

Case story

VLT® control of Rolex Paper Mills

Because of previous experience with Danfoss VLT® frequency converters, Rolex Paper Mills based in Palakollu, Andhra Pradesh, India, did not consider any other company than Danfoss for the line automation when the company planned an expansion of the capacity from 300 tons per day to 700 tons per day by adding another newsprint paper manufacturing line.

Newsprint paper manufacturing requires very precise synchronisation of sectional drives as the paper is made from recycled paper and is very thin (45-50 g per square meter) and runs

at very high speed. Since Rolex assembles the unit with partly recycled machinery, synchronisation became rather challenging.

A complete solution

Since the drives in the project need close synchronisation, a PLC based solution was chosen. Danfoss and Danfoss partner ESPL chose VIPA, a PLC manufacturer, to provide the complete solution.

Danfoss VLT® AutomationDrives along with dynamic braking and DC bus sharing were chosen because of the accurate control solution and the abil-

ity to run in constant torque mode. Encoder feedback and Profibus options were also considered to make the paper machine run precisely with set speeds.

The rating of drives range from 11 kW to 75 kW and their application details are as follows:

Application	kW rating	Qty
Couch	75	1
Press	37	2
Dryer	22	4
Calendar	22	1
Pope Reel	15	1



Best

Output production

compared to 12 paper mills in the area controlled by competitors automation systems.

The VIPA Speed7 range of PLC, model 315-2AJ10, was selected for smooth operator interface and for its quick response in controlling the speed and torque. This has Profibus DP interface, the required number of I/O's and two touch panels.

VIPA Speed7

The CPUs are programmable with Step7 from Siemens and the scanning cycle of the selected CPU is 15 ns for bit operation and 90 ns for floating point operation.

VIPA CPUs also have flexible memory options and a built-in Ethernet interface that makes them ideal for remote trouble shooting if required.

Having the Ethernet port available on the PLC also helped to trouble-shoot when one of the bits latched in the PLC program. The programming engineer could reset the bit online.

System control philosophy

The operator starts the machine in crawl mode to confirm the machine reliability and operation. At this stage the machine runs at low, fixed speed.

Later, the operator will switch the system to synchronization/run mode. Initially it will run at low speeds and all the draw sets for all the sections are adjusted to make sure the paper is drawn smoothly from Couch to Calendar from the machine.

This stage having been achieved, the operator will run the machine at higher speeds. Because the Pope reel



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requires variable torque, the operator switches the calendar and Pope reel from VVC+ mode to torque mode. The torque limits are set based on the VVC mode torque and adjusted further based on the required tightness of the paper roll.

After initial hiccups, the plant has been running smoothly for more than a year and in terms of output production and fewer breakages, is reputed to be the best of the plants in the local area. More than 12 paper mills in the area are controlled by competitor's automation systems.

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