

Modern management, technology, make Skogn significant newsprint maker

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Pulp and newsprint mills at Skogn, Norway, stress training, automation, quality control, and a year-round, ice-free harbor.

Nordenfjelske Treforedling's newsprint mill (Fig. 1) lies at Skogn, on the Trondheimsfjord about 75 km north of Trondheim, which is about a third of the way up the western Norwegian coast.

The site houses a mechanical pulp mill and a thermomechanical pulp (TMP) mill with three TMP pulp plants. The combined capacity is 2200 metric tons/day. The newsprint mill has three newsprint machines and a total capacity to make close to 500,000 metric tons/year. The mill's main market product is standard newsprint, which

ranges from 40 g/m² to 48.8 g/m². Telephone directory stock is also made.

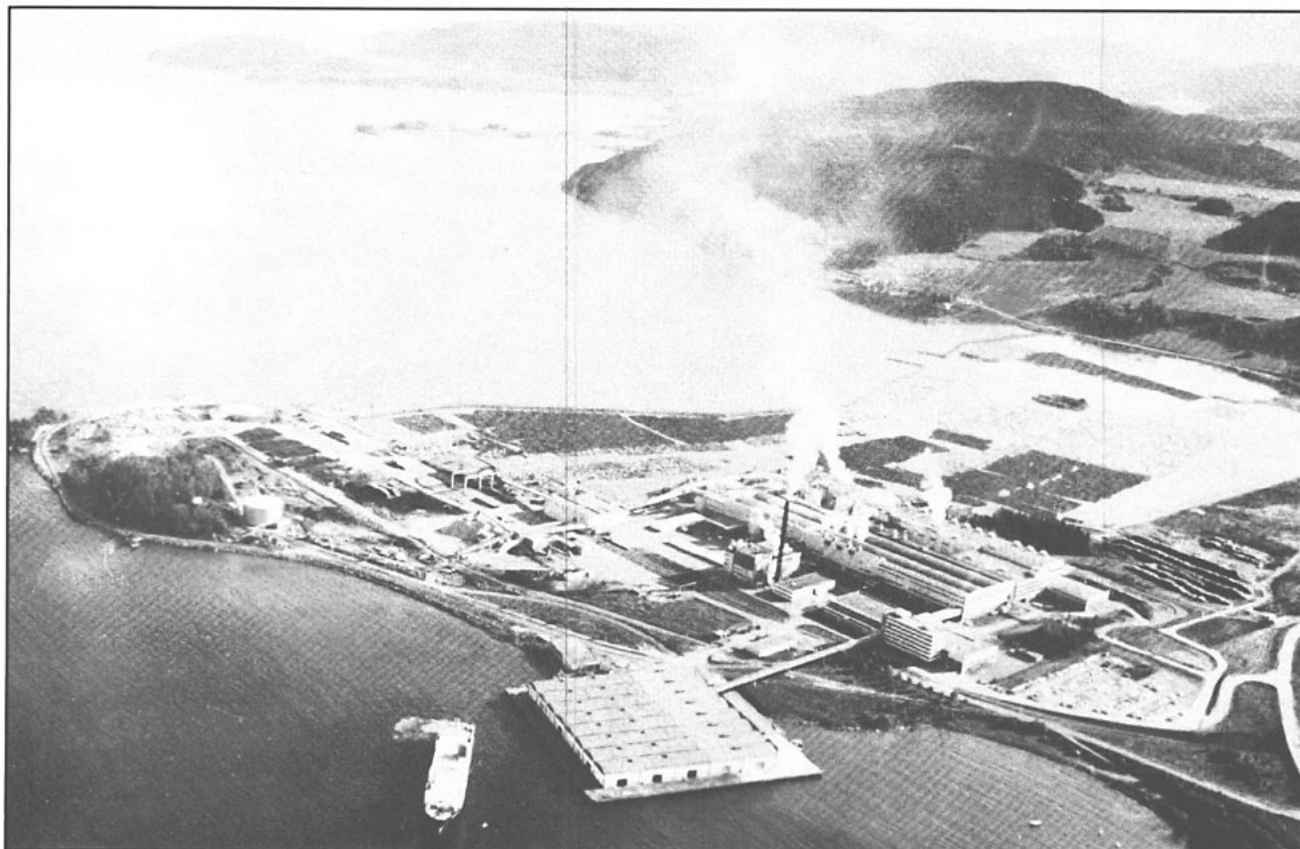
The mill was built as a greenfield project in the 1960s and is the property of Norske Skogindustrier A.S., known commonly as Norske Skog, which is headquartered at Skogn. The Skogn mill was among the first in Europe to introduce process control based upon microprocessors. Today, it is equipped with the most advanced, state-of-the-art process and quality control systems available.

In 1990, newsprint accounted for 20% of Norske Skog's sales. The Skogn mill is the main reason behind the company's significant standing as a European newsprint maker.

More than 90% of the mill's production is exported,

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1. The Nordenfjelske Treforedling mills at Skogn, Norway, on the Trondheimsfjord



2. Roundwood arrives at the Skogn woodyard.



3. Wood chips are stored in the woodyard wet or moist.



4. The control room in the thermomechanical pulp mill at Skogn



mainly to western Europe. Customers are also in the United States, the Far East, and elsewhere.

700 employees

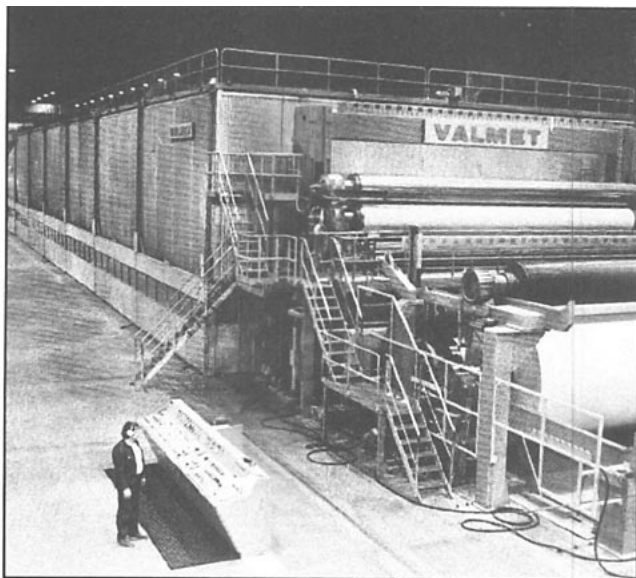
Nordenfjelske Treforedling employs about 700 people. It runs courses to maintain and upgrade its employees' skills and has its own three-year-long paper school to educate the various departments' operators. It has, in addition, independent quality circles dedicated to quality improvement, which reflect the management's policy of delegating responsibility wherever it seems appropriate.

The raw material for newsprint made at Skogn is Norway Spruce, which is delivered to the mill by rail and road either

as chips from nearby sawmills or as roundwood (**Fig. 2**). It is stored wet or moist for quality reasons (**Fig. 3**).

The mill recently ordered a new wood-handling system from Kone-KMW for SEK 60 million. The order includes an in-feed conveyor with a deicing facility, a debarking drum with a diameter of 5.6 m and a length of 36 m and metal traps, and a HQ-chipper. The bark-handling system includes a disc screen and bark shredder. The order also includes a complete water treatment system that will permit recirculating water to be cleaned. The new system is scheduled to be put in use in October and will process 1 million m³ of wood/year.

5. PM No. 3 came on-stream in 1981.



Stone groundwood

The mechanical pulp mill dates from 1966 and uses 10 Tampella grinders and can make 600 tons/day of stone groundwood (SGW). The oldest TMP mill was installed in 1975 and has a production capacity of 120 tons/day. It uses two Sund Bauer double disc BDB 490 refiners, 2 × 2.2 MW each.

The next plant was installed in 1981 and has 840 tons/day of production capacity. It is a Sunds Defibrator two-stage plant with nine refiners: five in the first stage (four RLP 60 S units with 7.5 MW each and one RGP 70 CD unit with 15 MW), three RLP 60 S units with 7.5 MW each in the second stage, and one RLP 60 with 7.5 MW for rejects.

The newest TMP plant was installed in 1988 and has a production capacity of 640 tons/day. It uses Sunds Defibrator equipment in a two-stage system. The first stage has two RGP 76 CD refiners with 19 MW each, the second stage has two RGP 65 refiners with 9.5 MW each, and there are two RGP 65 refiners with 9.5 MW each to handle rejects.

Buying chemical pulp

When chemical pulp is needed for added strength, it is bought from the Tofte kraft pulp mill in southern Norway, which is part of Norske Skog.

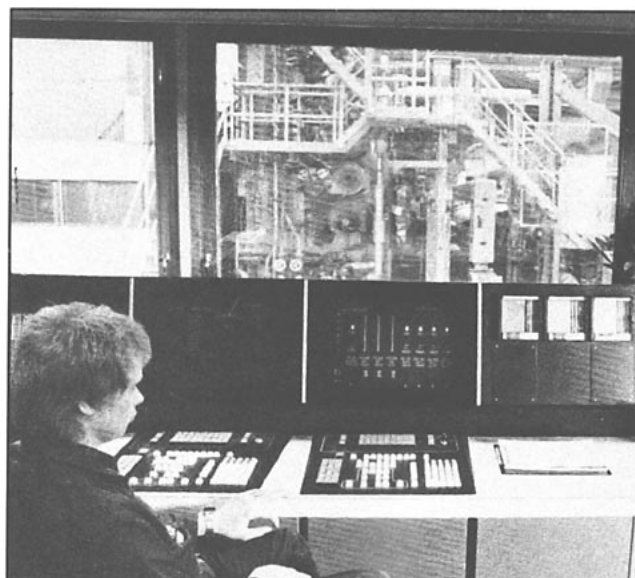
Skogn's yearly wood use is about 1 million m³ solid wood, or about 5 million pulpwood trees a year.

The mill's yearly electric use is about 1.4 million MW h/year, or more than 1% of the electrical energy used in Norway yearly.

The production of TMP and SGW is supervised from a central control room by five operators per shift (see Fig. 4). Every normal operation, including the startup and stop, are performed from video terminals.

The quality of the TMP and SGW made at Skogn is controlled automatically with a method developed by SCA Control Systems and Sunds Defibrator. The method is based upon automatic sampling and testing units, called

6. The control room for PM No. 3



pulp quality monitors (PQMs), which give feedback to the computers that control the refiners and grinders. There are five PQMs in the pulp mill.

Information from other departments, including the semiautomatic paper testing station, is supplied by a millwide computer from AFORA.

Paper mill

The pulps are metered, in the desired ratio, from the pulp mill to each of Skogn's three newsprint machines.

PM No. 1 is a Valmet Sym-R, which was started up in 1966 and rebuilt in 1975, 1987, and 1990. It has a trimmed width of 6.75 m and a working speed of 1050 m/min. The capacity is 140,000 metric tons/year of 48.8 g/m² newsprint; the product made is 40–48.8 g/m² newsprint.

The press section is a Twinver press and a separate third press. The machine calender has six rolls, which include two Kuster rolls and two Thermo rolls. The winder is a Valmet KL 1000 V. PM No. 2 is a Valmet Sym-R, which was installed in 1967 and rebuilt in 1979 and 1987. Its trimmed width is 6.75 m, and it has a working speed of 1200 m/min. The capacity is 165,000 metric tons/year of 48.8 g/m² newsprint; the product is 40–48.8 g/m² newsprint.

The press section is a Valmet Sym Press II. The six-roll machine calender includes two Kuster rolls and two Thermo rolls. The winder is a Valmet KL 1000 V.

PM No. 3 (Fig. 5) is a Valmet Speedformer, which was installed in 1981. Its trimmed width is 8.5 m and a working speed of 1220 m/min. The capacity is 220,000 metric tons/year of 48.8 g/m² newsprint; the product made is 40–48.8 g/m² newsprint. The press section is a Sym Press II from Valmet. The machine calender has six rolls of which two are Kuster rolls and two are Thermo rolls. The winder is a Valmet KL 1000.

Plan rebuilds

Rebuilds are currently planned for PM No. 3 in order to improve its quality and productivity.

Each of the mill's paper machines is controlled by sophisticated automatic controls and instrumentation systems from the wet ends to the pope reels (**Fig. 6**).

Honeywell TDC 2000/3000s are used to supervise the process. Electrical circuits are operated by PLC micro-processors, and AccuRay equipment controls grammage, moisture, and caliper. Sensors are mounted for the on-line measurement of formation, brightness, and opacity. New equipment has been installed for the cross-machine profile control of caliper, moisture, and fiber weight.

The Valmet winders on each machine were installed from 1981-1986. All have instruments that monitor the buildup of the reel from the core to periphery and ensure high-quality reels up to a diameter of 1250 mm. Production is followed from the winders through the wrapping station and on to the warehousing and shipping operations.

Heat recovery

The steam from the pressurized cyclones after the first stage of chip refining is led to a falling film evaporator. Clean steam from the heat exchanger is then compressed to 2.1 bar in a five-stage compressor and sent to the paper mill's low-pressure steam system. The steam from the second-stage refiners is heat exchanged, and the energy recovered from it is transferred to a circulating hot water system. Its uses include heating buildings, combustion air, and drying air in the paper mill.

Burning bark from the wood room and nearby sawmills furnishes the additional steam needed to dry the paper. As a result, even at full production, the mills are self-sufficient in heat energy.

Quality

Paper is tested around the clock in the Auto-lab, which is equipped with semiautomatic testing instruments linked to the millwide computer. Thus, information is given instantly to the relevant departments.

The mill's management has given the laboratory staff the responsibility to directly regulate the product's shade, brightness, and strength.

In the main laboratory, the daytime staff completes paper quality studies, which include printability, liquid adsorption properties, and linting tendency. Printing inks are tested to see how they match paper quality.

The laboratory staff also conducts process investigations, studies to optimize process equipment, and general troubleshooting. It performs trials to find ways to improve pulp and paper quality and carries out studies in connection with the technical services offered customers.

Shipping

Specially designed clamp trucks are used to store the newsprint reels in the mill's warehouse. They load them aboard specially designed ships that sail from the warehouse's dock through water that is always ice-free.

Most of the ships used are side-loaders that deliver to European harbors.

The sale of newsprint made at Skogn is handled for Norske Skog by Nornews ANS, the company's own sales organization, which has sales offices in about 15 countries. □