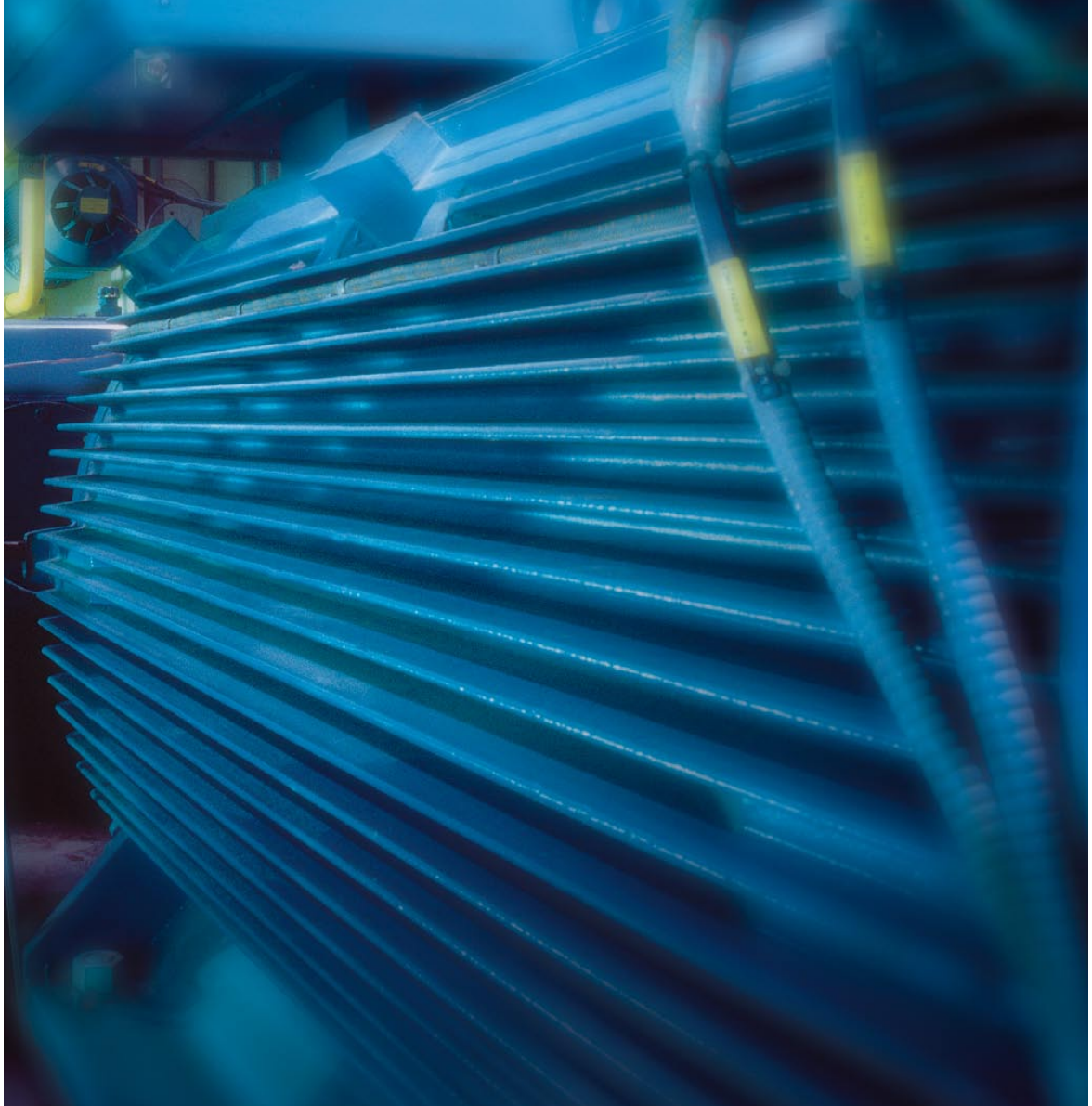


# Industrial<sup>IT</sup> for Papermaking

## Direct Drive Solutions



# First in innovation,



## Innovative Direct Drive Solution

Bigger and faster machines with increasing requirements concerning power consumption, control accuracy, system uptime, and lower life cycle costs place ever greater demands on machine drives. The need to simplify drives is one of the major requirements. Therefore, ABB developed an advanced solution responding to these customer needs.

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Reduced  
total  
life cycle  
costs

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Our references include production machinery e.g. for

- board
- copy paper
- fine paper
- other paper grades

It consists of gearless drives with permanent magnet motors, foot or shaft mounted, depending on process and machinery. The solution requires less maintenance, less energy and less space.

ABB takes responsibility also for all project execution services, including engineering, installation, start-up, training and maintenance during the operation.

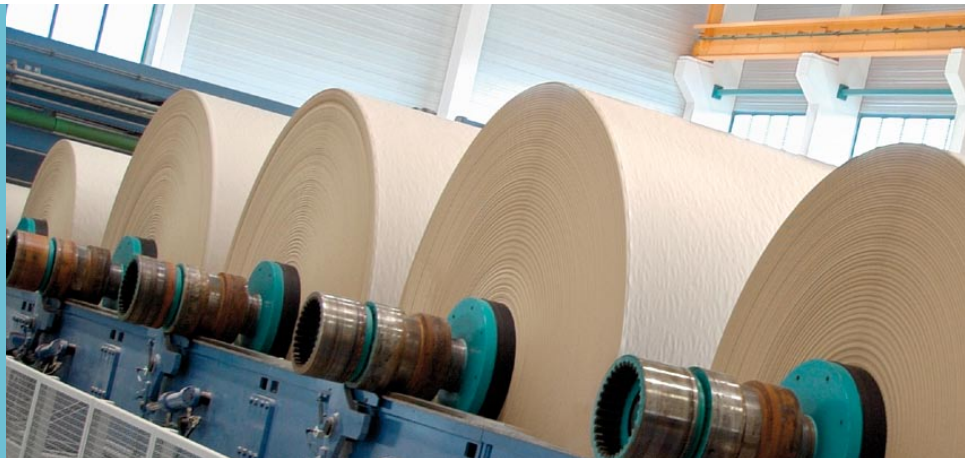
## No more gearboxes, no more pulse encoders

Direct Drive technology permits reduction in the number of mechanical drive components required in many applications. In most cases, the solution permits elimination of a gearbox and reduces the mechanical drive's effects on the coupling between the AC drive motor and machine section.

The gearless speeds typically range from 300 to 600 rpm. With the shaft mounted Direct Drive Motors even higher roll speeds are feasible. In the permanent magnet design, the elimination of slip, due to the synchronous design, improves both motor efficiency and the dynamic control performance of the entire drive.

# first in experience

ABB was the first company in the world to develop a Direct Drive solution for running and controlling paper machines.



## Clear benefits

The Direct Drive solution's benefits are very attractive from a papermaker's point of view:

- Reduced installation costs, due to the reduced amount of equipment
- Lower maintenance costs, from the elimination of gearboxes and the use of fewer couplings
- Reduced inventory-related costs, since no gearbox stock is needed
- Increased system efficiency
- Improved reliability, due to the reduced quantity of moving parts and the lower motor rotation speeds
- Improved system response, on account of elimination of gear backlash

To gain maximum benefits from this technology, Direct Drive should be applied for all sections. Practical operation speed usually demands the use of a mix of conventional induction motors and permanent magnet motors for driving a complete paper machine. Alternative mounting arrangements such as direct shaft mounting, gives additional benefits.

## In-depth expertise

ABB is the recognized leader in providing drive systems for the pulp and paper industry. In the mid '90s, ABB's AC drives made available a unique Direct Torque Control method for optimal motor control performance. The Direct Drive technology represents the most advanced technology of this millennium.

## Global service capability

The ABB Pulp and Paper Drives Network offers drive expertise close to our customers in all parts of the world. Highly qualified experts ensure smooth and effective project execution, from the design phase through the fine tuning of production.

Our 24/365 Support Line ensures availability of the best skills in drive systems and applications at all times.

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World class  
support for  
highest  
productivity

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# Our technologies at work, raising



## **M-real Kirkniemi, Finland**

The Direct Drive solution is developed together with the Finnish paper industry. It was tested at the M-real Kirkniemi mill. “A test period of over two years shows that this will become a unique drive system. It is an excellent idea to reduce the amount of components, and install the shaft of the motor directly to the end of a cylinder or a large-diameter reel without gears and auxiliary shafts,” said Martti Pakkanen, Service Manager of the Kirkniemi mill.



## **M-real Äänekoski, Finland**

“When building or rebuilding a board machine, we always want to take advantage of new technical innovations,” said Mika Joukio, manager of the Äänekoski board mill. The board machine at M-real’s Äänekoski mill includes the first full size Direct Drive solution ever. The BM of 160 000 t/y started up in September 2002.

“The new Direct Drive technology from ABB has aroused a lot of interest on the part of papermakers. We are extremely satisfied.”



## **Stora Enso Kotka, Finland**

In this project, ABB delivered a Direct Drive solution for the whole production line. It included 13 permanent magnet motor drives and 56 induction motor drives. The Direct Drive system controls PM2, which was rebuilt. The delivery also included transformers, cabling, installation, and start up and training services.

Stora Enso named ABB the best supplier for the Kotka project.



## **Sappi Tugela mill, South Africa**

ABB delivered a Direct Drive solution for Sappi Kraft’s No. 4 paper machine at its Tugela mill in KwaZulu Natal. The contract included the delivery of 24 drive sections, 17 permanent magnet motors, and seven standard asynchronous motors without gearboxes, as well as application software and all related services, including cabling, installation, commissioning, and training.

“Direct Drive will enable Sappi to reduce the total life cycle costs involved in operating the paper machine,” said Urs Leuenberger, technical director of ABB South Africa’s Automation Technologies division.



## **Carter Holt Harvey, Whakatane mill, New Zealand**

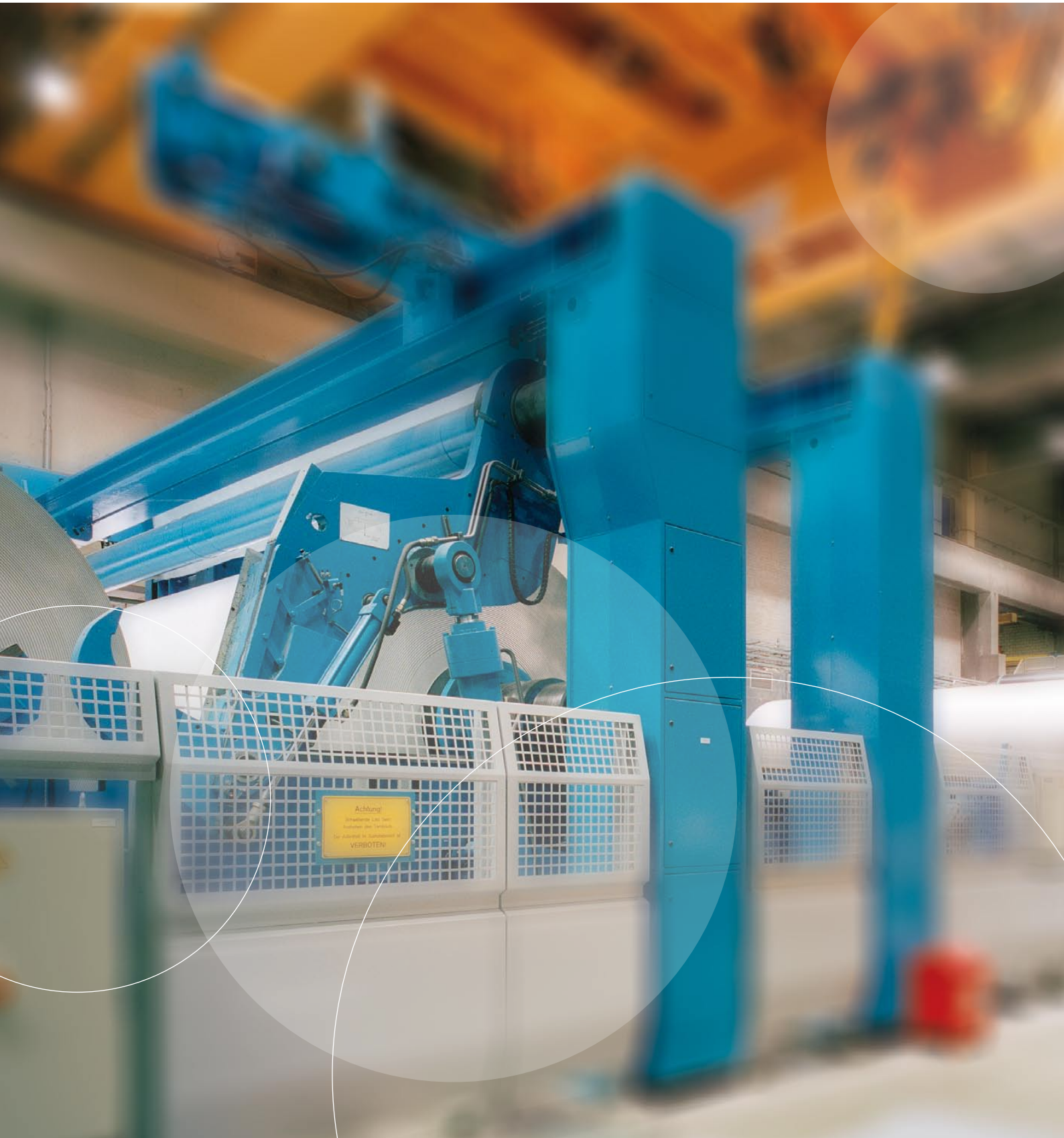
ABB supplied a Direct Drive solution to Carter Holt Harvey’s Whakatane board mill. The solution included 54 drive sections, of which 26 provided new technology in permanent magnet motors. The other 28 sections use induction motor drives.

The system operates BM3, which was rebuilt. The speed of BM3 will increase in stages to a maximum of 600 meters per minute.

# productivity at paper mills



# Economizing **space** and



# saving energy

## **Stora Enso Maxau, Germany**

This Direct Drive delivery was the first in Central Europe. It combines AC drives, traditional and new permanent magnet motor control, and system control features designed specifically for Direct Drive technology. The system delivery includes a total of 80 drive sections, of which 14 use direct drive.

One major benefit that the paper machine hall derives from Direct Drive technology is that it requires less space for mechanical drive components, thanks to direct coupling of the motors to the paper machine.



## **Norske Skog Albury, Australia**

The existing DC drives and motors were replaced as part of a major upgrade of the Albury facility, which comprised a rebuild of the paper machine, including a shoe press and a new winder. The Direct Drive solution for the paper machine included 36 induction motor drive sections, of which 10 are new technology permanent magnet motors.

The selection of ABB was based on the global cooperation established between the companies and ABB's extensive knowledge and experience of supplying paper machine drives.



## **Adolf Jass Schwartz, Germany**

According to the mill management, "ABB's Direct Drive is the Ferrari of the paper industry." In September 2005, Adolf Jass Schwartz GmbH officially inaugurated its facility and the new PM1.

Of the total of 59 drives, 20 are fitted with permanent magnet synchronous motors. Improved total efficiency, space savings, better dynamics, and tachometer-less operation are all benefits of the Direct Drive solution.



## **M-real Simpele, Finland**

ABB delivered a Direct Drive solution to the entire production line at the M-real Simpele mill. The rebuilt board machine started up in spring 2006.

The solution includes 83 drive sections, of which 32 are direct drives. The delivery included engineering, installation, cabling, as well as start-up and training services.



## **SAICA Spain**

ABB is delivering a Direct Drive solution for the S.A. Industrias Celulosa Aragonesa (SAICA) new fluting and line machine PM10 in El Burgo de Ebro (in Zaragoza province). The solution controls and monitors the whole production line. It also integrated to the Industrial<sup>IT</sup> Extended Automation System 800xA delivered also by ABB.

The start-up of PM10 was started up in spring 2006.





**ABB Oy**  
Process Industry  
Paper Machine Drives  
P.O.Box 94  
FI-00381 Helsinki  
Finland  
Telephone +358 10 22 11  
Fax +358 10 22 23833

[www.abb.com/pulpandpaper](http://www.abb.com/pulpandpaper)