

SES System Efficiency Service identifies pressure surges as cause of damage



Chemical park

In the cooling water circulation process of a reactor, two successive major failures of pumps impair process flows. The operating personnel is unable to identify the cause with the tools available.

Pump measurement with high sample rates sheds light on the cause.

Data gained from measurements with high sample rates make pressure surges visible

For the cooling tasks involved in the chemical processes of a reactor, two mag-drive pumps are employed in the secondary circuit. In single-pump operation, they circulate water of about 100 °C between the reactor and several heat exchangers. To increase the fluid temperature more rapidly after a product change in the reactor, steam is fed into the cooling circuit. The entire system process is already comprehensively measured and monitored by the process control system.

During plant operation, the mag-drive pumps failed repeatedly within a very short time. Both pumps showed signs of rubbing contact in the pump casing and destroyed plain bearings.

These two damage symptoms indicate large forces acting on the pump rotor; such forces cannot result from normal pump operation after such a short operating time. The operator's process data displays no signs of irregularities in plant operation.

It was only the comprehensive damage analysis at the pumps, using measurements with high sample rates in the potentially explosive atmosphere of zone 1, that revealed pressure surges. As the speed with which the pressure surges spread through the system is within a millisecond range, they could not be detected by the existing process control system. Hence, the effect was invisible to the personnel for technical reasons.

Result:

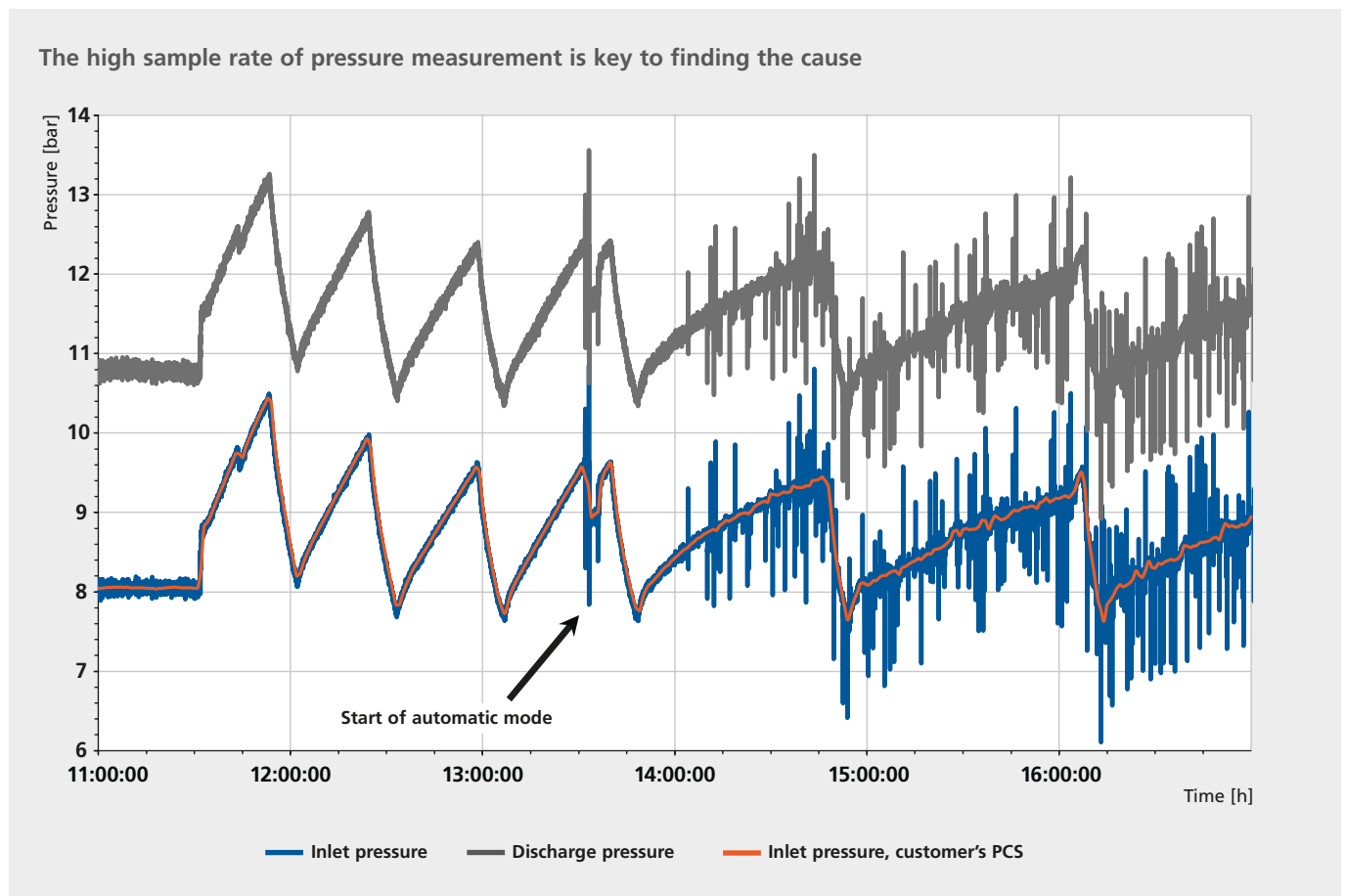
KSB's measurement revealed that pressure surges only occur at specific times when steam is fed in to increase the fluid temperature. Based on this piece of information, measures were defined together with the plant operator to prevent pressure surges.

More information

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Broken bearing bush of process pump



Pressure measurement with high sample rate performed by KSB (rate: 0.1 s)



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