

# Regulate braking

Control system for regulated braking of applications



*Achim Mayer*

*The BCS 600 is a program-controlled braking system which supplies hydraulically operated or hydraulically released brakes with an adjustable hydraulic pressure. It consists of a control and regulating unit and a hydraulic aggregate.*

*Together with the reliable RING-SPANN brakes, the BCS 600 performs sophisticated braking procedures while simultaneously taking on important safety and monitoring functions.*

In some applications, and particularly in conveying engineering, the load is unknown at the time of braking or varies very strongly during operation. This usually causes braking sys-

Further applications for regulated braking are applications with pre-set braking times, braking distances or deceleration. These specifications can only be reached if fluctuations in the

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tems to frequently engage with much too high a braking force hence overloading the plant. The highest friction coefficients and thus the optimal conditions, caused by high temperature and lower friction speed, are only reached at the end of the braking procedure and lead to very high load peaks. Even safety brakes, which are operated very rarely, are known to behave in a similar manner.

In many cases, this additional load is not a problem for the machine. In the case of large plants however, a 30% change in the braking force can be problematic.

friction coefficient and variable loads can be compensated for by alterable hydraulic pressure.

## How does the system work?

The braking force of hydraulically operated and hydraulically released brakes can be controlled very accurately on the basis of regulated hydraulic pressure. For this purpose, the actual values of speed or hydraulic pressure are measured and compared with the target values in real time. If the measured deviations are too great, the hydraulic pressure is adapted accord-

**Achim Mayer** is Development Engineer by RINGSPANN GmbH in Bad Homburg

ingly so that the preset braking time or deceleration can be achieved. At the same time, extra flat brake ramps ensure a low loading of the plant at the end of braking.

A fast IPC with a real-time capable operating system and a variable number of I/O ensure a fast processing of measured values and a delay-free control and regulating unit.

A selection of field bus interfaces such as EtherCAT, Profibus and CANOpen connect the braking system with the superordinate plant and thus make extensive communication in both directions possible.

There is the additional possibility of tracking the braking procedure in real time via an Ethernet connection or of just checking the current operating data.

A touch panel, installed directly at the braking system, is available as an option.

### Braking and monitoring functions

A fixed braking time, a fixed deceleration or a particular number of revolutions are possible brake ramp functions.

Quick bypassing of the brake clearance and a regular “braking clean” of the brake disc ensure the shortest response times in the event of an emergency and high friction values right at the beginning of the braking procedure.

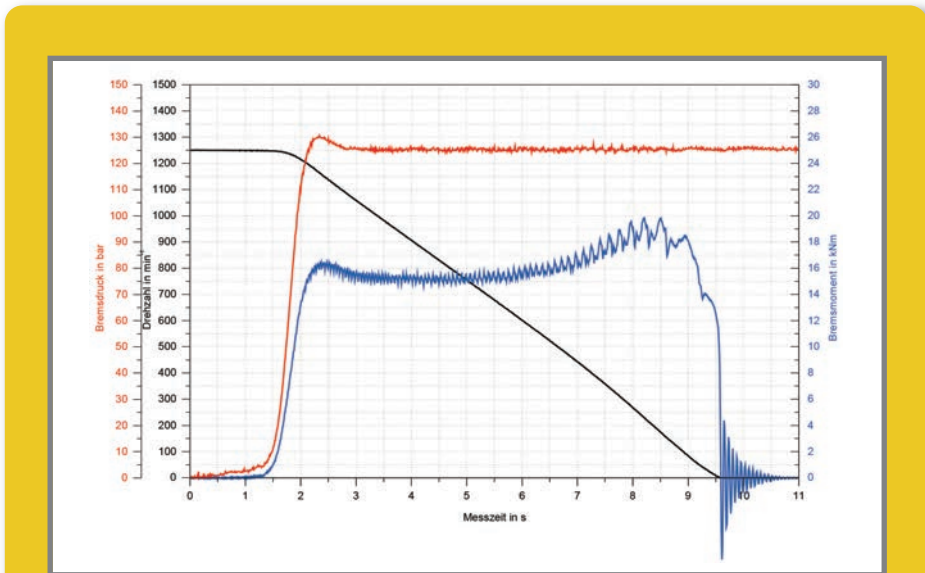
In addition to speed, various parts of the braking system or of the plant can also be monitored such as:

- Direction of rotation of the plant
- Condition of the brake lining
- Spring assembly of the brake
- Hydraulic pressure and temperature
- Drive train via speed difference

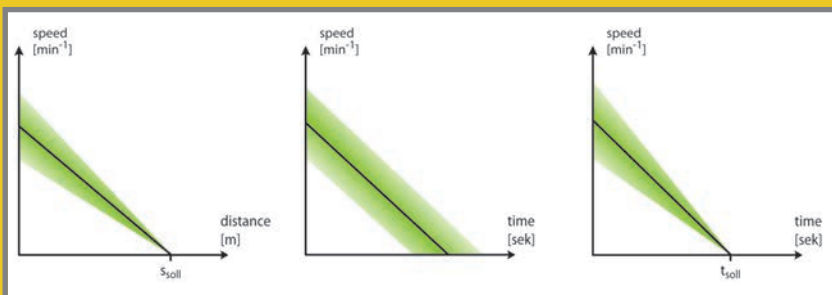
An intelligent hydraulic unit structure and robust high-quality components are important for ensuring high reliability, including in the mechanics. Seat valve technology with a cross-section of a sufficient size offers a high degree of safety.

### Variable torque curves

In addition to classic conveying engineering, a large number of options and setting possibilities open up further areas of application for the regulated braking system BCS 600. The clear program layout makes operation easier. Sophisticated braking procedures in the area of test engineering can be carried out just as reliably



01 Torque peaks in the case of non-regulated braking



02 Different brake ramps with fixed braking time, fixed deceleration or preset braking distance freely selectable



03 Controller with I/O

as the constant monitoring of complex plants. The braking system can also revert to pressure-controlled or braking torque controlled regulation here.

The possibility of presetting variable torque curves is unique. The braking system regulates using the measured torque values or force va-

lues along this variable torque curve and enables entirely free courses of test torque. A function like the one known with torque motors, only with an almost unlimited torque capacity.