

# The trend toward lightweight newsprint

Thomas S. Greiner

*European mills have turned a vice into a virtue with high quality, high secondary fiber content newsprint.*

While standard newsprint in North America has remained at 48.8 g/m<sup>2</sup> (30 lb/3000 ft<sup>2</sup>) since it was reduced from the original 52 g/m<sup>2</sup> (32 lb/3000 ft<sup>2</sup>), West European publishers now print their papers predominantly on newsprint of 45 g/m<sup>2</sup> (27.6 lb/3000 ft<sup>2</sup>), and some have gone down even to 40 g/m<sup>2</sup> (24.5 lb/3000 ft<sup>2</sup>). *Tappi Journal* requested that I investigate the reasons for and consequences of this divergence. This report is based on visits to two major European newsprint mills—one in Sweden, the other in the Netherlands—and on extensive conversations with key executives of these two mills.

## The need to conserve fiber and energy

It appears that the driving forces behind the lowering of basis weights were the Scandinavian mills who faced shortages of pulpwood and energy. Since the selling prices of newsprint were maintained on an area basis, i.e., per-ton prices were raised proportionately as basis weights were reduced, monetary sales volume was maintained at lower operating costs.

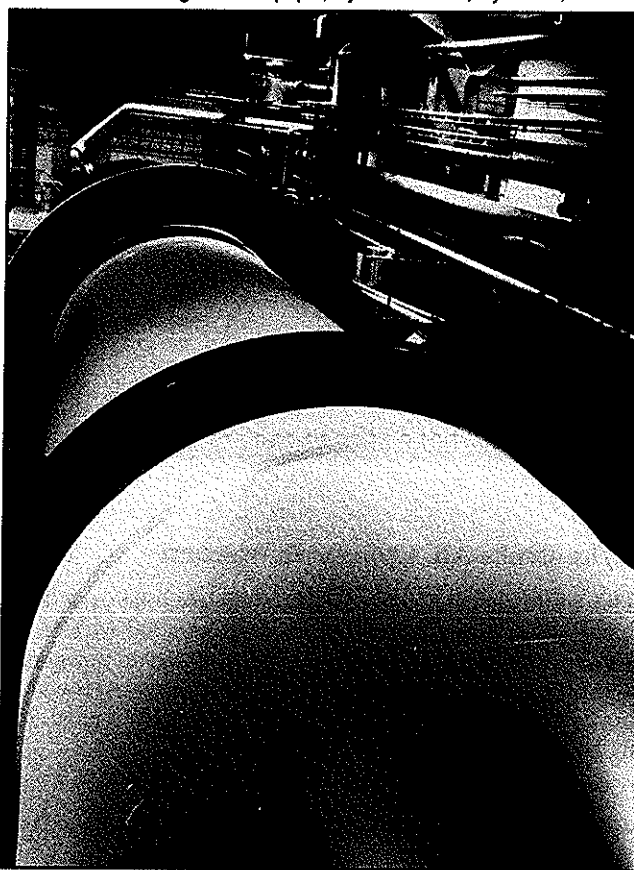
The shortage of pulpwood in Scandinavia was transformed into a blessing in disguise. A substantial amount of virgin fiber was replaced with recycled fiber through the addition of deinking plants. This measure served not only to stretch the supply of pulpwood but had the additional advantage of requiring only a fraction of energy compared to mechanical pulp, especially thermomechanical pulp (TMP), the preferred process in newsprint mills.

The benefits to the publisher accrue in the form of reduced shipping and distribution costs. Moreover, the lower basis weight results in rolls with more footage, thus reducing the number of roll changes on the press. More about this later.

## Investment in plant and equipment is imperative

Obviously, there are costs involved and efforts to be made to acquire these benefits. Running newsprint at lower basis weights and with less controllable furnish calls for up-to-date equipment, especially in the face of stringent

1. Flotation deinking of waste paper, Hylte Bruks AB, Hyltebruk, Sweden



requirements for uniform quality on the part of the publishers. Apart from modern deinking and stock preparation facilities, paper machines and finishing facilities have to reflect high standards of engineering and construction.

The oldest paper machine in the mills visited was 17 years old; the newest was just about ready to start up. A 10-year-old paper machine was being rebuilt extensively to incorporate state-of-the-art technology.

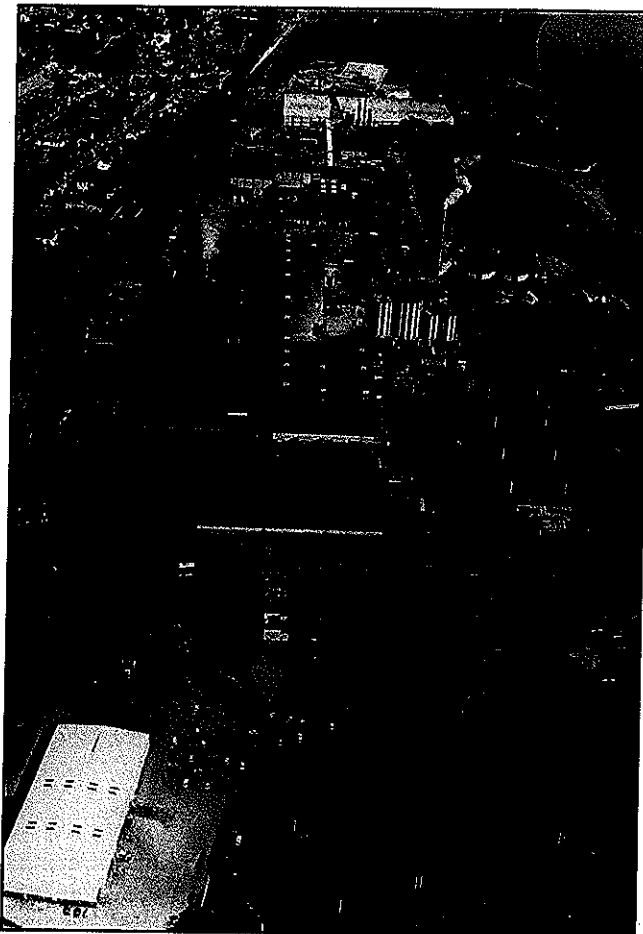
A description of the two mills investigated and a comparison of their operations will serve to characterize typical modern European newsprint production.

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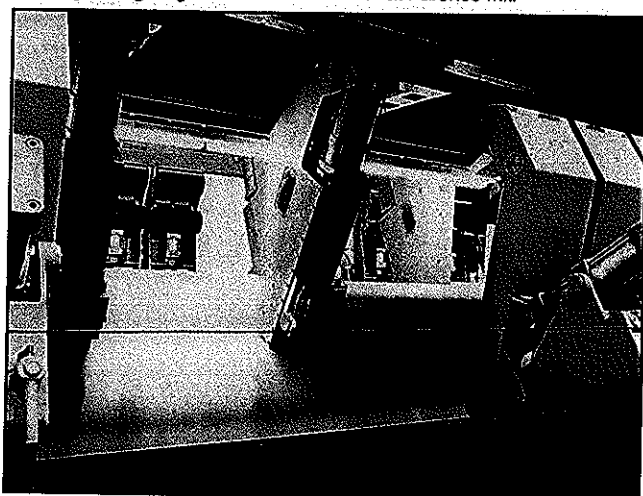
1. Characteristics of paper machines at Hylte Bruks AB, Hyltebruk, Sweden

| No. | Year Installed | Make            | Wet end    | Speed                                 |
|-----|----------------|-----------------|------------|---------------------------------------|
| 1   | 1972           | Valmet          | Sym-Former | 1100-1200 m/min<br>(3600-3900 ft/min) |
| 2   | 1974           | Valmet          | Sym-Former | 1100-1200 m/min<br>(3600-3900 ft/min) |
| 3   | 1979           | Valmet          | Sym-Former | 1100-1200 m/min<br>(3600-3900 ft/min) |
| 4   | 1989           | Beloit-Walmsley | Bel-Bale   | 1300-1400 m/min<br>(4260-4600 ft/min) |

2. Newsprint mill, Parenco B.V., Renkum, The Netherlands



3. Jagenberg single-drum center winder at Parenco mill



### Hylte Bruks AB, Hyltebruk, Sweden

This mill has a capacity of 750,000 metric tons/year (2350 short tons/day) of newsprint. It was founded in 1907 as a sulfite pulp and paper mill and converted to newsprint and magnesite pulp in 1972. Located in southern Sweden, in the region of Gothenburg, the mill is now owned 75% by Stora and 25% by Feldmuehle AG.

Furnish is composed, on the average, as follows:

- 40% de-inked fiber (with some waste paper shipped from Hamburg) (Fig. 1)
- 28% TMP
- 20% stone groundwood
- 12% magnesite pulp.

Characteristics of the four paper machines are listed in Table I.

All four paper machines have the same width—8400 mm (330 in.). Lined up next to each other, they are served by six winders. Four are Waertsilae two-drum winders and two are Jagenberg single-drum (Vari-Top) winders. Reels from any paper machine can be processed on any one of the winders.

Anders Palm, managing director of Hylte Bruks AB, explains, "Two developments went hand-in-hand with the lowering of the basis weight of newsprint. Substituting

deinked fiber for groundwood and TMP resulted in a certain densification of the sheet, thus a slight reduction in caliper. Along with the lower basis weight, this increased the number of layers in a roll of newsprint, as well as the shipping weight of the roll. This was coupled with an increase in the diameter of newsprint rolls as required by some of our customers. Such rolls could no longer be wound in a satisfactory manner on a two-drum winder. The Vari-Top single drum winders enable us to wind rolls up to 1250 mm (50 in.) diameter, which may contain as much as 19,000 running meters (62,320 ft) of paper." According to Hakan Andreason, sales director, roughly 20% of Hylte Bruks' production is sold in Sweden and another 60% in the remainder of Western Europe. About 10% is shipped to the Far East and another 10% to the U.S. Hylte's paper is accepted by Gannett Publications for printing *USA Today*.

As to basis weights, 45 g/m<sup>2</sup> predominates in Western Europe and amounts to about 50% of Hylte's sales. About 15% is run as light as 40 g/m<sup>2</sup> and the remaining 35% is still at 48.8 g/m<sup>2</sup>. The trend appears definitely to be toward the lower basis weights, and Hylte's executives feel that 42 g/m<sup>2</sup> or 26 lb/3000 ft<sup>2</sup> may be the standard eventually.

II. Running lengths of rolls of varying diameters by basis weight

| Roll diameter |     | Average running length by basis weight |        |                     |        |                       |        |
|---------------|-----|----------------------------------------|--------|---------------------|--------|-----------------------|--------|
|               |     | 40 g/m <sup>2</sup>                    |        | 45 g/m <sup>2</sup> |        | 48.8 g/m <sup>2</sup> |        |
| cm            | in. | m                                      | ft     | m                   | ft     | m                     | ft     |
| 100           | 40  | 12,630                                 | 41,400 | 11,280              | 37,000 | 10,370                | 34,000 |
| 107           | 42  | 14,530                                 | 47,650 | 12,640              | 41,500 | 11,860                | 38,900 |
| 115           | 45  | 16,460                                 | 54,000 | 14,780              | 48,500 | 13,680                | 44,900 |
| 125           | 50  | 19,460                                 | 63,800 | 17,470              | 57,300 | 16,220                | 53,200 |

### Parenco B.V., Renkum, The Netherlands

This facility has a capacity of 350,000 metric tons/year (1100 short tons/day) of newsprint plus 70,000 metric tons/year (220 short tons/day) of directory papers. It is a modern newsprint mill, started in 1979 on the premises of an historic mill. The owners, Van Gelder Zonen, sold the mill to the German Haindl Papier Concern in 1984. Located close to the border of the Federal Republic of Germany, the mill serves the West European continent (Fig. 2).

Parenco produces no chemical pulp and uses none. As much as 50% of the furnish is recycled fiber, of which about 15% consists of coated magazine papers, which yield much of the cellulose fibers required. The remaining 50% of the furnish is TMP produced from Dutch and German woods—approximately 70% pine and 30% spruce.

All of Parenco's paper is made on two paper machines, both of which are 8500 mm (336 in.) wide. The older of the two (PM No. 2), originally made in 1979, is now being rebuilt. Among other things, the process involves the installation of a fourth press and an on-machine soft-nip calender.

Both machines are made by Valmet and have SymFormer wet ends. After the rebuild is complete, No. 2 will have no breaker stack. It will use a Kleinewefers Soft Compact tandem single-nip calender to finish the sheet. In view of the width of the machine, both rolls of each of the two nips will be of the zoned deflection control type, the first such combination in the industry.

The No. 1 paper machine started up in 1987 and has no machine calender. The paper is finished off-machine on a Kleinewefers tandem calender with double nips (three rolls) in each stack. Gijs van Reenen, managing director of Parenco, maintains that this arrangement gives him more flexibility in view of the various types of directory paper produced there in addition to newsprint. The calendering operation keeps pace with the paper machine, which operates at about 1200 m/min (3900 ft/min), approximately the same speed as No. 2.

Four winders serve to finish the paper of these two machines. One is a Jagenberg two-drum winder; the other three are Vari-Tops with single drums and individual rewind stations (Fig. 3). Here again, mill management feels that the lighter basis weights, coupled with larger diameters and higher sheet density, requires this type of equipment for satisfactory roll structure.

van Reenen gave me an approximate breakdown of basis weights of newsprint produced at this time. Roughly half of the production is made in 48.8 g/m<sup>2</sup> and consumed by smaller publications. 45 g/m<sup>2</sup> accounts for about 43%, while the remaining 7% of newsprint is made in 40 g/m<sup>2</sup>. About 40% of the mill's output is sold in the domestic Dutch market, with the remainder being sold in Western Europe.

Due to the role played by recycled fiber in the production of newsprint in these mills, their deinking plants featured the latest flotation equipment, and quality control was strictly maintained. In spite of the secondary fibers, brightness of the finished sheet was up to that of any made from virgin fiber.

Parenco newsprint has an average of 9% ash content in its sheet. Mill manager Menko F. Biewenga confirms that their product is fully satisfactory for four-color offset printing, used most frequently in France.

### Paper specifications not affected by printing method

I tried to find out whether there was a correlation between basis weight and the method by which the papers were printed. There does not seem to be any. The larger publications are generally printed offset, although there is some variation from country to country. Flexo printing is rarely used, except in Italy, where there seems to be a considerable amount of it, especially in the south. One interesting piece of information: *The London Daily Mail* has recently switched from letterpress to flexo. The circulation is reported to be about 800,000.

The two paper mills visited did not seem to change their paper specifications in accordance with the anticipated method of printing. Parenco feels that 48.8 g/m<sup>2</sup> newsprint will eventually disappear entirely.

### Effect of larger roll diameters

The question of winding newsprint rolls to larger diameters has been subject to substantial research conducted by the Newsprint Committee of IFRA in Darmstadt, the Federal Republic of Germany. The information summarized in Table II, excerpted and simplified from a report dated April 1985, may be of interest. The considerable effect of roll diameter and basis weight on footage per roll is readily apparent.

Larger diameter rolls also result in up to 36% less waste of paper and cores at the printing plant. Efficiency of the presses increases with fewer roll changes. On the other hand, these benefits are purchased with investments in turret roll stands as they are available from the press manufacturers. Most important, however, larger diameters can present a loading problem on railroad cars and trucks. Most loading platforms are so dimensioned that two rolls cannot be loaded on end side-by-side when their diameters exceed 42 inches. Special loading patterns may have to be devised.

### Summary

What began undoubtedly as an economic necessity has turned out to be beneficial to both European newsprint mills and their publisher customers. The main characteristics distinguishing European newsprint from the North American product are these:

- Furnish consists of up to 50% of recycled fiber.
- Ash content is about 10%, sometimes higher.
- Basis weights are about 8 to 18% lower.

Apparent benefits to the mills are reduced consumption of raw materials and reduced consumption of energy. Benefits to the publishers are reduced cost of freight and distribution, as well as increased efficiency on the printing presses. These benefits have their costs, however: substantial investments in equipment by the mills, investments by the printers to handle larger and heavier rolls, and problems of loading and shipping rolls of larger diameters. □

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## CORRECTION

### An overview of flexible-packaging markets and structures

On page 81 of the January 1989 issue of *Tappi Journal*, Table III, note that EVA should be EVOH.

*Tappi Journal* regrets any inconvenience due to this error.

## CORRECTION

### Industry automation: how much and how soon?

On page 9 of the February issue of *Tappi Journal*, contained material that should have been cited as being authored by Ole-Kristian Fadum and presented at the 1983 TAPPI International Pulp and Paper Process Control Symposium. This citation was left out during preparation.

*Tappi Journal* regrets any inconvenience due to this error.

## CORRECTION

### Alloy 86—a suction roll material for white waters containing thiosulfate ion

On page 193 of the June 1989 issue of *Tappi Journal*, in the third column, the third sentence should read: Another material for suction roll shells, A171, nominally consists of: 0.06% carbon, 1.5% silicon, 0.8% manganese, 23.0% chromium, 8.3% nickel, and 1.2% molybdenum.

Also the following references were omitted:

6. Dieter, G.E., *Mechanical Metallurgy*, Second Edition, McGraw-Hill, 1976, p. 430.
7. Castillo, A.P., 1984 Engineering Conference Proceedings, TAPPI PRESS, Atlanta, p. 601.

*Tappi Journal* regrets any inconvenience due to these errors.