

# OPERATION CLEAN CANE

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## Abstract

The amount of extraneous matter entering a mill is of vital importance to the miller and the grower, particularly in a co-operative mill area where the milling profit is shared by the growers. Attempts by extension workers, growers and mill staff to reduce the level of soil in the cane bundles which are delivered to the Union Co-operative mill at Dalton have been encouraging.

## Introduction

At the end of the 1981 milling season, the late Mr. P. V. van Breda estimated that the cost of repairing damage to the Union Co-operative mill was between R150 000 and R250 000. This damage was caused by soil in the cane bundles. Ash % cane is a measure of the soil content of cane entering the mill and the Union Co-op mill had the highest level in the industry; 2,36% in 1981. This poor state of affairs led to communication with the Transvaalse Suikerkorporasie Bpk (TSB) millers at Malelane who were involved with a "Clean Cane" programme. Dr. Geyer, the Assistant General Manager for agriculture, was subsequently invited to address the Union Co-op members at a field day on 4 November 1981, and ways of improving the undesirable situation were discussed. It was at his suggestion that the "Clean Cane" campaign was launched and was to involve the growers and mill and extension staff. During a tour of the factory, the severity of the problem was impressed upon, and the extent of the damage to the mill machinery by the soil, was pointed out to the growers. The inaugural meeting of the "Clean Cane" campaign Committee was held on 14 January 1982, and was attended by SASA extension staff, growers and mill staff. The programme was aimed at reducing the amount of soil in particular, but also other extraneous matter entering the mill.

## Procedures

Five methods of loading cane were recognised:

### • Hand loading

The cane is cut, windrowed and stacked manually and loaded by means of a side loader, or it is loaded from the windrow directly into trailers or pallets.

### • Bell loading

The cane is cut and windrowed then picked up by the loader in the direction of the cane rows. Very little pushing is required and the loader pivots on its wheels to travel across the rows to the waiting transport.

### • Buck loader

This is an A-frame built around a tractor with a push piler and grab mounted at the rear. The push piling is clearly visible by the operator and once the grab has been closed and lifted, the tractor turns across the rows to load.

### • Slewing loader (Dalton, Upfold, Tamhe)

These loaders operate only between the lines. Ideally the cane should be planted on ridges to facilitate push piling, but much of it is planted in furrows. Once the grab has been closed and lifted, the bundle is slewed through 90° and loaded directly onto the lorry or trailer which travels alongside.

### • Front end loader (Quickie, Horndraulic, Massey Ferguson, John Deere)

These are simple, low capacity grabs mounted on the front of a tractor. The cane is push piled, grabbed and lifted and the tractor reverses and turns to travel across the rows to the waiting lorry or trailer.

A muffle furnace, large enough to accommodate 106 samples per day, was purchased and installed at the mill so that ash % cane could be monitored. The amount of cane (expressed as a percentage) loaded by each method, together with the respective ash percentages for the season, are given in Table 1.

TABLE 1  
Percentage of crop loaded using each method and ash % cane  
(1982/83 season)

Loading method	Ash % average	% of crop
Hand loading	1,22	9
Buck loader . . . . .	1,34	7
Slewing loader . . . . .	1,37	12
Bell loader . . . . .	1,43	62
Front end loader . . . . .	1,57	10
Union Co-op average . . . . .	1,38	—

Six grower convenors were appointed to monitor ash % cane and to co-ordinate efforts to exclude soil from the cane loaded by each of the five methods. Two of these convenors were assigned to monitor the cane loaded by the Bell as 62% of the Union Co-op growers use this method. Whenever the ash % cane from a particular farm was consistently high, the convenor concerned and the mill extension staff suggested ways in which the situation could be improved. Several field days were organised and ways in which the efficiency of loader operators could be improved were considered, and improved techniques of windrowing and topping were demonstrated. In the main, the following items received attention:

- The number of rows per windrow was increased from four to five so as to reduce the push piling distance per unit volume of cane loaded, thus reducing the opportunity to pick up soil with the cane.
- More care was taken to align the cane tops in the windrow to ensure more even topping, and to move the tops away from the cane so that they were not picked up by the loader.
- A marked reduction in the amount of soil picked up during loading resulted from extending the tips and skids on the push pilers so that cane was lifted up off the ground during push piling.
- Bell operators were taught to flick the cane forward until a grab size load had accumulated rather than using the Bell grab at a low setting to push cane along the ground to make a bundle.
- Many stalks were being crushed unnecessarily and the juice caused soil to adhere to the stalks.

## Results

At the start of the "Clean Cane" campaign, the objective was to reduce the previous season's ash percentage by half. This objective was nearly reached; at the end of the 1981/82 season,

the ash % cane was 2,36%, and at the end of the 1982/83 season it was 1,38%, an improvement of 41%. There is no doubt that ash % cane is affected by weather conditions; there is a relationship between rainfall and the amount of soil sent to the mill. The 1982/83 milling season was somewhat drier than the previous season and the ash % cane was lower (see Figures 1 and 2). However, most of the credit for the reduced ash % figure during the 1982/83 season should be given to the growers because it is mainly through their efforts and changes in loading methods that the ash % figure for the season decreased so markedly.

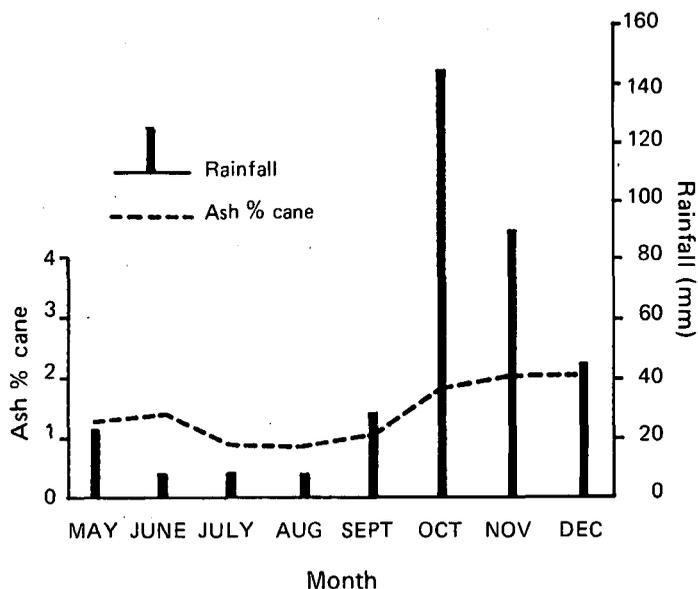


FIGURE 1 Ash % cane relative to rainfall (1982/83 season)

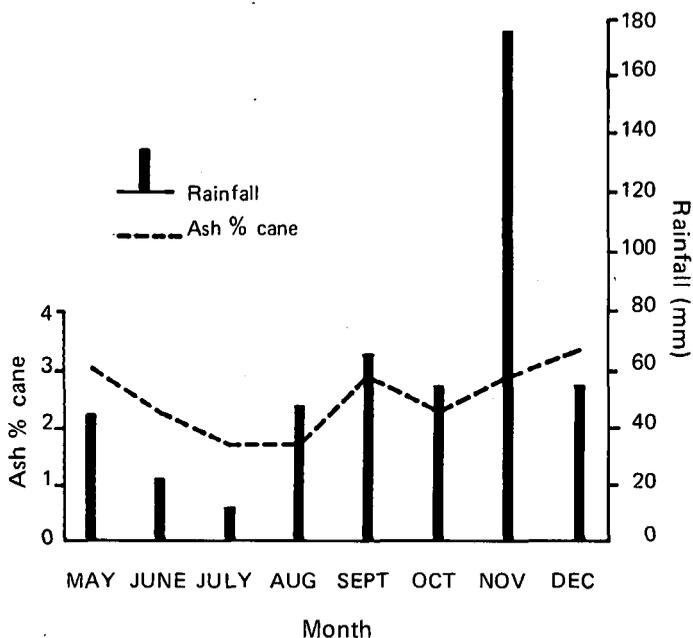


FIGURE 2 Ash % cane relative to rainfall (1981/82 season)

For the past four seasons, the juice purity determined in the direct analysis of cane (DAC) and mixed juice purity of the Union Co-op mill has been very much lower than the industrial average. This was particularly marked in the 1981/82 season (see Figure 3). The "Clean Cane" campaign seems to have been, at least partly, responsible for the marked improvement in juice purities in the 1982/83 season. This has been achieved by improved topping methods and control as several of the larger growers have reverted to the old method of cutting and topping cane in the hand before placing the cane in the windrow. Many other growers were taking care to align the tops of cane in the windrow and to move them well away from the windrow when cut.

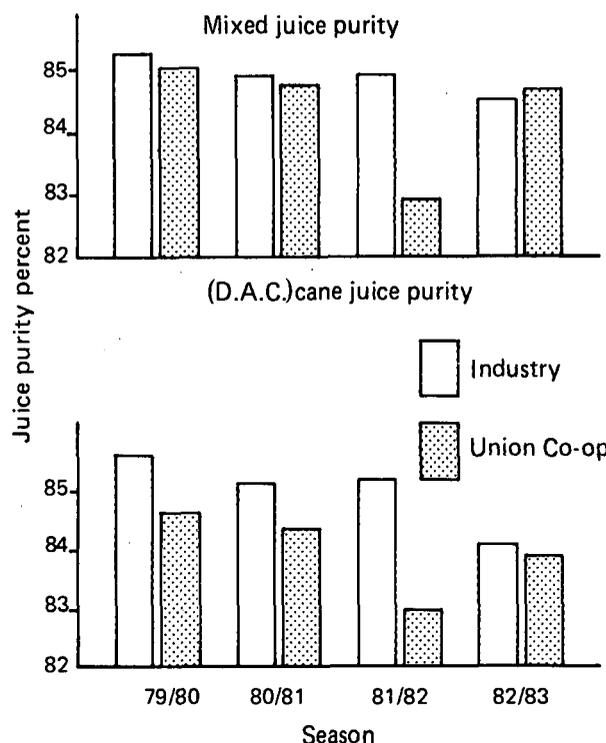


FIGURE 3 Mixed juice purity and cane juice purity of Union Co-op compared with that for the industry

There are many factors that affect the amount of soil incorporated in the cane bundle, but it was found that the most important person in the whole operation was the loader operator. The "Clean Cane" campaign Committee is of the opinion that operators are inadequately trained and supervised. This was evident from the great variations in ash percentages in cane loaded by the same machines in almost identical conditions. In July 1982, the ash % cane at the Union Co-op mill was third lowest in the industry and ninth for the season. By October the mill's position was fifteenth and was eleventh overall. The reason given by the Committee, is that many operators and supervisors do not receive enough attention from managers in the midlands at this time of the year. Most of the midland farms are multi-enterprise and since timing of operations is more critical for annual crops, sugarcane takes second place. Several growers introduced a cash incentive for loader operators who kept the ash % cane below the mill average. The Committee is to consider prize incentives and training for loader operators in the 1983/84 season because there can be no doubt that improved cane quality and a reduction in mill maintenance costs will benefit all the Union Co-op growers.

**Conclusion**

Perhaps the most significant factor which has emerged from "Operation Clean Cane" is that so much can be achieved in a cane growing area when there is co-operation from all who are involved. The extension drive which in this instance was provided by growers, millers and Experiment Station staff, resulted in the problem being investigated and assessed, solutions being found and then the recommended measures adopted in the field.

This project was made easier by the fact that it was conducted in a Union Co-operative mill area. However, this type of project would also be valuable to other mills because by improving mill efficiency, the whole industry could produce more sugar at a lower cost.

**Acknowledgements**

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