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The hollow shaft direct motor FlexoDrive® in operation

A progress report from the paper mill Vreden

In both machines of the paper mill Vreden 10 special gearboxes for the dryer cylinders FlexoGear® KS 295, one central lubrication unit Lubriflex® MIDI Size III with 2500 litres chamber volume as well as 16 intelligent flow meter FlexoFlow® split into two FlexoFlow® Terminals were installed.

Vreden is very satisfied with the AS solutions, especially with the mounting and the service. The cooperation is characterized by great confidence and mutual respect. Due to the close proximity and the good relationship between both companies it was natural to also install the first hollow shaft direct drive FlexoDrive® in Vreden.

In summer 2010 the basic data was defined. The 5th dryer group with 10 cylinders was driven by four felt rolls. Stickys often led to slippages and paper cuts. The last two felt roll drives were replaced by two FlexoDrives® with 35 kW each. The cooling aggregate Cooliflex® was installed in the cellar directly under the 5th dryer group. In addition to the Cooliflex®, the control unit and the frequency controller PM/PD 1000 Converter were installed. All the products are developed and manufactured by AS (Fig. 1, 2, 3)!

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Fig. 2: FlexoFlow® Terminal: Intelligent flow control without manual adjustment!

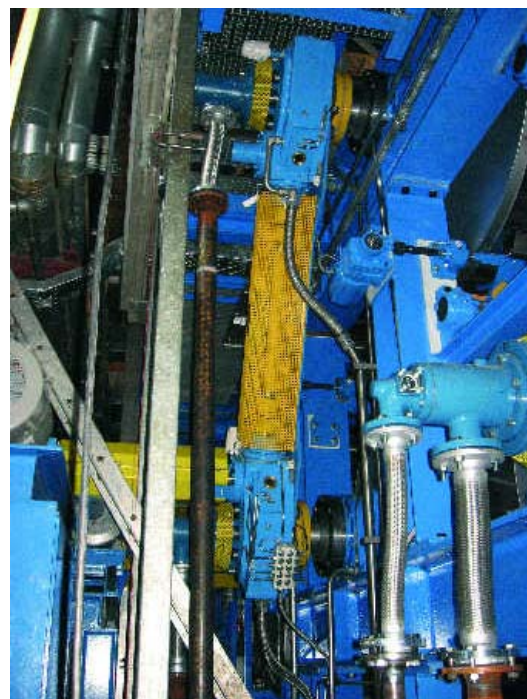


Fig. 3: gearboxes for dryer cylinders FlexoGear® YOC. 2009



Fig. 1: oil lubrication unit Lubriflex® YOC. 2004



Fig. 4: Hollow shaft motors FlexoDrive® with 35 kW each



Fig. 6: Cooling aggregate Cooliflex® with FlexoFlow® Water

Fig. 4 shows the two direct drives FlexoDrive®, which are connected with the proven torque support known from the FlexoGearSystem®, as well as the coupling of the old felt roll drive. The test runs have been a bit difficult, not due to AS products, but due to the fact that the 5th dryer group is connected to the 4th dryer group via rope. So the two motors had to accelerate and carry 12 cylinders in the test run (Fig. 5). In January 2011 the project partners changed the premises. In future there should be only two drive points for the complete group and the felt roll drive should be omitted. The power calculation showed that now two direct drives FlexoDrive® with 70 kW each were required. Within only five hours the motors were changed. This decision has proved perfect. A short time later the first paper was produced with the two FlexoDrive®. That was the final breakthrough and both drives have been fulfilling their task without any problems. The strategy to develop all required products by AS was ground breaking. Until now there have been no problems with broken torque supports, cooling below dew point and corrosion, high temperature, water-leakages or technical problems (e.g. with the converter) etc. (Fig. 6, 7, 8). From a today's point of view all development guidelines have been proved right. As early as 2005 AS defined that a big diameter does no harm, but an overall length of the motor does. This makes it possible to connect the steam head directly to the motor and creates a high torque due to the long lever arm at an excellent efficiency factor. Furthermore AS defined that the

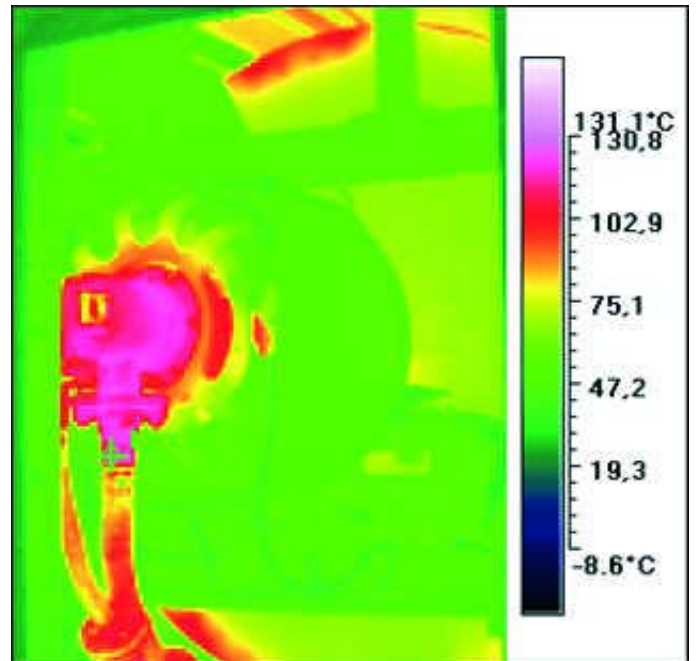


Fig. 7: Shot taken with a thermal imaging camera of the FlexoDrive®. Easy to see that the steam head is hot (red) but the motor is cool (green)!

FlexoDrive® - test run

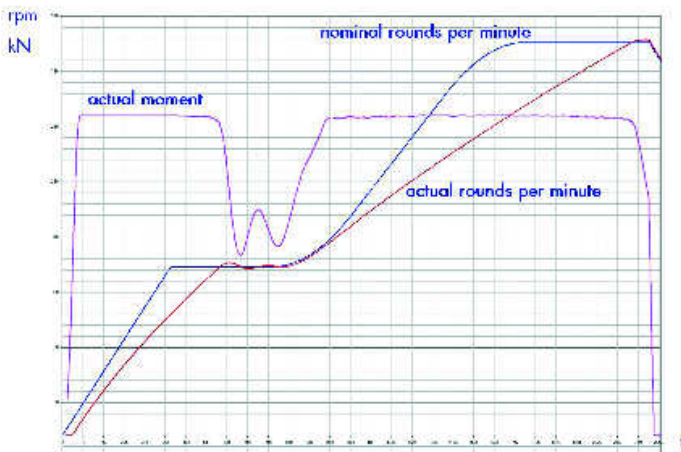


Fig. 5: Torque curve at insufficient performance



Fig. 8: AS-frequency controller PM/PD 1000 Converter – The first built Papermachine-Profi-Drive – Converter from AS

motor must run at an ambient temperature of 120 °C and 100 % humidity. Because dryer groups often have upper and lower felt, it was clear that normally two motors would be needed. Right from the beginning it was decided that the motors should be equipped with the flexible torque support and a fixed connection to the frame would not be needed. AS owns a patent for this spherical, three-dimensional motion compensation and will pay more attention in future if this patent is infringed. Based on the previous information a possible perspective for Vreden could be made easily. For this purpose the following image sequence is self-explanatory (Fig. 9, 10, 11).

But what could be better than a satisfied customer?

Jens Bußmann – Technical Director of Papierfabrik Vreden GmbH

“The company AS Drives & Services GmbH enjoys our full confidence. This is not least due to the results of many successful projects.

With the project FlexoDrive® we are in a new field of technology. This product in this form is completely new.

During the project there were no problems, neither electrical nor mechanical. The friendly relationship was typical for the cooperation between Vreden and AS – as well as working “hand in hand”.

The rebuild at the PM 3 is a bit like a test for us. In future we can imagine that we will rebuild both machines step by step when necessary. With the flat design the FlexoDrive® is also ideal for the PM1 because the space is very limited behind this machine” (Fig. 12).



Fig. 12: The installation space behind the PM 1 is very tight. With the FlexoDrive® the foundations and the motors which are out of the hood can be omitted.



Fig. 9: The installation space of the steam head situation should be not exceeded!



Fig. 10: The FlexoDrive® MINI with 35 kW fits into the construction space!



Fig. 11: Even the FlexoDrive® MIDI with 70 kW fits into the construction space!