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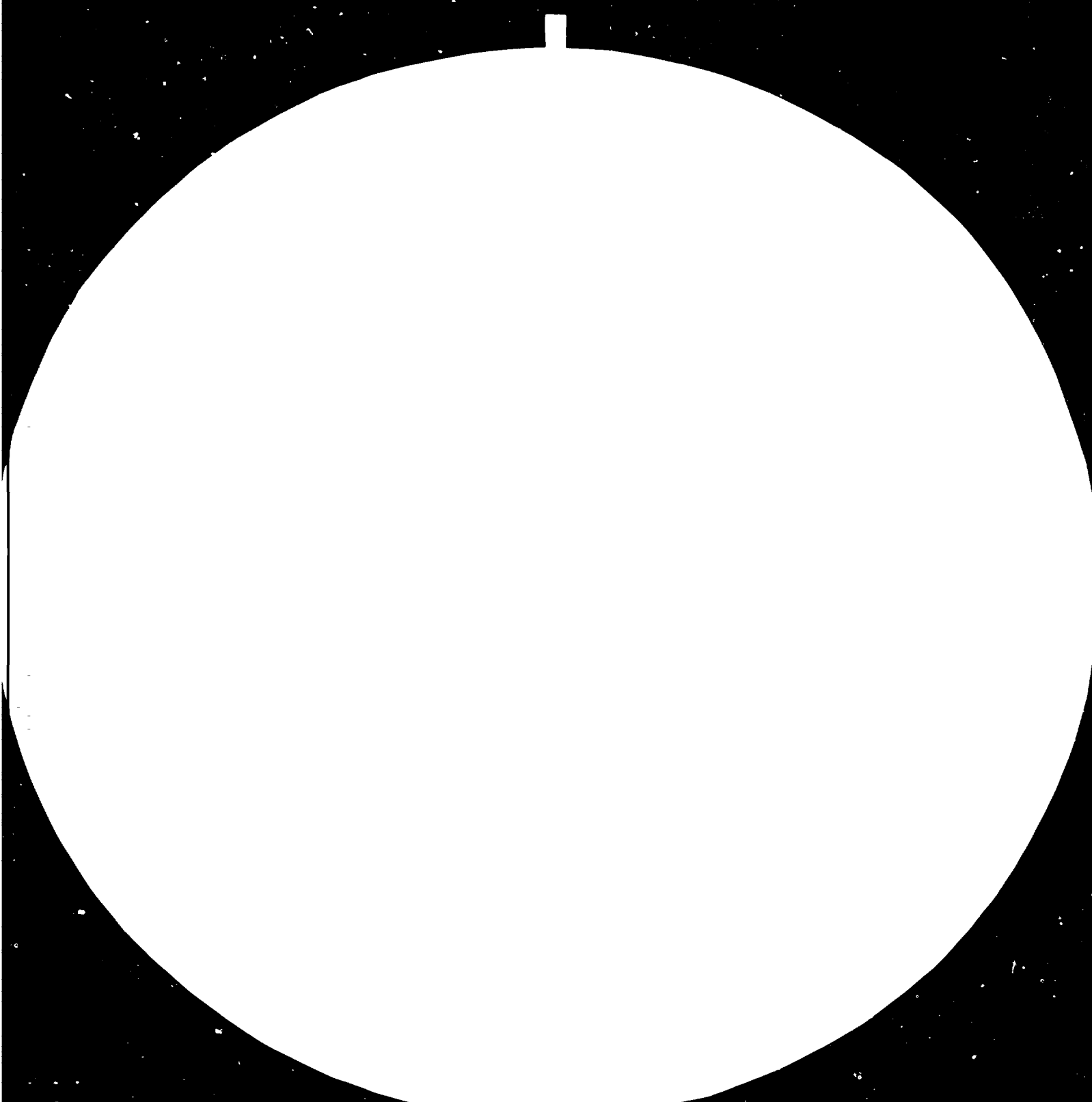

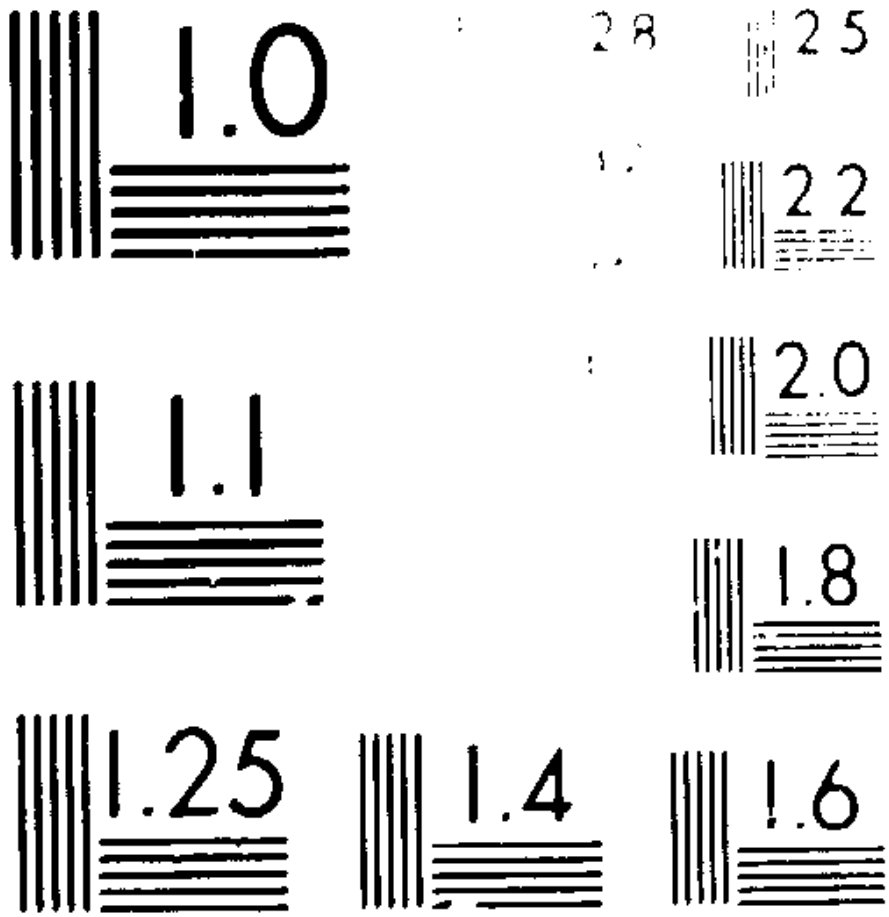
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BAGASSE NEWSPRINT WITH VALMET SYM-CONCEPT*

by

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GENERAL

During the last ten years the amount of bagasse pulp in the world has tripled and is expected to reach two million tons a year in 1980. There are several reasons for this development e.g.

- utilization of conventional fiber resources cannot be increased very much in the future
- countries where softwood fiber materials do not exist wish to cut the import of paper and to produce it from their own raw materials, one possibility being sugar cane i.e. bagasse.

Bagasse has been used several years for papermaking purposes, qualities having been boards, printing papers, tissue grades etc. Last year the first wide high speed newsprint machine built by Valmet was started-up at Soc.Paramonga S.A.Ltda Trupal Mill in Peru using bagasse as the main raw material.

Valmet carried out several extensive research programs to find out the most suitable designs and components for a bagasse paper machine. The Valmet Sym-Concept wet end with Sym-Former F proved to be the most suitable for this raw material. This has now been confirmed by the results from the full scale machine started-up in Peru.

RESEARCH PROGRAM

In addition to laboratory research and measurements we carried out several extensive trials with our Pilot paper machine (Fig.1) and also ran a mill scale trial with United Paper Mills Simpele PM 1 (Fig.2).

The main operating data was as follows:

Furnish	70-90% bagasse
	0-15% groundwood
	0-10% TMP
	0-15% chemical pulp (kraft)
	0-10% ash in paper
Basis weight	40-65 g/m2
Operating speed	500-750 m/min

The bagasse furnish was made mainly by the Cusi method, but also Peadco bagasse was studied. The sugar canes used originated from Mexico, Peru and Argentina.

As a summary the following results were obtained from the research programs:

- The basis weight of newsprint should be kept above 50 g/m2 mainly due to opacity of the paper

- Shrinkage of bagasse in the dryer section is almost twice as much as with Scandinavian furnish.

- Wet web strength in the area of 30-50% dryness is higher with bagasse produced on Sym-Concept machine than wet web strength of newsprint from Scandinavian furnish made on Fourdrinier machine (Fig.3).

- Dewatering of bagasse furnish was easier on wire section and more difficult on press section than the same with Scandinavian furnish.

- Sticking on the press roll surfaces and first dryers was experienced. Especially with Fourdrinier wire section when the fines were not removed from top surface tending to stick on press rolls. Same did not happen when running with Sym-Former where fines are washed from both surfaces. The Finnish fine grain granite was proved to be most suitable for press roll surface in this respect. The web has tendency to release from some synthetic press roll covers.

- Dry content of the sheet after press section was 35-38% maximum being 40%.

- It was noticed that special attention has to be paid to cleaning of wires and felts.

- Typical paper characteristics during the trials are shown in Fig.4.

- By using TMP the amount of chemical and mechanical pulp can be decreased considerably.

The results we have received are contradictory compared to earlier ones published by others. The reason is the wet end of the paper machine. Valmet Steady-Flow Nozzle headbox creates a high scale microturbulence initiated from the tube bunch and finalized in the vane section which is the heart of the headbox.

The entanglement of the fibers weaves them together and gives excellent base structure to the web. Furthermore the good fiber network will not be destroyed by heavy dewatering on the wire section, since the gentle initial drainage takes place on the fourdrinier section of Sym-Former. This gives the web enough time to develop before the top wire comes into contact with stock and the fibers will not be torn apart from each other. Only after the bottom side of the web has developed a good fiber network, upward dewatering takes place. It should also be noted that dewatering is always in one direction on Sym-Former and never upwards and downwards at the same time, which would disrupt the good network of fibers. During the trials, the effect of bagasse fines on the sticking problem was checked. With Sym-Former both surfaces of the web are washed which improves the runnability on the press and dryer sections.

PAPER MACHINE DELIVERED TO PERU

In 1975 Industrias del Peru placed an order with Valmet Oy for a bagasse newsprint machine to be delivered to Sociedad Paramonga S.A. Ltda's Trupal Mill in the northern part of Peru. This machine was started up successfully last year.

Valmet's delivery included a complete paper machine with auxiliary equipment and winders.

The main data of the PM are:

Production	400 tons/day
Design Speed	1000 m/min
Trim	7620 mm
Basis weight	49-60 g/m2
Furnish	75-90% bagasse
	0-15% chemical pulp
	0-15% mechanical pulp
	5-15% filler

HEADBOX: Valmet Steady-Flow Nozzle (Fig.5).

WIRE SECTION: Sym-Former F with single adjustable foils, wet suction boxes, forming shoe and flat suction boxes as dewatering elements. The wire section design is of special telescope beam type to accept the possible earthquakes in the area.

PRESS SECTION: Due to the difficult dewatering of bagasse furnish in the press section the no-open draw Sym-Press III with 4 nips was selected. The first open draw being after 4th nip when the sheet strength is high enough to take the open draw. The first nip is double felted between two suction rolls, the second is also double-felted between rubber covered grooved roll and a suction roll, the third between same suction roll and a granite roll, fourth between same granite roll and a stainless steel covered G-roll. All the suction rolls are gun-drilled and made of special VK-A171 material to resist the severe condition since the pH should be as low as 4-4,2 in operation. The pick-up felt is furnished with a grooved wringer press.

Design nip pressures are 70, 70, 80, 90 kN/m.

DRYER SECTION: There is one baby-dryer of dia 1500 mm, 38 dryers of dia 1800 mm and two sweat dryers of dia 1800 mm. The dryer section is grouped into six drive section of which three first ones are of low-profile design to prevent sheet-fluttering. Sheet run from the press section to dryer section is open. The first dryer section has a single felt for the top and bottom dryers.

CALENDER: Calender is of open type and designed for 6 rolls with three adjustable crown rolls, but it can be run also as a four roll stack with only two adjustable crown rolls. Drive is on the queen roll. Maximum nip pressure is 120 kN/m.

REEL: Pope type horizontal. Maximum jumbo roll size is 2500 mm.

WINDER: Wärtsilä shaftless winder.

HOOD AND VENTILATION: Paper machine is equipped with closed hood and pocket ventilation equipment supplied by Valmet also.

OPERATING EXPERIENCES FROM PERU

The paper machine was started-up at the speed of 500 m/min with basis weight of 54 g/m2. The speed has been increased up to 700 m/min and various basis weights 50-65 g/m2 have been produced. The paper has been sold for newsprint and telephone catalogues mainly for domestic markets.

The paper quality meets the requirements set for the newsprint (Fig.6) and the operation has proved to be a success in all respects.

g.7 Circle drawing of the PM.

Fig.8 and 9. Photographs of the Paper Machine in Peru.

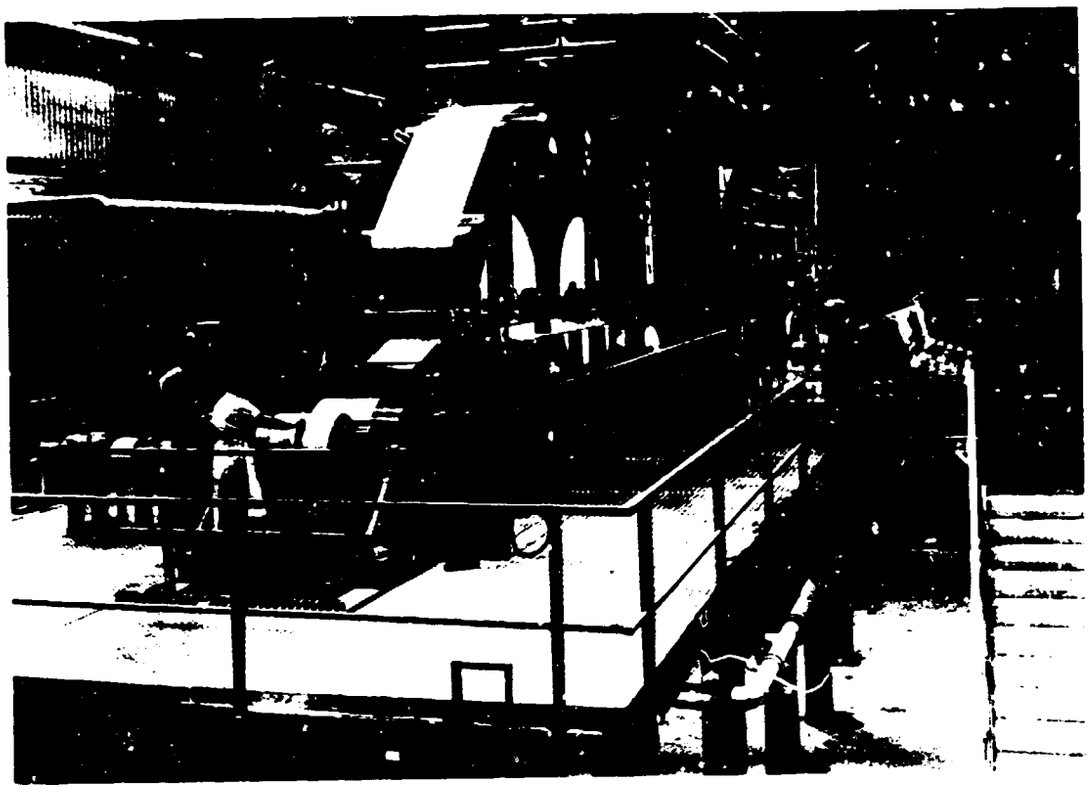


FIGURE 1

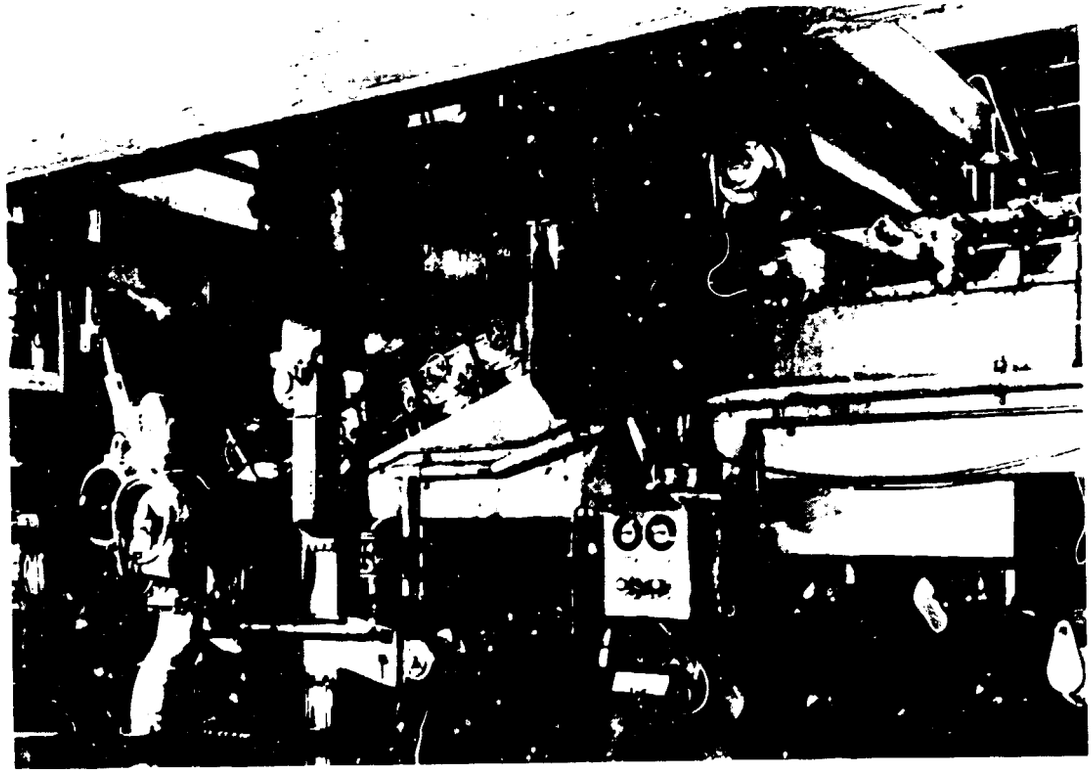
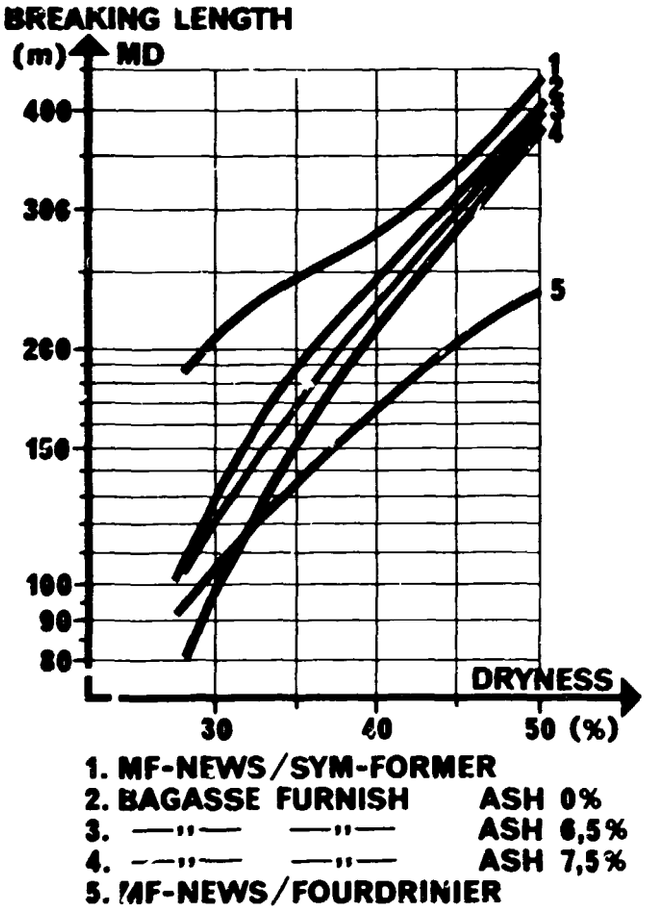


FIGURE 2

INITIAL WET-WEB STRENGTHS



1. MF-NEWS/SYM-FORMER
2. BAGASSE FURNISH ASH 0%
3. —"— —"— ASH 6,5%
4. —"— —"— ASH 7,5%
5. MF-NEWS/FOURDRINIER

2046

FIGURE 3

Basis Weight	g/m^2	50 - 55
Roughness,Bendtsen -98,1 kPa	ml/min	75 - 120
Opacity, SCAN %		87 - 90
Brightness, SCAN %		53 - 57
Tear, SCAN mNm^2/g	cd	5,5 - 6
	md	3,5 - 4,5
Tensile Index, Nm/g	cd	35 - 40
	md	25 - 30

FIG.4 TYPICAL PAPER CHARACTERISTICS DURING TRIAL RUNS

NEWSPRINT MACHINE
INDUPERU

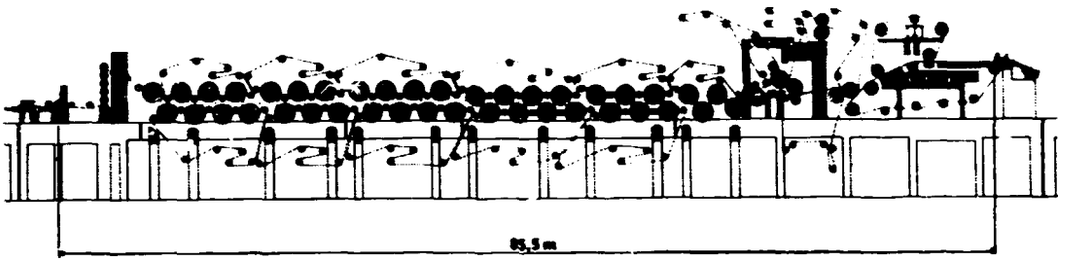


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FIGURE 5

STEADY-FLOW NOZZLE

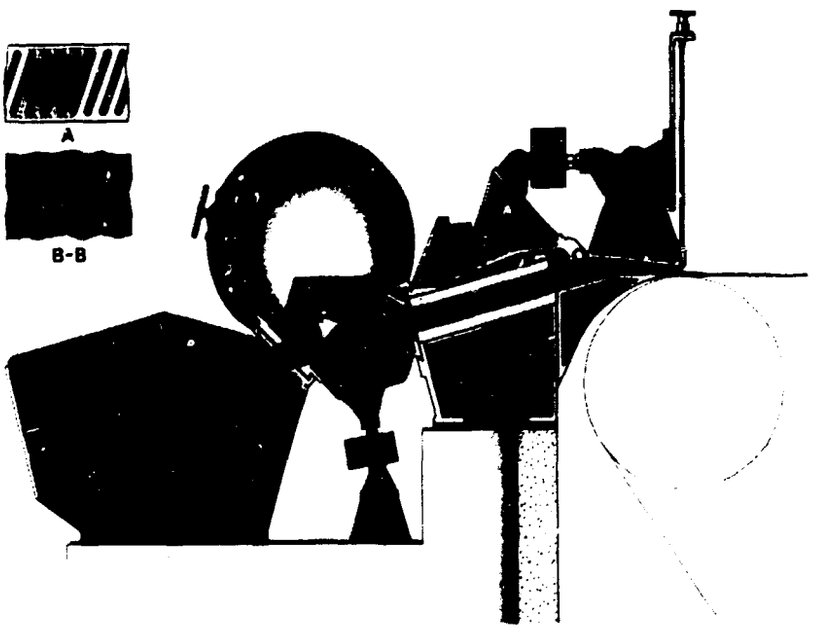

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FIGURE 6

FIGURE 7

Basis Weight	g/m^2	49 - 58
Opacity, %		84 - 89
Brightness, %		60 - 66
Tear, SCAN mNm^2/g	cd	5,8 - 6,8
	md	4,8 - 6,8
Tensile Index, Nm/g	cd	15 - 20
	md	25 - 40
Moisture,%		6 - 8

FIG. 6 PAPER CHARACTERISTICS IN TRUPAL MILL