

Successful collaboration between UPM and Voith

New drive concept reduces long-term costs

Just because you are used to something that does not necessarily mean it is good. With this in mind, UPM and Voith could see that the standard sectional drive concept for paper machines was capable of being improved and together they developed a new, energy-efficient concept.

Just over a year ago personnel from UPM-Kymmene and Voith Paper

formed a task force to resolve the following question: What would a

sectional paper machine drive with optimum energy efficiency look like? Over a period of six months the team analyzed the prevailing state-of-the-art, discussed advantages and disadvantages, and developed a new concept to enable the machine to be driven at reduced cost.

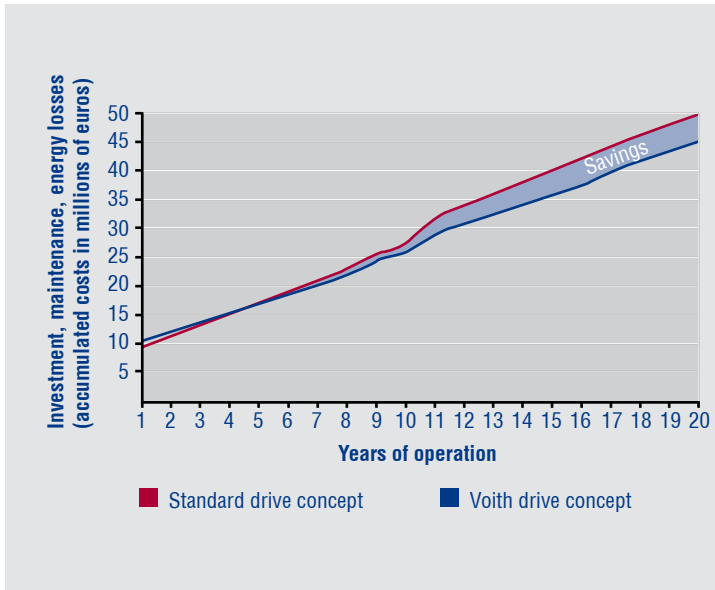
Focus on total costs

The basis of the investigation initiated by UPM was a consideration of the overall cost or >>> **Total Cost of Ownership (TCO)**. To ensure as

The concept does not just score highly in terms of better economy, it also offers technical benefits.

Conventional asynchronous drives on a Janus calender.





More profitable: synchronous motor in use (Voith Drive).

After just three to four years, the higher investment costs for the new drive concept have paid off.

detailed and thorough an analysis as possible of the standard drive concept currently used worldwide, the task force decided to base its considerations on a typical paper machine for coated, wood-free paper. The TCO of the sectional drive over a period of 20 years was calculated based on 60 drives with asynchronous motors with a total drive output of 25,000 kW.

Synchronous motors save costs

As a next step the team of UPM and Voith specialists investigated the extent to which a new drive concept would be feasible and profitable. The main component of the alternative concept is the replacement of as many asynchronous motors as possible with synchronous motors. These motors would be used along the paper machine to drive the rolls. Only in the wet section of the machine were asynchronous motors

partially retained even at the analysis stage, as the blanket use of synchronous machines proved impractical for technical reasons.

Based on the given paper machine, the team worked out alternative scenarios to the familiar drive concept. During the process, particular emphasis was placed on taking all influencing variables into account. At the end of the process even the participants themselves were surprised by the unequivocal outcome: It emerged that although initially a somewhat higher investment was needed for the new synchronous motor concept, its lower operating costs made it more profitable than

the previous drive systems even after a short period of time. The reason for this lies above all in the lower energy consumption facilitated by the new solution. If rated correctly, a synchronous motor is a convincing winner over the asynchronous motor due to its lower energy losses resulting from its generally higher efficiency. In addition, the transmission gearing required on previous systems is frequently superfluous and can be dispensed with due to the high torque offered by synchronous motors. Therefore, the paper manufacturer profits not only from fewer energy losses but also from lower maintenance outlay. Moreover, on top of these crucial benefits UPM

>>> Info: Total Cost of Ownership (TCO)

A TCO analysis does not just consider the pure investment costs but also the operating costs incurred following start-up, which cover expenditure on maintenance and energy. Usually a period of 20 years is considered in this kind of analysis to be able to determine the total costs during the service life of a product. Unlike a comparison of investment costs only, this approach therefore provides much more information, as hidden costs occurring subsequently can also be taken into account.

and Voith also established additional savings potential in the periphery. In its analysis, for example, the team used a motor type that does not need a power filter due to the electric strength of its windings. This leads to a direct reduction of investment and energy costs.

In addition, the investigation identified that the concept for cooling motors and switchgear has a major impact on the cost. In the case of the paper machine used for the analysis, for example, heat in the range of 2,500-3,750 kW has to be removed from the system, so that an efficient cooling system enables a substantial reduction in costs.

In the black after three years

By now adding up all savings potentials offered by the new drive concept, the higher investment costs compared to the current standard solution are absolutely sustainable and will provide long term profit. In particular, the difference in procurement costs is offset by the considerably lower operating costs after a period of around only

three to four years. It is from this point in time that the paper manufacturer gains an economic advantage, or to express it in figures: In the case of the paper machine used as a basis for the analysis, the savings would amount to almost € 5,000,000 in 20 years! The total cost of ownership, i.e. the overall cost, is therefore a convincing argument in favor of the newly developed approach. All calculations were based on constant 2009 energy prices. In the event of increasing energy prices the financial advantages of the new drive system are even higher.

However, the concept does not just score highly in terms of better economy, it also offers technical benefits. Synchronous motors allow higher control accuracy, which can also be implemented due to the omission of gearing. In addition, there is less mechanical load on the drive train, reducing the likelihood of potential operational malfunctions. Crucial to the successful development of the drive concept was the close, hands-on cooperation between

UPM as paper manufacturer and Voith Paper as machine and automation vendor. The incorporation of technological know-how about process, machine and drive systems allowed a holistic approach to be taken, with customer requirements taking center-stage.

The drive concept is suitable not only for new machines but is also particularly attractive when renewing drive systems on existing machines.

On Focus: Drive concept

- ProRunnability +++
- ProEnvironment ++++
- ProSpace +++

Section: total paper machine
Width: all
Paper grade: all

Contact



Wolfgang Klotzbücher
wolfgang.klotzbuecher@voith.com



“The present TCO model will play a crucial role in our future acquisitions in the drive area.”

Fritz Wolf, Sourcing Manager Electrification, UPM-Kymmene Papier GmbH & Co. KG

“For the TCO analysis, it was extremely important for the cross-functional team to include all costs incurred. The detailed know-how obtained in this process is of decisive importance to us. Therefore the present TCO model will play a crucial role in our future acquisitions in this area.”