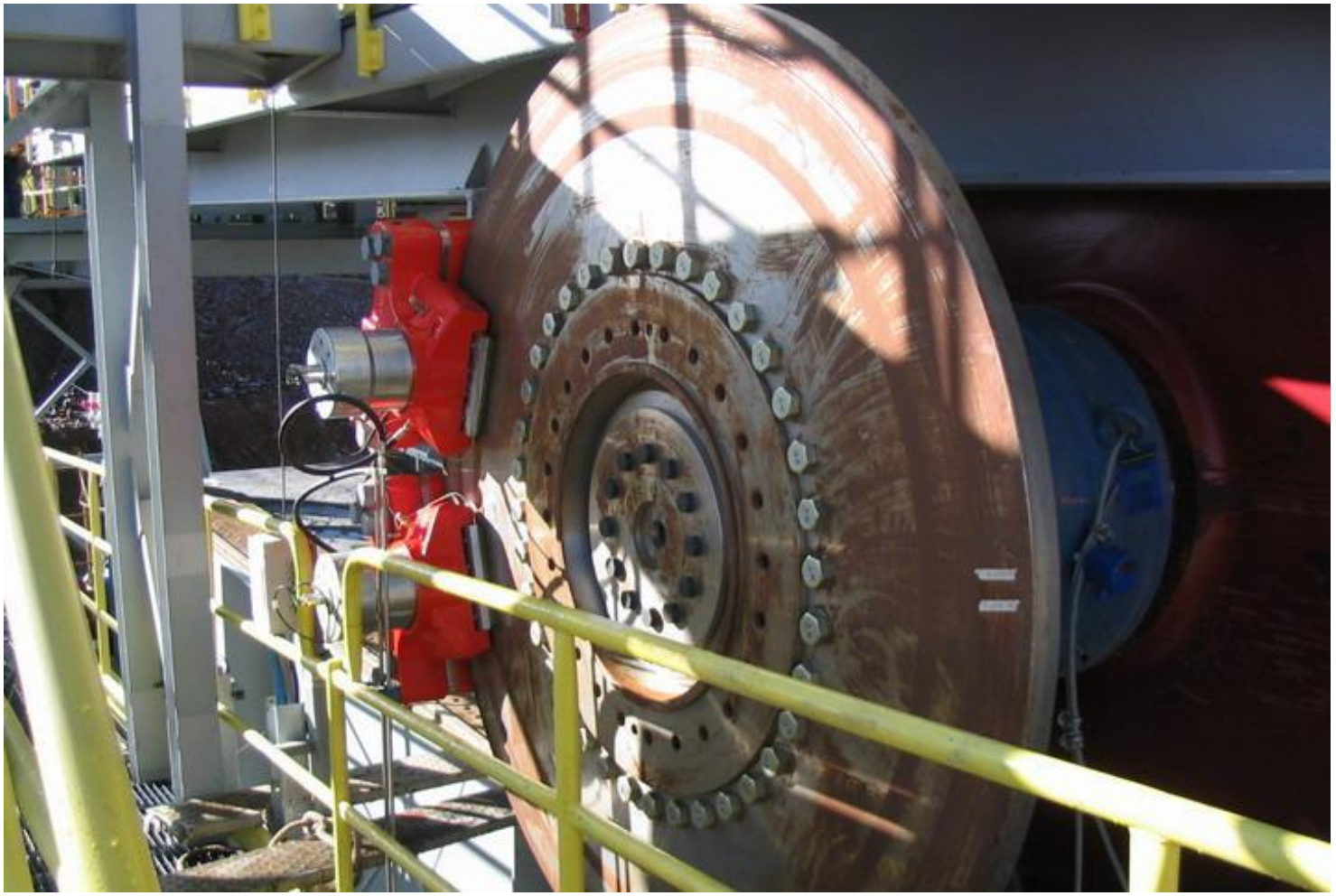
Brake systems on large conveyors



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Brake systems on large conveyors

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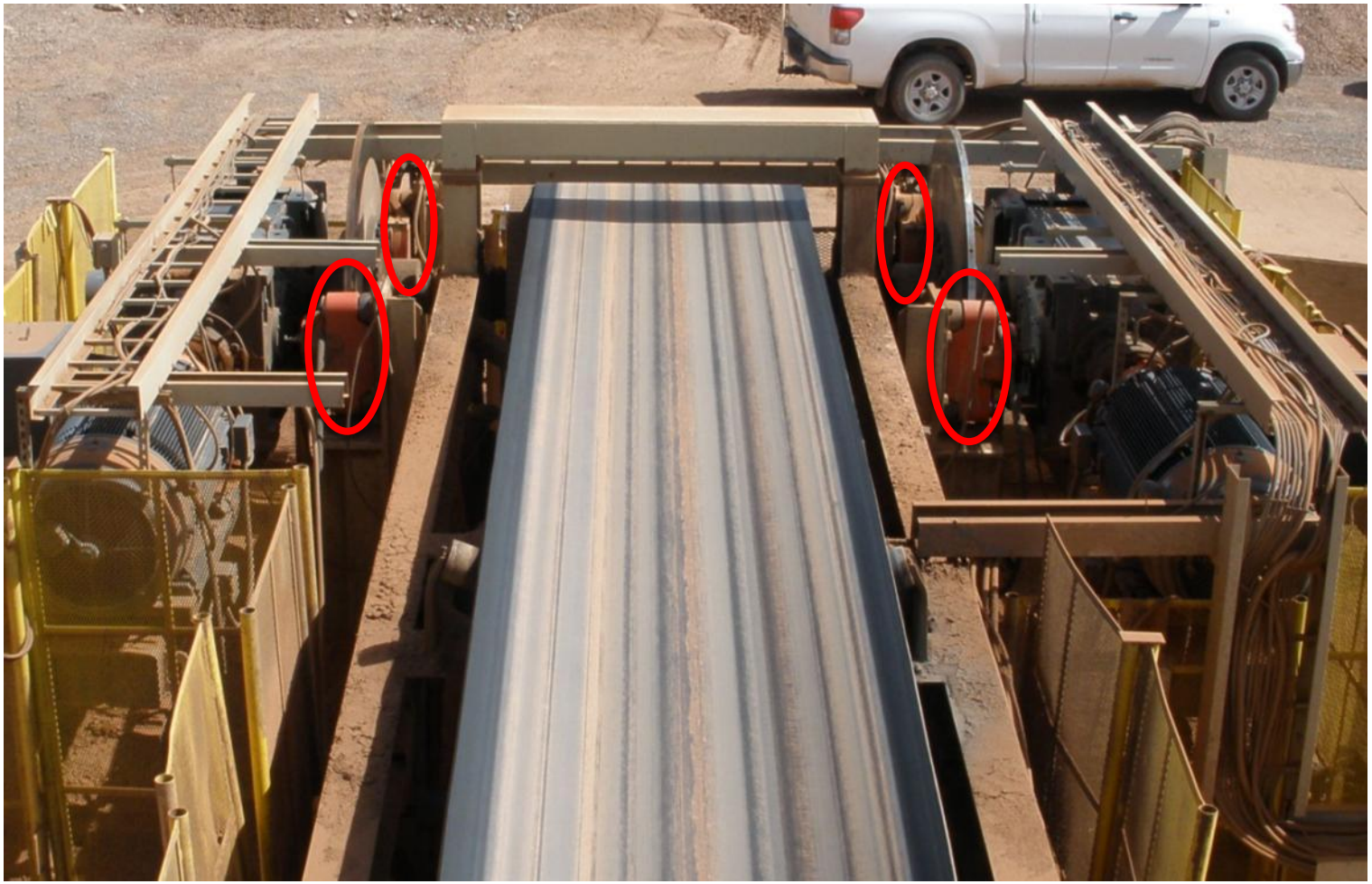

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Brake systems on large conveyors

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Brake systems on large conveyors

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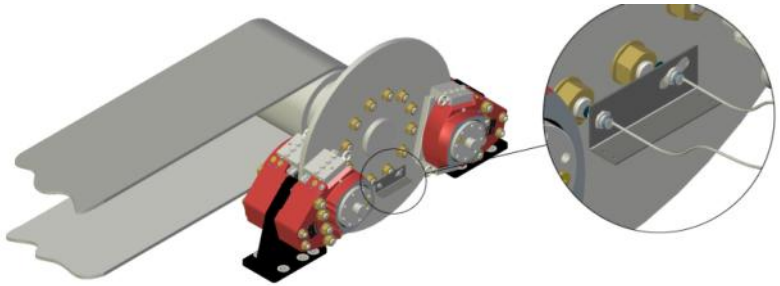
Intelligent brake system features

- **Torque Control** (brakes will apply according to motor torque feedback)
- **Shadow Braking** (e.g. shadows VFD ramp)
- **Priority Braking** (braking ramps are prioritized)
- **Multiple Stopping Ramps** (e.g. Normal stop, E-stop etc.)
- **Startup Ramp** (for controlled release of brakes -- e.g. used with fluid coupling)
- **Dual Speed Input** (direction detection and redundancy)



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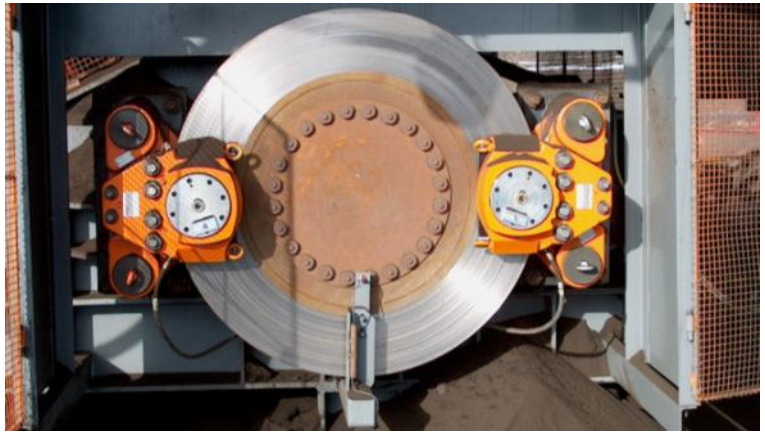
Intelligent brake system features

- **Parking Sequence** (last phase of braking)
- **Operation Signal** (to inform if brake system performs an action)
- **Safety Signal** (to inform status of brake controller)
- **Programmable Locally** (programmable onsite w/o computer)
- **RPM Timer** (speed detection after brake(s) set)
- **Rollback** (in place of mechanical back stop)



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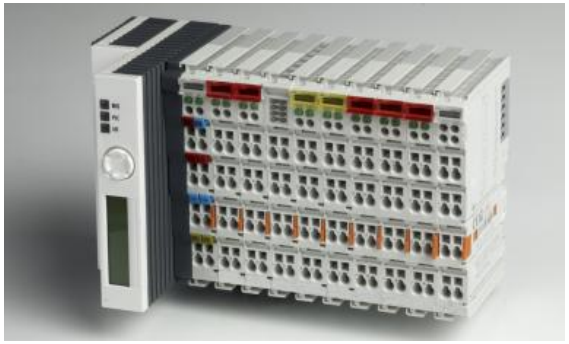
Intelligent brake system features

- **Configurable Relay Outputs** (additional outputs for e.g. Pump Run Time, Pad Temp etc.)
- **Reset Mode** (restore factory settings)
- **Brake Log** (stores data from last 10 stops)
- **Access Levels** (diff. access levels for diff. operators)
- **Password Protection** (to protect against tampering)
- **Redundancy Module** (for additional safety and uptime)



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Intelligent brake system features

- **Pad Temp Sensor** (to prevent overheating)
- **Pad Worn Wire** (to prevent disc and brake damage)
- **Critical Error** (output signal for e.g. no RPM signal)
- **UPS/ Battery Backup** (works in power failure situation)
- **Monitoring of Battery Backup** (Battery status)
- **Communication Protocols** (e.g.ModBus RTU - Profibus - DeviceNet - ModBus TCP)

PROFI® PROCESS FIELD BUS BUS

DeviceNet® CONFORMANCE TESTED

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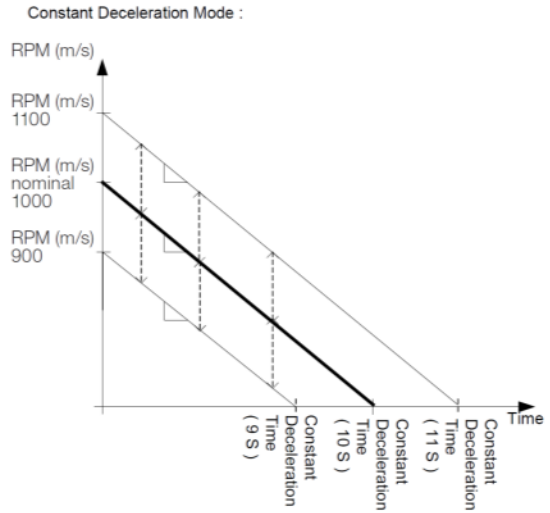
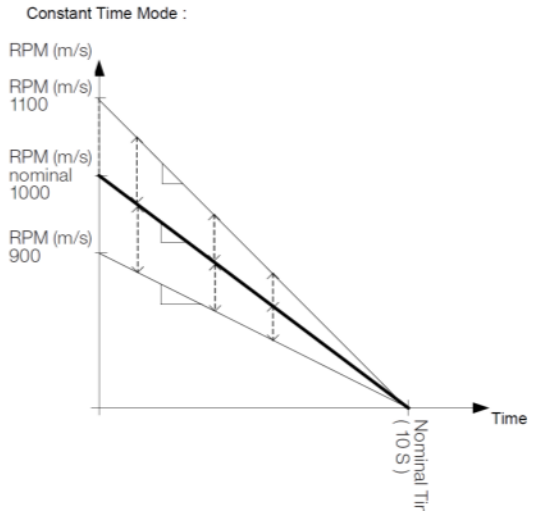
Intelligent brake system features

- **Out of Band Monitoring** (monitoring of programmed RPM limits)
- **Sensor Monitoring** (to detect failure of speed sensor)
- **Gear Monitoring** (detection of gearbox failure)
- **Braking Profile Modes** (Time - Decelleration - Distance)





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Intelligent brake system features

- **Safety Ramp** (pressure decelleration without speed reference)
- **Mechanical Backup** (for unlikely event where brake controller fails)
- **CONTROLLED Braking** (min. stress transferred to mech. components incl. shaft, coupling, gearbox & BELT)

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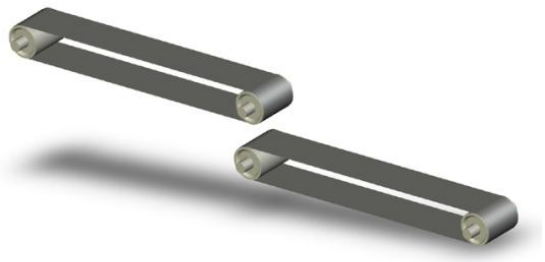
Intelligent brake system benefits

- **Increased Equipment Life** (shaft, coupling, gearbox, BELT etc.)
- **Prevention of Belt Slipping**
- **Constant Stopping Time** (independent of load)
- **Prevent Material Spillage Between Conveyors** (coordinate stop time between conveyors)



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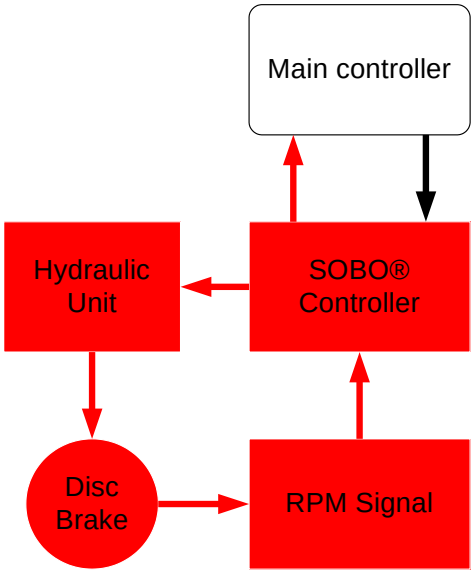
Intelligent brake system benefits

- **Flexibility** (easy change of e.g. stopping time onsite)
- **Cost Savings** (combine the dynamic brake and backstop in one system)
- **Syncronization of multiple Brake Systems installed on different Pulleys**
- **Monitoring/Feedback** (preventative maintenance)
- **Increased Safety**
- **Closed Loop System**



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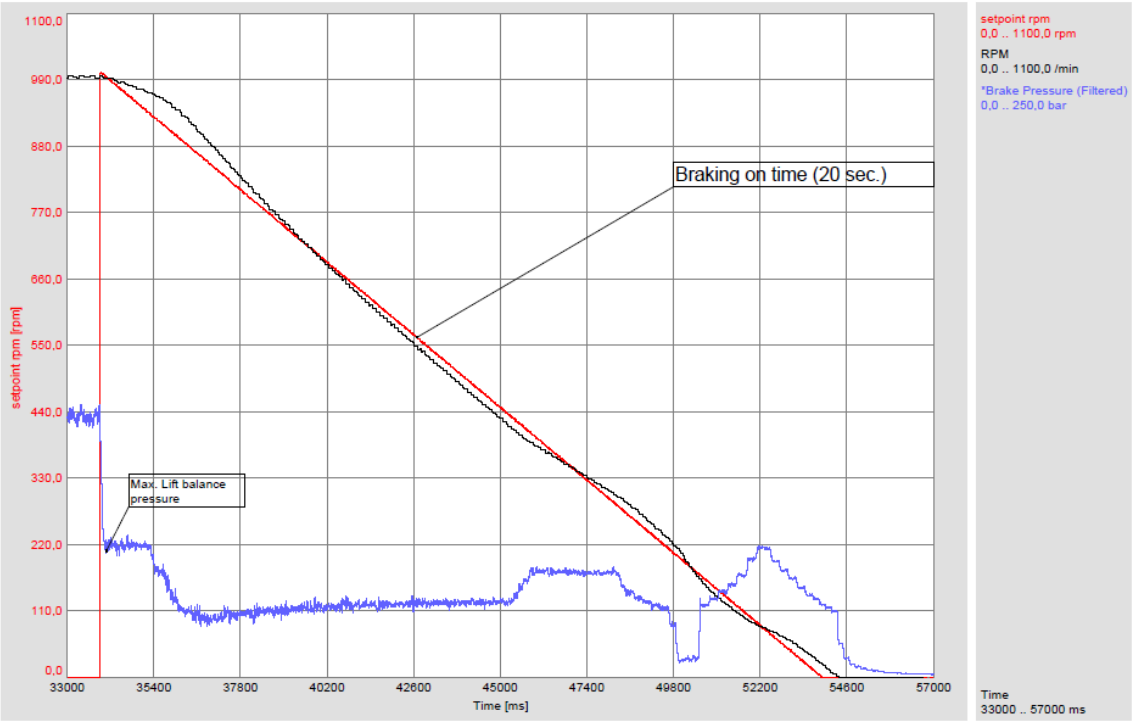
Intelligent brake system benefits

- **Compensate for Variable Friction Factors**
- **Simple Interface between Brake Controller and Main PLC**
- **Accurate control and fast response time** (not valid for scissor brakes)



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Maintenance

- As with most systems, the brake system needs regular maintenance in order to perform correctly and minimize downtime.

- Fewer components typically makes maintenance process easier and increases reliability – *however*, for some operators/end users it does not seem to matter how simple the system is, they still forget about it (... maybe because they cant see it?....)

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Thank You

Questions?

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