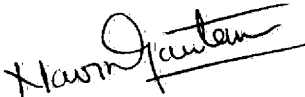


PHILIP MORRIS U. S. A.  
INTER-OFFICE CORRESPONDENCE  
Richmond, Virginia

To: R. M. Rogers  
From: Navin Gautam   
Subject: An Update on "Daubing Dandy" Trials at the University of Maine

Date: October 1, 1990

**OBJECTIVE:**

Develop pilot capability to incorporate cross-directional bands of cellulosic fines and/or fillers in cigarette papers to control cigarettes' burn characteristics.

**SUMMARY OF TRIALS:**

**Trial # 1 :** No paper was made during the first set of trials conducted in April, 1990. However, desirable slurry characteristics and equipment modifications required to produce banded papers on Maine's pilot machine, were identified. Modifications to "Daubing Dandy" were recommended to enhance release properties and provide additional drive.

**Trial # 2 :** Banded papers were produced during June, 1990 trials although target specifications were not achieved. Also, band configuration (spacing & uniformity) was not satisfactory. Modifications recommended after first trial proved useful in alleviating some of the runnability problems. Control of application level and drainage after application were identified as major problems on Maine's pilot machine. Further modifications were recommended to improve the control of application rate/band contrast and uniformity of application across the machine width.

**Trial # 3 :** Small bobbin of much improved banded papers was produced during August, 1990 trials. Modified "Daubing Dandy" had a new shell with a continuous and narrower (2.5 mm versus 5 mm) slot across the machine-width and a distributed slurry feed system. These modifications significantly improved the wet and dry band contrast, and the cross-machine band distribution. Some of the slurries which were known to effectively control the burn characteristics of cigarette but could not be handled during previous trials, were used with limited success. Drainage after application still remained a major problem. A limited number of hand-made cigarettes from banded papers produced during August trials appear to be effective.

**DISCUSSION:**

Pilot trials conducted at the University of Maine have been useful in demonstrating the viability of applying cross-directional bands during the forming stage of papermaking process. These trials have also helped in identifying the major problems that can be encountered in adapting this approach to a full-scale machine. After the third round of trials in August, 1990, it was realized that only minor improvement in machine runnability and general appearance of banded

2021372929

papers could be made on Maine's pilot machine (primarily because of its limited drainage capacity).

Problems associated with application of bands by the "Daubing Dandy" can be divided into two categories: (1) slurry characteristics, (2) paper-machine and "Daubing Dandy" related problems. The main problem associated with slurries used for this application is the viscosity/water-retention relationship. A slurry with high viscosity but very low water retention is a basic requirement for Maine's pilot machine because of its shorter wire table and very little drainage capacity downstream of the "Daubing Dandy". Low viscosity slurries do not give acceptable band contrast with the existing design. Any new design should be able to handle lower viscosity/concentration slurries as the overall direction of this project is to minimize the band application level required to effectively control the mass burn rate of a cigarette. Length of forming table and drainage capacity should be the prime consideration in the selection of a new facility for scale-up. Low water retention could be achieved by adding some drainage aids to the slurry. Drainage aids are typically cationic or amphoteric polymers which flocculate the cellulosic fibers thereby reducing their water holding capacity. This approach was tried during the August trials but did not yield any useful results. Flocculation of pulp fibers caused jamming of "Daubing Dandy" slots and therefore resulted in poor band application and runnability problems. This approach may still be very useful with smaller size pulp fibers/fines, which do not form flocs big enough to cause problems, when treated with drainage aids. Several options are being evaluated to achieve desired water-retention at an acceptable viscosity level.

Major equipment related problems are: control of application level, slot cleaning to facilitate smooth and uniform metering across the width. Since the amount of material applied will control the potential problems at the press and dryer sections of the paper-machine (runnability, wrinkles and creases), a precise control on application level should be one of the important design criterion for scale-up. Also, with the current design of "Daubing Dandy", an uneven trailing edge of band is obtained. This unevenness may be the result of film-splitting at the trailing edge.

A limited number of hand-made cigarettes from banded papers produced at the University of Maine during week of 08/20/90 appear to be effective. Next round of trials are scheduled for the week of 10/22/90. The objective of next trials will be to produce a larger quantity of banded papers with the existing design so that this concept could be properly evaluated. Efforts will be made to improve upon the quality of band application relative to trial#3, keeping in mind the limitations of pilot paper-machine at the University of Maine.

cc:	S. Baldwin	P. Gauvin	T. Sanders
	G. Bokelman	B. Geiszler	J. Whidby
	B. Dwyer	J. Myracle	Central Files