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DEVELOPMENT PROGRESS REPORT

JANUARY - APRIL 1977

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AUTHOR: N.E. Willis
P.J. Nicholl

ISSUED BY: C.I. Ayres

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1. PROCESS ENGINEERING

1.1 Tobacco Processing

Measurements of odour emissions from ITM type dryers operating on flue-cured CRS and flue-cured cut whole blend have shown that the malodorous compounds in the exhaust are not only very intense but are also present in very low concentrations (3). It is apparent that, to remove the malodours, a highly efficient technique is required.

A survey of odour control methods available, and the existing legislation in several countries, showed the two most appropriate processes to be thermal catalytic oxidation and activated carbon adsorption. In most circumstances, carbon adsorption offers both lower capital and operating costs than thermal catalytic oxidation.

A pilot scale carbon adsorption plant has been constructed and tested in Group R. & D. Centre. Treatment of Legg dryer exhausts from flue-cured tobacco showed complete odour removal.

Preliminary results for Dip Leaf Dryer exhausts are encouraging although it may be necessary to use a high efficiency prefilter to avoid fouling of the condenser/adsorber. It is recommended that investigation of the practical operating problems be undertaken, preferably in a production situation.

1.2 Cigarette Manufacture

A report has been issued covering the 2nd Development Contract with AMF SASIB which was concerned with the substitution of a transfer duct for the YPSILON drum (7). Consequent upon this work SASIB have altered their machines to incorporate a transfer duct and the first

production machine is currently running in the Bologna factory of the Italian Monopoly.

The collaboration between AMF/Sasib and B.A.T during this contract has proved the following:

a. The drum and vacuum wheel method of transporting tobacco from the hopper to the nylon band, thus forming the rod, can be replaced by a duct. This duct can be of the form investigated during this contract, but redesign is necessary so that the machine height will be normal.

b. There are good indications that the formation of tobacco on the nylon band is improved if the grilles for the extra air in the duct are not close to the nylon band.

c. The maximum width of the "nose" that could be tried was 15 mm; reducing this width produced an inferior tobacco flow. The uniformity of the flow may be improved if the width is increased.

d. The deceleration distances to bring the tobacco rods to rest on the assembly drum, after their transfer from the Ypsilon maker, are so short that damage is caused to the rods. In particular, trailing rods hit the double length plug and high impulsive forces are brought into play. An assembly drum of greater length is required to increase the braking distances for both leading and trailing tobacco rods.

e. Weight performance measurements were obtained for this duct in short test runs. By comparison with measurements previously obtained using the drum system, there was an improvement in the within-cigarette weight variability and a small improvement in the inherent individual weight performance.

Two tipping adhesives have been tested in order to establish whether they might be acceptable as alternatives to a brand used exclusively in the U.K. factories and widely in other parts of the Group. One was recommended for longer term, production trials, now under way; the other was considered to be in need of further development.

One tipping adhesive, submitted by Samuel Jones as a potential alternative to Swift's TK.9001, was tested, both in the laboratory and on filter cigarette making machinery (8). Although the results of the laboratory tests were encouraging and good cigarettes were manufactured during production trials, use of the Samuel Jones adhesive resulted in unacceptable contamination of the cork drum of the Molins PA7RO F.T.A. Two further modifed samples of the adhesive prepared by Samuel Jones were unsatisfactory for different reasons and we believe that, if Samuel Jones are to produce an adhesive which will be acceptable as an alternative to Swift's TK.9001, it will be necessary for them and Group R. & D. Centre to co-operate in an adhesive development programme.

The performance of National 033-1110 was also evaluated with a view to establishing whether it might also be acceptable as an alternative to Swift's TK.9001 tipping adhesive (9). Both the laboratory tests and the cigarette production trials gave good results and there are indications that the National adhesive may have some advantages over the Swift's. It was recommended that the investigation of the National adhesive should be continued by prolonged production running in Group R. & D. Centre.

Trials in which flavours were applied by an Arenco DOQ to two cigarette brands during manufacture on a Molins Mk. 8 making machine

were carried out on behalf of B.A.T (U.K. & E.) (11). With one brand there were no signs of spotting but, with the other, a certain level of spotting developed after a storage period. It was considered that reformulation of the flavour could overcome the problem.

1.3 Filter Manufacture

The pilot scale manufacture of fibrillated polypropylene tow has continued at Bridon together with the manufacture of filters in G.R. & D.C. as a means of monitoring the tow characteristics. The information obtained by using the filter rod maker as a test instrument has helped Bridon to improve progressively the tow processing conditions (6). A change of polymer, a different whitening agent and higher speed have all produced encouraging results and much has been learnt about the importance of crimping conditions, particularly the control of secondary crimp regularity.

An examination of the possibility of exploiting fibrillated polypropylene tow in Ghana has shown such a venture to be financially attractive (5). It was estimated that a single production line of the present type used at Bridon with a total initial capacity of 216 tonnes of tow per year would meet the present total tow requirements for Pioneer Tobacco Co. Ltd. The existing filter specifications should be within the range of the presently used P.P.1 tow specification without modification.

The implementation of potential increases in the capacity of the line would further increase profitability, provide tow for any anticipated expansion in the market volume and simultaneously provide a substantial amount of P.P.1 tow for possible exportation.

2. WASTE TOBACCO UTILIZATION

2.1 Paper-type Products

The evaluation of PRT, manufactured at Glory Mill by Wiggins Teape has been extended (2). Substitution was made for selected grades at 2%, 4% and 6% in a variant of B.A.T (U.K. & E.) Blend 180. It was confirmed that substitution for the chosen grades in this particular blend results in no change in any of the measured cigarette physical or smoke properties.

An examination of Reemtsma (Germany) brands - No. 1, R6 and Atika - indicated that, as yet, Reemtsma are not using nicotine-fortified SRT although it is understood that I.F.F. have been associated with Le Tabac Reconstitué on the "flavouring" of SRT by tobacco extracts.

2.2 Film Processes

A preliminary study to investigate the possibility of Nobleza (Argentina) setting up an RTS plant, based on a B.A.T process, to supply the Argentine industry has been initiated. Procedures to determine the availability and quality of waste tobacco, both in the factories and leaf plants, have been drawn up.

3. PRODUCT AND OTHER SERVICES

The yellow spotting potential of certain grades from the U.S. crops for the 5 years from 1972 to 1976 was examined at the request of B.A.T (U.K. & E.) (4). Some of the grades had been selected because chemical, screening tests in the country of origin had indicated that there was a risk of yellow spotting when the grades were used in cigarette manufacture. All the suspect grades were found to produce more yellow spots than acceptable grades and, further, it was established

that the relationships between spotting and petroleum ether extractables (PETEX) and between spotting and the ratio of total sugars to PETEX were constant over the 5 crop years.

At the request of B.A.T (U.K. & E.), sound level measurements were made around an AMF SASIB YPSILON/H.O. F.T.C.M. during its evaluation in the Southampton factory. This machine incorporated changes following the first SASIB development contract with G.R. & D.C. and met the sound level criterion of 85 dB(A) recommended currently by B.A.T (10).

A limited survey of the product characteristics of some Brazilian brands has been carried out which shows that the Souza Cruz brands examined differ in character from Philip Morris and Reynolds brands (1).

The main differences were found in the following areas, where Souza Cruz brands have:

physical - generally lower cigarette circumference than Philip Morris brands and very short filters (11 mm) on some brands.

blend - higher nicotine content.

smoke - higher total nicotine alkaloids (TNA) and extractable nicotine deliveries but lower TPM/TNA ratios.

O/WP - generally higher levels of pyridines for similar levels of furfurals in filtered smoke.

- higher O/WP nicotine but, similar vapour phase levels.

- higher O/WP nicotine but, lower vapour phase proportions.

These O/WP attributes are probably of a desirable nature. A plot of O/WP nicotine and vapour phase components (percentage normalised data) showed a resemblance to an impact and irritation map prepared by Souza Cruz some years ago.

Amongst the Souza Cruz brands, PALL MALL stood out as different from the other brands.

The similarity between the tobacco and smoke chemistries of Galaxy and Marlboro was quite marked suggesting that a very similar tobacco blend is used for both brands but perhaps with different casing sugar recipes. The physical measurements also suggested that similar materials are used in the construction of both brands, with the exception that ventilation holes have been punched in the Galaxy filter after normal manufacture.

LIST OF REPORTS ISSUED

Ref.	Report No.	Title
1	RD.1454 Restricted	Product Characteristics of Some Brazilian Brands.
2	RD.1460 Restricted	The Evaluation of PRT in B.A.T (U.K. & Export) Golf Blend.
3	RD.1468 Unclassified	Tobacco Process Odour Control by Carbon Adsorption.
4	RD.1472 Restricted	Yellow Spotting of some U.S. Grades from the 1972, 1973, 1974, 1975 and 1976 Crops.
5	RD.1473 Restricted	Fibrillated Polypropylene Tow Exploitation - Pioneer Tobacco Co. Ltd., Accra, Ghana.
6	RD.1474 Unclassified	Pilot Scale Manufacture of P.P.1 Tow Bridon - Summary of Characteristics: Report 3.
7	RD.1486 Restricted	Development of the AMF SASIB YPSILON F.T.C.M. September 1975 - August 1976.
8	E.201 Unclassified	Tipping Adhesive Trial - Samuel Jones EX.267/9.
9	E.202 Unclassified	Tipping Adhesive Trial - National 033-1110.
10	E.203 Unclassified	Sound Level Measurements - AMF SASIB YPSILON/ HO/CID/RAS T.F.U., B.A.T (U.K. & E.) Ltd., Southampton.
11	L.544 Unclassified	Spotting Tests on Cigarettes (B.A.T (U.K. & E.)) Flavoured Using the Arenco DOQ.