

# A CANE CORE SAMPLING INSTALLATION AT UMFOLOZI

By G. G. ASHE

*Umfolozi Co-operative Sugar Planters Limited*

## Abstract

Core sampling equipment for tramway and railway wagons is described. Both whole stick and chopped cane are sampled in the tramway system.

## Introduction

At Umfolozi factory all cane is delivered to the mill either in SAR wagons or the company's own cane trucks or baskets (chopped cane). No cane is stockpiled on the ground. Umfolozi has a conventional mill and a diffuser and it was not difficult to keep individual consignments separate when being crushed. It was decided to increase the throughput of cane to the mill to 300 tons per hour but in order to achieve this it was necessary to mix SAR's and company smalls and this made it impossible to use the hatch sampler. Cane core sampling installations in other countries were inspected and it was decided that a similar system would be the only feasible method of sampling cane at Umfolozi.

## Company Small's Sampler

Approximately two thirds of the cane arrives in company cane trucks, averaging about three and a half tons per truck, and amounts to approximately 1300 trucks in 24 hours. The remainder is brought in on SAR wagons of approximately 30 tons each. Immediately after the Small's weighbridge two corers of 200 mm diameter are mounted horizontally and at an angle of 45° to the tramline and approximately 2 m apart.

By having two corers mounted on the one carriage, two cane trucks can be sampled simultaneously. Each corer can be raised or lowered independently in order to vary the position where the sample is taken. The entire corer is hydraulically operated.

There is only one operator who starts the sampling cycle by pressing a button. When the button is pressed a clamp, in between the rails on which the trucks run, is raised and when a truck comes from the weighbridge it is caught by the clamp. When this happens the corers start to rotate and at the same time the whole carriage moves in towards the two trucks held by the clamp.

When the corers have travelled just over halfway through the cane bundles on the trucks the carriage stops and commences its return; at the same time the corers stop rotating. When the carriage has returned to rest, a plunger inside each corer is actuated and this ejects the sample which has been collected.

At the same time a slat conveyor under the end of the corers is started and this conveys the samples of cane from the corers to the pre-breaker. The chopped cane from the pre-breaker is then sub-sampled and placed in the small shredder and from there it is placed in a sample bucket marked with the farmer's code number and conveyed to the laboratory. Two men are required for the whole operation. A pneumatic conveyor system from the sample station to the laboratory is being investigated and this will get the sample to the laboratory in fifteen seconds and also eliminate the need for one man.

## Basket Sampler

Approximately 400 basket type trucks with cane from the chopper harvesters are brought in each day and these are also sampled just after the weighbridge. A clam type hydraulic grab is used to take a sample out of the basket. The first grab is placed on top of the truck which has been sampled and the second grab is then emptied into the pre-breaker where it is handled in the same way as the core sample.

The excess cane from the pre-breaker falls into a hopper beside the clam grab where it is picked up by the clam grab and placed on top of a cane truck after sampling. This is then transported to the mill on the cane truck.

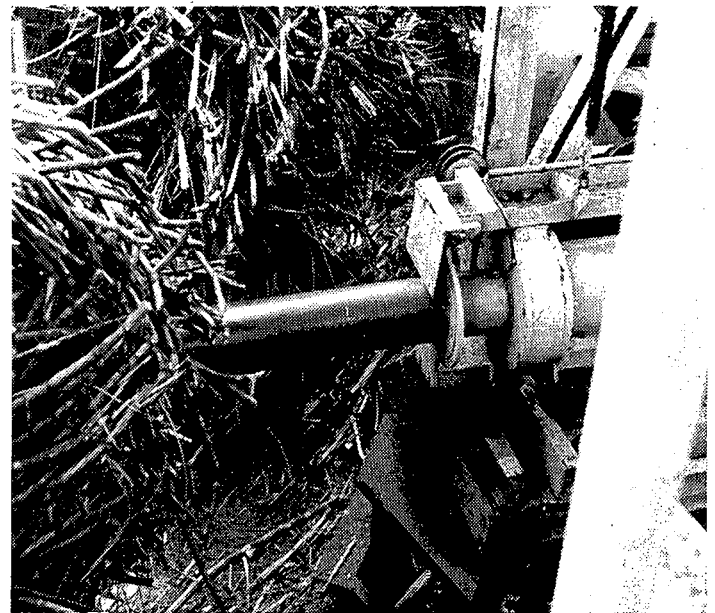


FIGURE 1 Corer entering cane bundle.

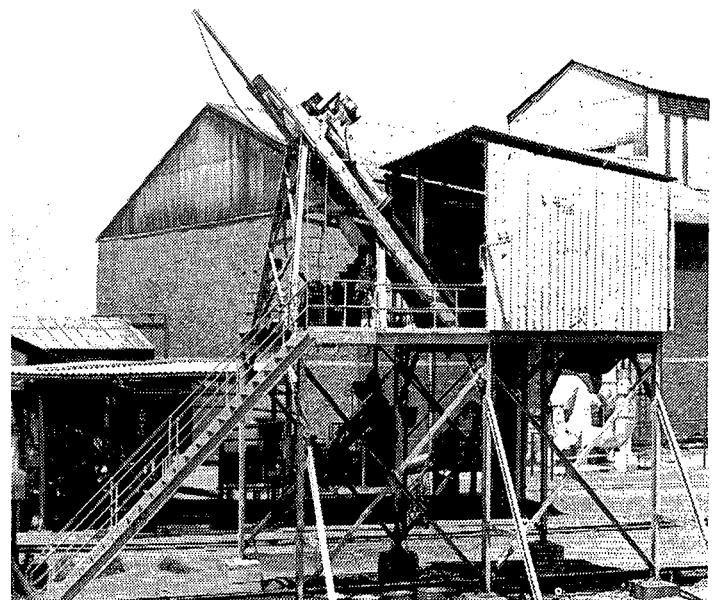
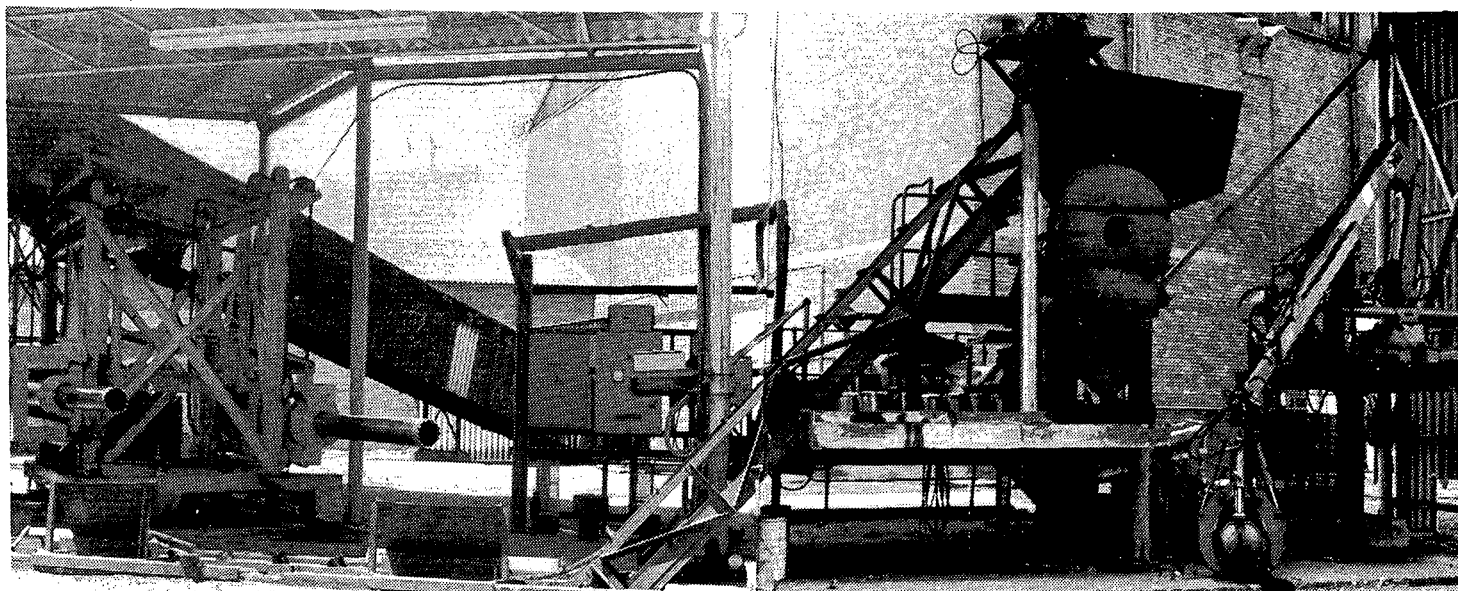


FIGURE 3 Inclined corer to sample railway wagons.

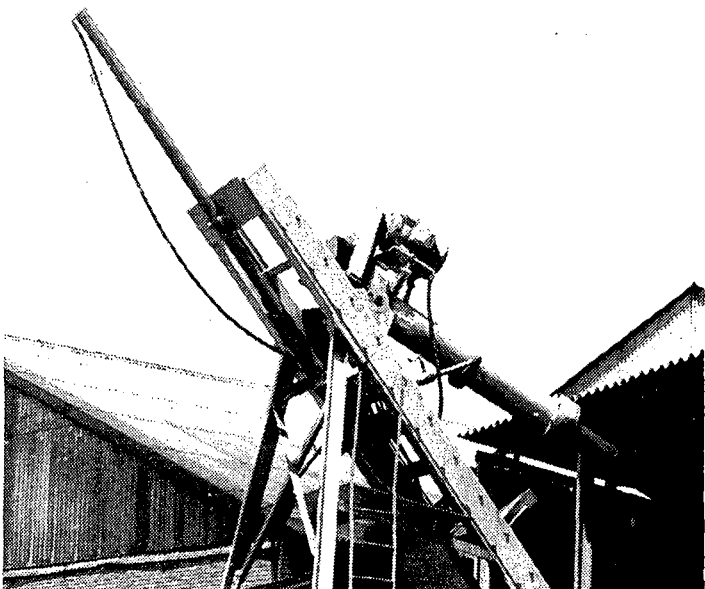


**FIGURE 2** General view of the installation. Corers on carriage (left), conveyor to prebreaker (centre) and clamshell grab for chopper harvested cane (right).

Figure 1 shows the corer entering the side of a cane truck and Figure 2 shows the corers on the carriage on the left and the slat conveyor feeding the pre-breaker on the right. The grab sampler is shown on the extreme right.

#### *SAR Core Sampler*

The carrier is mounted vertically and at an angle of 45° to the horizontal, with its motor mounted in a slide (Figure 3). At one end of the platform a pre-breaker is mounted.



**FIGURE 4** Corer raised to eject sample.

When the operator presses the start button the corer starts to rotate and at the same time it is lowered into the top of the cane truck on the inclined slide. When the carrier has travelled 2 m into the cane the corer stops rotating and withdraws from the cane. When the carriage has returned to rest the corer lifts one end to come to rest over the hopper on the pre-breaker (see Figure 4).

The cane sample is ejected by a piston within the carrier barrel into the pre-breaker. The sample is collected in a tray under the pre-breaker and the excess falls back into the SAR truck. The sample is then sub-divided and placed in a bucket marked with the farmer's code number and is lowered on a wire slide to the shredder and from there to the laboratory.

#### **Conclusions**

This system has enabled Umfolozi to crush cane on the mill at the higher rate without having to worry about samples being mixed in the carriers.

Another advantage is that the cane is sampled immediately after it has been weighed, and as each truck can be sampled individually there is little chance of the wrong cane being sampled or of a sample being mixed. Also, cane can be cleaned if necessary after this point or rejected if of too low a purity whilst it is still being unloaded.

Analytical data using this system has been taken over a long period by the Sugar Industry Central Board, Cane Testing Division, and the results are being analysed for comparison with both a hatch and grab sampler. At the time of writing these results are not known.

Pol and brix factors, during the period the mill was on core sampling only, were within 0,50% of the mill balance.