

World's biggest paper machine running with ABB's drives and controlled by ABB's automation



UPM Changshu's PM1 adopted ABB's Extended Automation System 800xA, which won the Science & Technology Achievement Award at the Multinational Instrumentation Conference and Exhibition (MICONEX) in 2005. According to the mill management, it was a very smooth start-up and successful cooperation and partnership with ABB.

Client: UPM Changshu

Location: Changshu, China

Scope of Delivery: Papermaking Suite 4.0 delivery including Distributed Control System, Drive System, electrification and engineering, installation, start-up, and training for wood-free uncoated paper production line PM1.

For PM2, ABB also delivered technology to integrate the existing Advant Open Control System (OCS), the power house, and the drive system, as well as a Web Imaging Solution (WIS) product. Summer 2005 saw ABB start up systems on both the new PM1 and the PM2 line.

At present, consumption of all paper grades in China is a meager 45-47 kg per capita, though the country is second only to the USA in production of paper and board. China's industrial-scale paper producers have the newest, most up-to-date machines, which rival any in the world.

World-class paper machines

The UPM Changshu mill has two world-class paper machines. The latest addition, PM1, started up in May 2005. This new machine, supplied by Metso Paper, has a trim width of 9.73 m, a maximum operating speed of 2,000 m/min, and a production capacity of 450,000 tpy.

The new capacity adds to that of the existing PM2, also supplied by Metso Paper, in 1999. The PM2 trim width is 8.66 m, the operating speed 1,500 m/min, and the capacity 350,000 tpy. The mill now has a total capacity of 800,000 tpy of coated, lightweight coated, and uncoated wood-free papers, all of office and graphic quality.

ABB's deliveries covered both PM1 and PM2. The capital employed by UPM for the Changshu mill amounts to 1.1 billion US dollars.

The delivery for PM2 included a Web Imaging Solution, HDI8. The heart of the WIS is its advanced defect detection and classification system, which can detect the finest defects in the moving paper web and collect a database of defects for analysis. The operator interface was redesigned to give instant access to detailed information and images of all important flaws. This useful information can be used to fine tune the process and make corrective production and maintenance decisions before problems occur.

For PM1, ABB supplied an integrated solution consisting of the extended automation system 800xA, a drive system, and electrification. The electrification delivery covered the package boiler, the bale pulpers, the paper machine, the converting plant, and a network control system for the entire mill's power distribution. The drive system, which runs the whole production line, includes several new technologies, such as ACS800 Multidrive.

The 800xA system in the main role

System 800xA consists of nine operator stations, 26 AC800M controllers, about 6,000 I/Os, PROFIBUS integration with S800 and Smart MCCs, OPC communication to the information systems, and Modbus communication to the quality control system.

The ABB system integrates all mill operations, connecting the main control room to the system servers and all of the applications and process controls from the pulper, the size press, the pope reel, and the winder. It also integrates the Smart MCCs, the variable speed drives, and various field devices, as well as the AC800M controllers and the ACS800 sectional drives.

In addition to the paper machine systems, ABB also has integrated links with the converting section. The converting department has a 15-pocket cut-size sheeter – the first to be installed in Asia. It has a cut-size sheeting capacity of 320,000 tpy and a folio sheeting capacity of 320,000 tpy. The product mix equates to approximately 600,000 tpy of uncoated fine papers and 200,000 tpy of coated grades.

The 800xA extended system allows the access and retrieval of relevant information throughout the process. With ABB's patented Aspect Object framework, information on any object in the integrated network can be accessed at a simple right click of the mouse. Every component in the entire production facility is linked, and information associated across application and system boundaries can be accessed from any single workstation connected to the network. This unique capability enables the management to optimize associated responses and facilitates consistent and sound business decisions.

Mill area

The Changshu paper mill also includes a major pulp storage warehouse, two converting units, and two finished goods warehouses.

Between the paper mill and the Yangtze River is the mill's power plant with its dedicated coal storage facility. There also is a large lagoon where water is stored prior to being treated for use as processed water, and there is a sophisticated water treatment plant for any discharge.

The mill has its own deepwater jetty where raw materials are unloaded and finished goods are transported either to other parts of China or for export shipments if required. Within sight of the mill is a rapidly expanding infrastructure. The building of a major bridge, which will link the motorway network around Shanghai, Suzhou, and Wuxi with Nantong City and the region stretching north towards Beijing, is quite advanced.





On the 185-hectare UPM site in Changshu, Walki Wisa, part of the group, is starting the manufacture of wrapping materials for the Chinese market. A new converting unit on the site started-up in 2006 with an investment of 6 million.

UPM Raflatac built a world-class pressure-sensitive label-stock production facility adjacent to the paper mill in Changshu. The total value of the investment was approximately USD 40 million. The factory started-up at the beginning of 2007. UPM Raflatac's old production facility in Shanghai was closed after the start-up of the Changshu factory. The new facility's production is targeted at the eastern China markets of Shanghai, Jiangsu, and Zhejiang.

Future fiber sources

Northern bleached softwood kraft pulp for the mill's fiber furnish is sourced from Scandinavia and Canada. The mill's bleached hardwood fiber is supplied from southern hemisphere plantation acacia and eucalyptus. From 2007 the main source of short fiber has been Botnia's pulp mill in Uruguay, the production started in November 2007. The mill in Fray Bentos is co-owned by UPM.

Environmental management equal to the best in Europe

The Changshu mill has had ISO 14001 certification for its environmental management system since March 2003. Its environmental protection systems are based on the very latest technology and comparable to those of the best European mills. Effluent and air emissions meet standards far superior to the national standards established by the Chinese authorities.

UPM in brief

UPM is one of the world's leading manufacturers of forest products. The company's business operations focus on magazine papers, newsprint, fine and specialty papers, converting materials, and wood products.

Driven by continuous, sustainable development, UPM trusts in efficient, reliable technology and long-term production expertise in its operations.

The company has a total of 22 paper mills in eight countries and more than 3,000 customers in 120 countries. UPM's turnover in 2004 was close to EUR 10 billion, and the group employs approximately 33,400 people.

The Changshu fine paper mill, in Jiangsu Province, is a major investment by UPM in the Far East. Located in eastern China on the banks of the Yangtze River, it is about 100 km northwest of Shanghai. The People's Republic of China is the fastest growing paper and board market in the world. Demand for printing and writing paper in the Asia-Pacific region far outpaces that in both Europe and North America, at about 46 million tpy out of a world total of 143 million tpy.

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