REDUCING EXTRANEOUS MATTER IN CANE LOADED MECHANICALLY

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Abstract

This paper discusses how a marked improvement in cane quality was achieved by modification of mechanised loading procedures. The main change made was to cut into stacks instead of windrows thereby avoiding extraneous matter pick-up which is often characteristic of push-piling. It is estimated that the improvements achieved would have a beneficial effect on milling performance and throughput and ultimately reduce length of season.

Introduction

The harvesting system used is hand cutting and mechanical loading directly into trailers. All the cane is burnt before harvesting.

The soil can be divided into three types (55% Red Recent Sand; 25% Tugela Schist and 20% Wet Valley Bottoms).

The topography is undulating with a 30 metre difference between the highest and lowest points.

During the 1976/77 season, problems were experienced with sand and tops in the consignments of cane delivered to the mill. This resulted in numerous complaints being received from the mill, and the mill group representative having to inspect the cane on at least two occasions. The cane cutters were placing 5 lines of cane in a single windrow, and a push-piler loader was used to load the cane into the trailers. Because of problems encountered with loading in steep, wet and awkward areas a Bell loader was purchased for the 1977/78 season. The cutting method was also changed to the Australian method of cutting where three lines are placed in a single windrow.

Method

The cane quality did improve from the beginning of 1977/78 but sand and tops were still evident in the consignments to the mill. The improvement was due mainly to the fact that the new loader did not pick up as much extraneous matter as the old push-piler.

After attending a symposium on the 18th August, 1977, where push-piling was discussed, we decided to modify our loading technique.

Instead of the cutter placing the three lines of cane in a continuous windrow, the cane was placed in small bundles about 1 metre apart. (Interrupted windrow).

The loader operator then 'picked' up each bundle until he had a full grab (usually 3 bundles) which he then loaded into the trailer.

Results

As indicated in Table 1 the weekly average cane quality delivered prior to the changes described, i.e. before the 18th August, was normally inferior to that delivered by the Empangeni grower group. Sucrose was frequently below average while fibre was usually well above average. These conditions were identified on the South African Cane Growers Association's cane quality control system in terms of 'excess milling capacity', and frequent warnings or penalties were advised.

Subsequent to the changes implemented during Week 20 Table 1 shows that sucrose rose significantly above group average, fibre levels dropped steadily to remain below mill average and there was a marked improvement in purity levels as indicated by the reduced non-pol (and increased sucrose). All warnings ceased as the cane was not in the default quality range of the quality control system. It is also interesting to note that the reduction in extraneous matter also led to a marked reduction in the variability of individual cane test results as shown in Table 2. Prior to Week 20 the test results were extremely variable within each week as typified by Week 19 with sucrose varying from 16% down to 7,5%, fibre from 13% to over 31% and purity from 89 to 77. A marked reduction of the test variability was evident subsequent to the changes as shown by the reduced standard deviation.

Observations

1. Since the introduction of mechanical loading in 1974/75 season the sucrose has been about 1% below mill average, whereas for 1977/78 season the sucrose was actually above mill average (see Table 3).

TABLE 1

Improvements in cane quality
Empangeni Group compared against Wood & Raw

Week	Sucrose % Cane		Fibre % Cane		Non-Pol % Cane		% EMC	Status
	Group	W&R	Group	W&R	Group	W&R		
13	13,26	12,89	16,63	18,50	2,49	2,22	+ 1,99	W1
14	13,11	11,92	17,04	19,86	2,40	2,20	+ 15,23	W2
15	13,45	12,96	16,31	18,67	2,55	2,18	+ 6,02	P
16	13,72	14,38	16,24	16,04	2,48	2,20	– 17,48	OK
17	13,82	13,85	16,81	18,31	2,65	2,27	– 3,13	OK
18	14,11	14,47	16,83	17,95	2,65	2,32	– 7,54	OK
19	13,45	12,59	17,25	19,37	2,55	2,26	+ 7,57	W1
20	13,27	13,33	18,33	19,93	2,57	2,29	– 2,53	OK
21	13,27	14,73	17,84	18,01	2,53	2,10	– 19,18	OK
22	13,58	14,13	17,48	17,32	2,43	2,09	– 15,70	OK
23	14,00	15,01	17,11	14,95	2,53	2,28	– 29,38	OK
24	14,26	15,56	16,77	13,76	2,45	2,08	– 35,71	OK
25	13,28	14,64	17,85	16,63	2,59	2,35	– 25,60	OK
26	12,87	14,00	17,69	17,22	2,33	2,08	– 20,87	OK
27	13,46	14,84	17,99	16,96	2,40	2,12	– 24,48	OK

% EMC = % excess milling capacity occupied by cane through excess fibre.
Status: W1 = first warning, W2 = second warning, P = penalty.

2. The increase in sucrose and the drop in fibre content would result in about 8% less bulk required to produce 4 000 tons of sucrose, i.e. about 2 500 tons less 'bulk' would be carted to the mill at 12 tons per day.
   (4 000 tons sucrose of 12,5% pol in cane = 32 000 tons cane).
   (8% of 32 000 tons = 2 560 tons).
3. The productivity of the cutters was not affected by the change to bundles (± 8 tons per man per day).
4. From our observations the variety NCo 382 would appear to be higher in fibre than most other varieties.

Conclusions

It would appear that with a little thought, care and supervision the quality of cane loaded mechanically can be significantly improved.

If such results can be obtained on an industrial scale from a comparatively simple alteration of the loading techniques, then there must be every possibility of improving the throughput and reducing the breakdowns at the mills, which in turn would shorten the milling season, with obvious benefits to all growers.

TABLE 2

Variability of cane within weeks

	Sucrose % Cane		Fibre % Cane		Purity	
Week	19	21	19	21	19	21
Standard Deviation . .	2,37	0,72	4,26	1,87	2,76	1,07
Maximum . .	15,98	15,93	31,7	22,7	88,7	89,7
Minimum . .	7,47	13,37	13,1	13,3	77,4	84,9

TABLE 3

Sucrose % Cane – Annual Averages

Season	Wood & Raw	Empangeni Mill Group	Difference
1964/65	13,20	14,53	- 1,33
1972/73	12,79	13,11	- 0,32
1973/74	12,41	12,99	- 0,58
1974/75	12,32	13,13	- 0,81
1975/76	11,46	12,40	- 0,94
1976/77	11,64	12,48	- 0,84
1977/78	13,04	12,78	+ 0,26