

# Future Trends in the Paper Making Process

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There are many trends evident in the paper industry today. Although sophistication and automation are clearly evident the future trends are primarily determined by a desire to :

1. Lower production costs
2. Improve quality
3. Implement new and improved technology.

Although paper is customarily sold by weight the customer is generally more interested in the surface area. In recognition of this the newsprint industry in North America have recently reduced the standard basis weight of newsprint from 52 gsm. to 49 gsm. or an increase in surface area of 5.77 per cent for a given amount of fibre. To produce the same tonnage machine speeds will have to increase. It is projected that by 1985 there will be newsprint machines running in the 1200 m/m range, and publication grades in the 900 meter range. A machine of this future generation is currently in the design stages at Beloit. The 9650 mm. wire width, makes it the widest twin wire unit designed for newsprint. The dryer section, designed for over 775 MT/day production, will incorporate an air float first dryer section. This innovation is designed to allow operation at high speeds with a furnish cost no higher than machines operating today in the 1000 to 1100 meter range.

Another trend in newsprints is the increase in shipping roll size. In December, International Paper Company ran a full page advt. in the Wall Street Journal advising that they were currently furnishing 1500 mm. dia. newsprint rolls to some of their customers. This increase in surface area of nearly 150%, it was stated, saved their customers several hundred thousand dollars per year.

Twin wire forming has produced a new type of paper and board. No longer do we have the drastic difference between the top and bottom sides of the sheet. Fines and ash distribution are much more and equal on both sides of the sheet. The sheet has less tendency to curl. Dusting or linting is less of a problem with offset printing. Coating and ink acceptability is much more uniform on both sides of the sheet. The Fourdrinier is no longer the standard for paper machine design.

New press sections with double felting are producing more uniform paper and stronger paper by the elimination of draws through the press section. Double felting also allows the use of higher nip pressures 60 to 110 kg/cm. vs the customary 25 to 60 in the first press position. In the third or last press position nip pressures upto 285 kg/cm. are possible on liner board. The further trend will

be towards higher nip pressures on all grades where bulk is not critical.

Moisture uniformity across the paper machine is becoming more uniform with improvements in : drying condensate systems, pocket ventilation, dryer felt design, and moisture correcting devices.

The use of non-deflecting rolls has greatly improved the uniformity and flexibility of pressing and finishing of paper and board. We can now accomplish with one calender stack what used to be accomplished with two calender stacks as far as paper and board smoothness is concerned. A new plastic covered roll re-opens the door for on-machine supercalendering. This cover material called Supertex is very forgiving and does not mark like the conventional cotton or paper filled supercalender rolls.

The gate roll size press which is really a coater, is improving the surface characteristics of paper and board. It is replacing the conventional waterboxes on calender stacks. Improvements are continually being made in the quality of coating and sizing formulations.

While on the subject of coating we should mention the work being carried on in 100% solids

coating. 100% solids coating looks and feels like heavy clear oil. It is a coating that has no vehicle to be evaporated such as solvents or water and can be applied by a modified gate roll coater. 100% solids coating is a new technology, a new process, one, our research people feel, shows great promise in a world that has become energy and cost conscious.

Probably one of the most interesting new developments in the manufacture of paper and board is the ability to make multi-ply sheets at high paper machine speeds with excellent ply bond. This has been done for many years at slow speeds with the use of cylinder machines. It is now possible to put the strong long fibres in the center of the sheet or on the outside surface of the sheet to give the strength characteristics that are required. Paper or board can be made with the short fibres on the outside to improve printing qualities or with groundwood or hardwood fibres in the center of the sheet to help increase bulk. Fillers can be inserted in the center of the sheet to improve opacity when basis weights are reduced. The possibilities are almost too numerous to mention and certainly offers a new dimension in the production of paper and board.

One of the new developments that make structured sheets possible is the Strata-Flo headbox. The stocks are kept completely separated until they exit from the headbox after which very little mixing takes place. The plies have very good ply bond since they are combined at a very low consistency. Two or three layered paper can also be made at very high speeds with the twin wire former. A high speed linerboard machine is operating in this manner using waste in the center ply. Multiply paper and board can be made on a Fourdrinier with a combination of a Strata-Flo headbox and top wire formers.

An example of this type of machine is the American Israeli Paper Mills PM4 machine. This 5 meter trim width machine with a secondary headbox and 3 Belvac top wire formers is designed to make 45 gsm. newsprint to 400 gsm. folding box board. In its first partial year of production it produced 14,000 tons of woodfree, 10,000 tons of fluting, 9,000 tons of kraft grades and 3,000 tons of folding box board, an impressive variety for one machine.

For future paper machine design we see the following trends :

1. Speeds will continue to in-

crease, however, machine width will not increase beyond the present maximum of approx. 10 meters width.

2. Basis weights will continue to be reduced which will probably mean an increase in the use of fillers to maintain opacity.
3. Pulp yields will continue to increase and more use will be made of mechanical pulps.
4. Mills will continue to reduce the use of fresh water and the use of fossil fuels.
5. Machine efficiency will improve and more use will be made of automatic controls.
6. Multi-ply grades will be made at high speeds with lower cost furnish for filler plies.
7. Machines will be made shorter and simpler with the elimination of all hand threading of the machine.

The paper and board industry should have a good future. New developments in paper making will be able to meet the demands of the printing and paper converting industry.