

Hunsfos Fabrikker plans increased medium-weight coated production at its multigrade integrated mill

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A Norwegian mill with old, diverse, but well-maintained equipment sets a production record and looks toward winning a bigger market share.

Hunsfos Fabrikker, in Vennesla, Norway, is a 105-year-old company (Fig. 1) that plans to increase its share of medium-weight coated papers (MWC) from 1% to 4% in the Western European market by 1995.

(Vennesla lies just north of Kristiansand and Norway's southern coast.)

Equipment at Hunsfos' mill is old, diverse, but well maintained. In 1989, the mill set a production record of 103,000 metric tons of paper, an increase of 8400 metric tons over 1988.

Guttorm A. Vennesland, the mill's administrative director, said that the mill's business plan, which goes to the year 2000, calls for production bottlenecks to be unplugged by 1992 so the mill can reach and sustain production of 135,000 metric tons/year. "The company plans to spend most of the money earmarked for expansion to increase the production of coated mechanical paper, which has been one of the mill's product areas and continues to grow in sales," he said.

This product area is divided into two main groups: lightweight coated (LWC) from 54 g/m² to 72 g/m², and MWC from 75 g/m² and up.

The demand for MWC in Western Europe (Hunsfos' traditional market) is expected to grow by 3.3% yearly through 1995, equal to 300,000 metric tons in increased demand. Hunsfos expects to sell 70,000 metric tons/year of MWC, or 4% of the MWC sales in that growing market during this decade.

Major investment

To win its planned market share, Hunsfos plans to spend NOK 380 million in 1991 and 1992 to expand the mill's capacity. The investment will raise groundwood production capacity from 19,000 metric tons/year to 21,000 metric tons/year, and chemical pulp capacity from 60,000 metric tons/year to 70,000 metric tons/year. Coating capacity will be raised from 20,000 metric tons/year to almost 70,000 metric tons/year, and sheeting from 12,000 metric tons/year to 24,000 metric tons/year of big sheets. Not included in this increase is paper of size A4, which will account for an additional 15,000 metric tons/year.

1. Hunsfos Fabrikker is a 105-year-old company in Vennesla, Norway.



The production capacity of PM No. 5 and the coater will be increased from 40,000 metric tons/year to 70,000 metric tons/year. Storage and transportation facilities will be expanded to handle the mill's total capacity increase.

The result will make Hunsfos a medium-sized supplier of MWC internationally. Hunsfos expects its increased capacity will enable total sales to reach NOK 1 billion in 1994.

The company was founded in 1886. Today, it has five paper machines, which were added and rebuilt through the years. Since 1939, Hunsfos has been one of the largest makers of machine glazed (MG) sulfite papers in Europe.

First in Europe

According to Vennesland, Hunsfos was the first mill in Europe to switch to the magnesium bisulfite pulp process. "In addition to quality advantages, this method also makes it possible to make bleached chemical pulp from pine, which is the predominant wood species in the region the mill draws its wood supply from," he said.

It also results in a better, more economical cleaning and recirculating system for the mill in that it reduces fuel use, recirculates the spent chemicals, and allows compliance with Norway's strict effluent discharge limits, Vennesland noted.

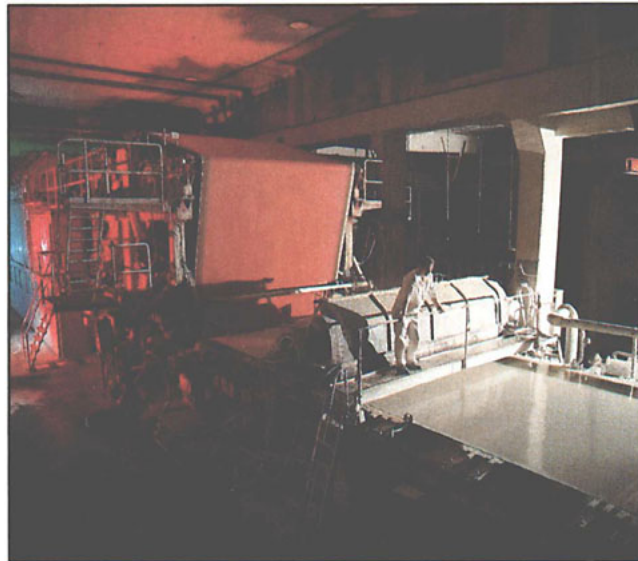
Ola Taraldrud, the mill's technical director, said the mill

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2. The entire cleaning and bleaching process is connected to an advanced data system on a computer with two terminals. A schematic of the oxygen reactor is on the terminal in this photo.



3. PM No. 5's wet end (right), with an operator by the fourdrinier's dandy roll and the press section (left).



is highly automated. Each of the two fourdrinier lines and one of the MG-lines is computer-controlled from a single control panel.

The production flow at Hunsfos is in no way unusual at the raw material entry end. Timber comes into the mill mainly by truck and is stored in the woodyard, where a Wisbech gantry crane moves it to the slasher. After barking in two Rauma Repola barking drums, it is chipped in an Ottersland chipper. The chips are then screened in a Wennberg rotating disc chip screen.

Logs for the groundwood mill bypass the chippers and are moved to the log silo and ground in five Voith grinders, with a total capacity of 30,000 metric tons/year.

The groundwood moves to two-stage screening (Rothrom/Covan) and thickening on Myren thickeners. Once thickened, some of the groundwood pulp is bleached to 74 ISO brightness in a hydrosulfite process and sent to the paper mill. The rest is sent to the paper mill unbleached at 64 ISO.

Five batch digesters

The chips are routed to five Avestad cold-stretched batch digesters, each with a 235 m³ capacity. Spent black liquor from the digesters is drained off and evaporated to a 56% concentration in an evaporation system, which consists of four Rosenblade evaporators, one falling film evaporator from Ahlström, and a Götaverken (Babcock & Wilcox) boiler. Makeup sulfur is bought as melted sulfur and burned in a sulfur burner at the recovery boiler.

The pulp moves from the digester to double screening by four Sunds Delta 4 screens and on to thickening. After screening, the pulp is split into three lines. Of the total production of 60,000 tons/year, 40,000 tons/year is fully bleached to 90 ISO, 10,000 tons/year is semibleached to 80 ISO, and 10,000 tons/year is used by the paper mill as unbleached at 70 ISO.

The main bleach line is O/C/EP/H. The oxygen reactor

(Fig. 2) is a high-consistency downflow reactor made by Kamyr. Ahead of the reactor is a Thune SP-70 dewatering press, which brings the consistency up to 30%. After the oxygen stage, the pulp is double-washed and then fully bleached according to the sequence. The bleach plant was delivered by Kamyr. In 1980, Hunsfos started up the world's first oxygen bleaching plant for sulfite pulp. The semibleached pulp is bleached in a single-stage, high-consistency peroxide bleach plant. The thickening is also done there by a Thune SP-32 dewatering press.

The unbleached pulp is heated with peroxide in order to avoid a sulfite smell before it reaches the paper mill.

For fully bleached pulp, a mixture of 60% pine and 40% birch is used. The semibleached pulp and the unbleached pulp are made of spruce to get the pulp as bright and clean as is possible.

Two fourdriniers

PM No. 1, a 264 cm-wide fourdrinier, is used to make woodfree fine paper for use as copy paper, office stationery, and woodfree printing and writing papers. Its capacity is 25,000 metric tons/year. The line is controlled with a Measurex 2001 computer installed in 1981. The machine is a Fulkliner machine, which was rebuilt by Thune in 1966.

PM No. 5, a 336 cm-wide fourdrinier, supplies most of the base paper for the mill's coating operations. Its capacity is 40,000 metric tons/year. This line is controlled with a Sentry 300SG computer installed in 1982. The machine is a Beloit machine, which was installed in 1949.

PM No. 5 is also controlled by a continuous, computerized system from Fischer through to the storage chest. The Fischer computer system also controls dye, beating, and furnish. The cleaner system is a Radiclone/Perivac system from Noss.

PM Nos. 3, 4, and 6 each have a Yankee dryer of 4.5-m diameter and are machine glaze (MG) machines. PM

4. The infrared dried system on PM No. 5 regulates the cross profile moisture.



6. The existing off machine coater was made by Karlstads Mekaniska Verkstad.



No. 3, 322 cm wide, has a capacity of 12,000 metric tons/year of paper from 16 g/m² to 30 g/m²; PM No. 4, wire width 322 cm, makes 12,000 metric tons/year of paper from 30-60 g/m²; and PM No. 6, wire width 343 cm, makes 18,000 metric tons/year of paper from 50 g/m² and upward.

PM No. 6 is a modern MG machine equipped with a Sentry 300 SX computer installed in 1988. The machine also has an infrared drying system from Impact and a hole detector from Ulma.

PM Nos. 3 and 4 are from KMW (Karlstads Mekaniska Verkstad), and were installed in 1938. PM No. 6 is a Thune machine with a KMW Yankee, which was installed in 1956.

The MG machines can make a wide range of grades, including papers for waxing, laminating, bag making, and flower tissue; poster paper; fruit wrapping paper; metalizing paper; and envelopes.

PM No. 5

PM No. 5's fourdrinier (Fig. 3) has a pressurized headbox from Voith and a Beloit Walmsley wire section with foils, a dandy roll, and a suction couch followed by a suction pickup roll to a Beloit Twinver press section with a third, felted press added. The paper then goes to a predryer with 21 cylinders and infrared drying from Impact, on to a Beloit size press, and then to after dryers with 13 cylinders and infrared drying from Impact (Fig. 4) with Nipco caliper control and an Ulma hole detector. The winder is from British Winders.

The mill's three cutters for printing papers are from Strecker and have widths of 1400 mm, 1450 mm, and 1600 mm; they cut a maximum length of 1800 mm, 1800 mm, and 1740 mm, respectively. Two can sort automatically.

The mill also has two automatic cutting and packaging lines for paper sizes A4 and A3. These have a total capacity of 20,000 metric tons/year. The cutters are from Will, and

the ream packaging units are from Wrapmatic. Packs of five reams are placed into cartons by a Nor-Reg boxing system.

Large sheets are wrapped on a Wrapmatic Grande Risme Veloce that handles up to 3400 reams/shift. It cuts the wrapper to the right size, marks the fiber direction and the production week, wraps and labels reams, and delivers them neatly stacked on pallets.

The power units for Hunsfos, in addition to the recovery boiler, consist of three electrical boilers with a 36-MW capacity (Norway has relatively inexpensive hydroelectric power) and two oil-fired boilers with a total capacity of 110 tons/h of steam. Each day the choice of whether to use electricity or oil as the main power source for the mill is determined by which is cheaper that day.

Expansion

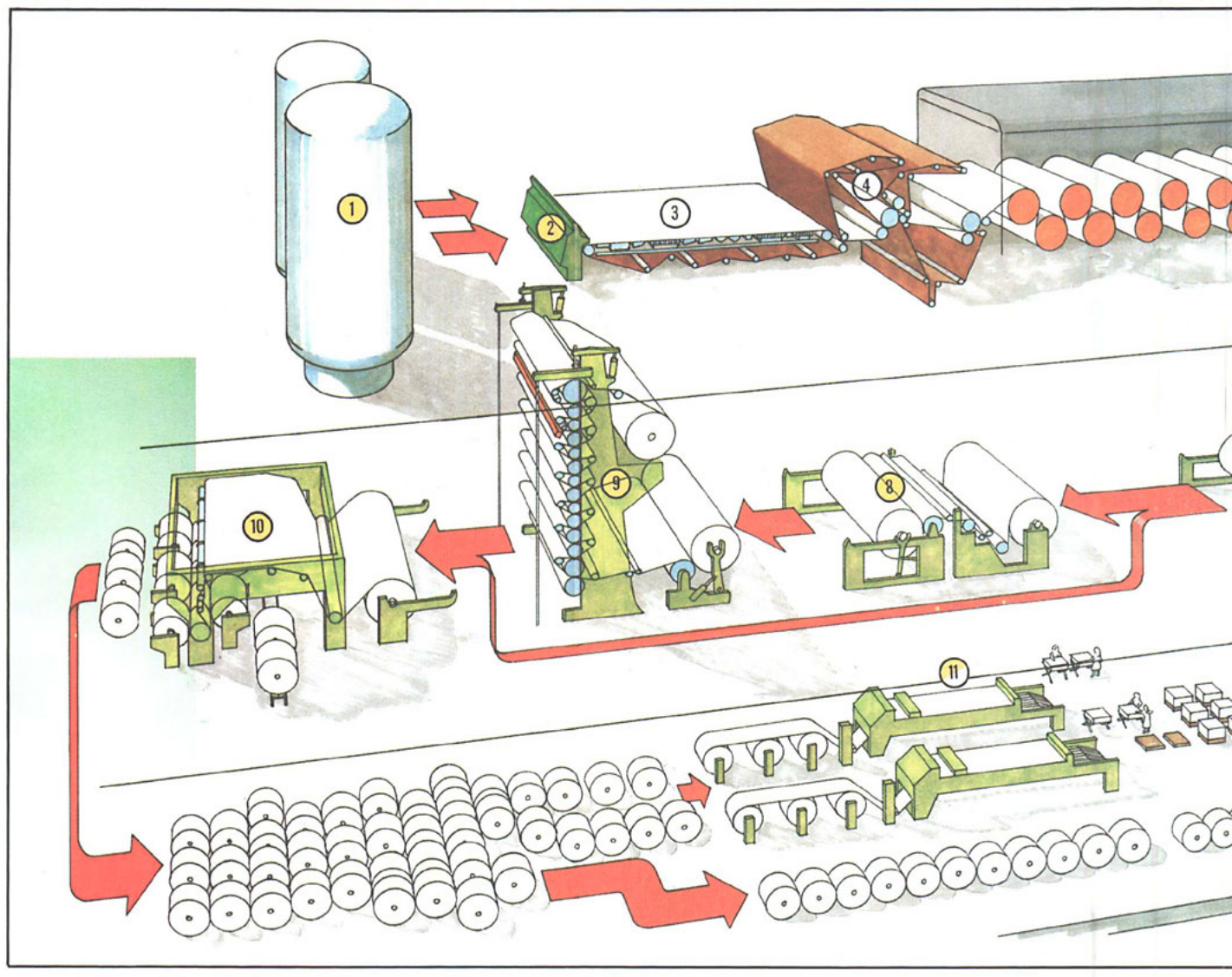
"The planned expansion of PM No. 5 will result in the full use of the capacity of the pulp mill, coaters, sheeters, and power house," Vennesland said. "The available capacity of these systems guided the decision to focus investment on the paper machine, winders, and other finishing equipment."

According to Taraldrud, when PM No. 5 is completed in 1992, it will have a completely modern wet end suitable for making paper for coating. The machine will have suitable storage towers for broke and white liquor to meet the requirements of evenness and low fiber loss.

"The machine speed will be 700 m/min and will be controlled by a state-of-the-art computer system to ensure both production quantity and quality," he said.

The coater will be equipped with a flying splicer and a new, center-drum winder will ready the rolls for a double coating alternative to glazing. The roll wrapping department will be an extension of the coating area, as will the sheeting department. The finished products will then be moved to a new section in the storage area for

5. Flow diagram of PM No. 5, coating machine, finishing, and warehouse: (1) pulp chest and white water chest; (2) headbox; (3) fourdrinier; (4) press section; (5) dryer section; (6) rewinder; (7) coating machine; (8) winder; (9) supercalender; (10) slitter-winder; (11) sheeters; (12) sheet packing; (13) roll wrapping; (14) warehouse.



shipment to domestic and foreign customers (Fig. 5).

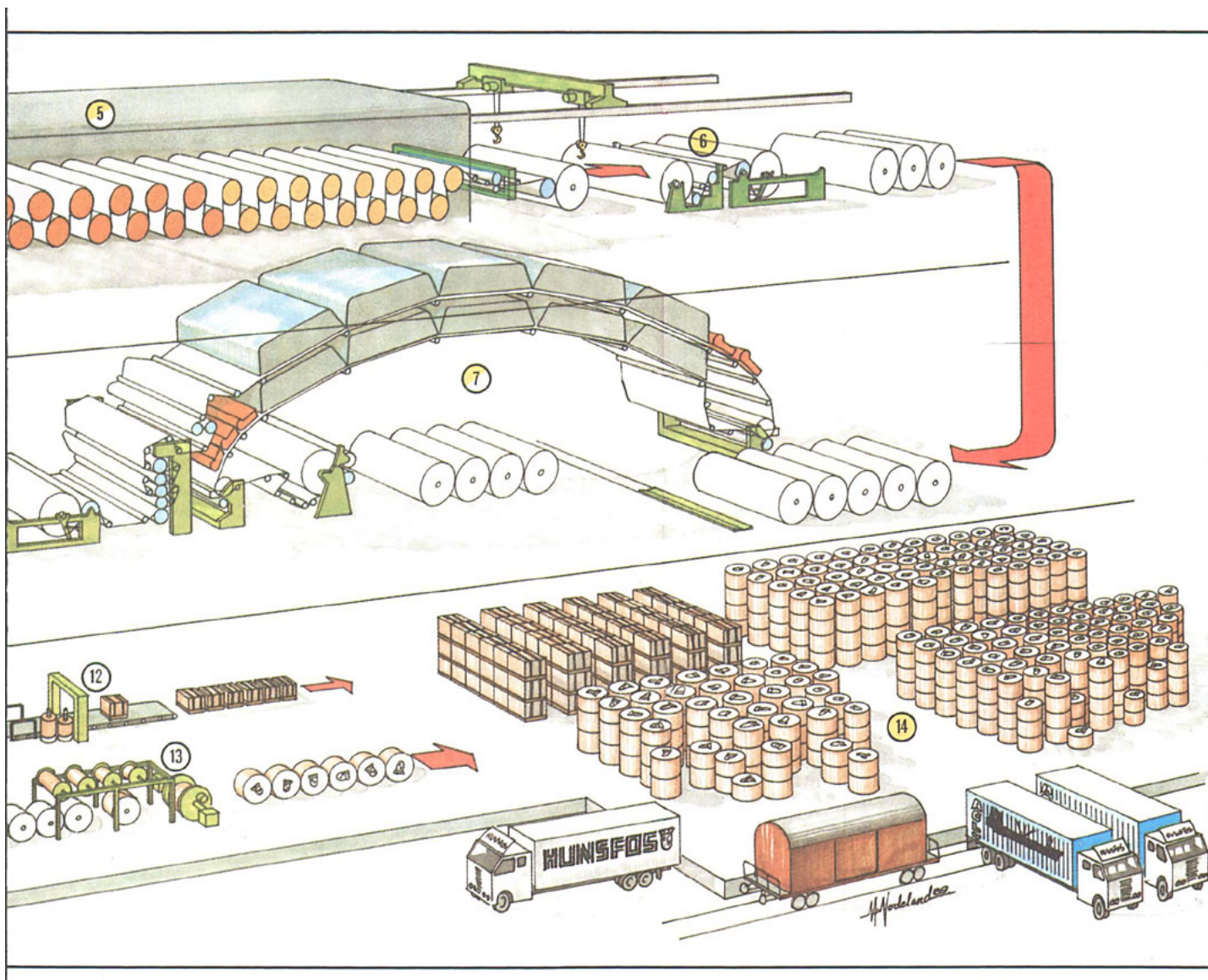
The entire production line will be equipped with machines especially designed to make coated, mechanical printing paper, Taraldrud said. Ekono is the consultant that developed the expansion plan. (Figure 6 depicts the existing off-machine coater.)

Results

In addition to giving Hunsfos the ability to make more

products suitable for future markets and to make full use of all the mill's production components, Vennesland said the high degree of automation, together with increased production, will result in a low labor unit cost.

When the expansion has been completed, Hunsfos will be able to make 25,000 metric tons/year of uncoated, fine paper; 40,000 metric tons/year of MG specialty paper; and 70,000 metric tons/year of MWC paper. Also, according to the plan, it will be able to enlarge its market niche in MWC. □



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