

## M-real made it real First full-size Direct Drive System for a board machine



“When building or rebuilding a board machine, we always want to take advantage of new technical innovations”, said **Mika Joukio**, Mill Manager of the Äänekoski Board, after the successful start-up of their rebuilt board machine. The board machine at M-real Äänekoski mill in Finland includes the first full-size Direct Drive solution in a board machine, a gearless drive system.

Innovative thinking is typical of the M-real Corporation, and not just in technology. M-real recently reorganized its board business by rearranging production lines according to the end use of the board. Production of wallpaper base at the Äänekoski mill was brought to an end and the mill decided to concentrate on folding boxboard for the healthcare segment. The decision resulted in new products, a new production line and a new customer base.

The rebuilt board machine started up in September 2002. The old machine also ran with ABB drives.

The Direct Drive system is based on permanent magnet motors, frequency converters and software applications. The changeover from conventional asynchronous motors to permanent magnet motor technology is of the same magnitude as the changeover from DC to AC technology a decade ago.



## Board machine modernization at a record pace

Voith Paper supplied the main equipment for the modernization of the board machine: press and drying sections, a new Yankee cylinder, a size press, three coating stations, a winder, and a ventilation system.

The ABB delivery included a dryer hood, a Direct Drive system, and electrification for the entire board machine, including all product related services such as commissioning, start-up and training.

The board machine was completed at a world record pace. The old machine was dismantled and rebuilt in eight weeks. A total of 500 professionals, over 200 of them from Voith, worked at the machine round the clock. Thanks to accurate planning and careful work, the machine started up on schedule - and this schedule was a really tight one.

The target annual capacity of the board machine is 160 000 tons. The design speed is 800 m/minute and the board machine has a wire width of 4150 mm. The modernized board machine produces high-quality fully coated bleached paperboard of 170-335 gsm for the healthcare sector and the graphics industry.

## Direct Drive as sectional drives

“Above all, we expect production efficiency and lower operating costs from our board

machine throughout its whole life-cycle”, stressed Mika Joukio, Mill Manager of the M-real Äänekoski Board. “The Direct Drive solution does not need gear boxes. This is a major advantage of the solution, resulting in savings in our maintenance costs.”

The Direct Drive system includes 29 permanent magnet motor drives and 72 induction motor drives.

The Direct Drive system consists of permanent magnet motors controlled by ACS 600 frequency converters. The software application secures the paper functionality and safety of the drive system.

ABB’s permanent magnet motor is a synchronous motor. Because there is no rotor slip it provides better accuracy than standard, asynchronous motors. In an asynchronous motor the slip varies according to speed and load. With a synchronous motor it is simpler to optimize the speed, while the elimination of the slip compensation improves the dynamic motor control.

The permanent magnets are made from neodymium iron boron, the newest magnetic material on the market. It is the most powerful magnetic material available, with high values of flux density at very high values of magnetization.

"The new Direct Drive - technology from ABB has raised a lot of interest in paper makers. We are extremely satisfied."

"Another advantage of the Direct Drive technology is the smaller space requirement for the motors, also a result of the gearless construction. Our machine hall is not very big and there is absolutely no extra space available", pointed out Mill Manager Joukio.

### Higher efficiency and less maintenance

The Direct Drive solution allows savings in several life-cycle phases of the machinery.

Fewer components and simpler configurations reduce plant engineering hours, make installations easier, cut down supplier contact, allow more efficient use of the mill floor space and trim spare-part inventories.

The Direct Drive system has a considerable impact also on operational savings. Simpler configurations bring an improved level of machine availability. Fewer production interruptions and ramp-ups decrease raw material waste, increase end product quality and reduce wear and tear on production machinery. Maintenance and repair work can also be carried out faster.



### M-real in brief

M-real is one of the leading suppliers of paper and paperboard in Europe.

As M-real has quadrupled its turnover in just over five years, it has become one of the industry's most advanced companies. M-real focuses on coated and uncoated fine paper and high quality magazine papers, as well as on packaging boards for consumer products.

M-real currently ranks as the largest producer of fine paper in Europe. It has grown to become the European market leader in both coated and uncoated fine papers, and at the same time, one of the largest paper merchants in Europe.

M-real is an international company, the majority of whose personnel work in different European countries. At the end of 2002 M-real employed over 20 000 people.





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