

INFIELD CANE TRANSPORT WITH MASCANE TRAILER AND SIDE LOADER

By Q. A. TURNER

The last five years have seen tremendous developments in cane road transport and mechanization. Numerous self-loaders, trailers, and cranes have been developed by individuals to suit their "own particular conditions". It is this latter phrase which should be emphasised. Transport should always be tailored to suit a particular job and its conditions. I propose to discuss further one particular type of transport which we have developed at Tongaat and found very satisfactory under our conditions.

Our entry into motorising infield transport started with the importation by Mr. C. J. Saunders of a Mascane trailer from Trinidad. This is the articulated trailer, two wheels on each half, now common throughout the sugar belt. The original had the wheels centrally located for balance and a drawbar at each end. It could thus be pulled forward or backward with equal facility. This was useful in tight corners or in mud but threw no additional weight onto the tractor to assist traction, so had to be changed. It was the first step, although experimentation and experience were to teach us a great deal. For example, that direct loading into trailers was not as popular with labour as bundling, due to having to wait on transport and consequent upset when breakdowns occurred.

Our next step was to modify a crane, the original design borrowed from Zululand, and attach the crane to the back of a tractor. This crane was towed around the fields to pick up bundles and drop them into the Mascane trailers. We moved 250,000 tons during the 1957 season without serious mishap with this crane, but there were several danger features in its operation which alarmed even agriculturists!

We took the next jump, and in early 1958 designed the side-loader crane. As now developed it loaded over 400,000 tons of cane during this past 1958-59 season. We found no serious faults calling for modification and its performance amazed even its most optimistic supporters. Here we again used the Mascane trailer to get the advantage of two bundles per trip and compliance with road regulations when loaded. The sides of the Mascane have now been cut down to 3 ft. 6 ins. in height and strengthened considerably to withstand side thrust during loading. The platform of each half of the trailer is 12 ft. x 8 ft. The rated capacity is 5 tons in each half of the trailer with 8.25 x 20 tyres. Loads of 7 tons have been carried without damage.

The crane is built up on an independent chassis which is slung under the tractor back axle and the

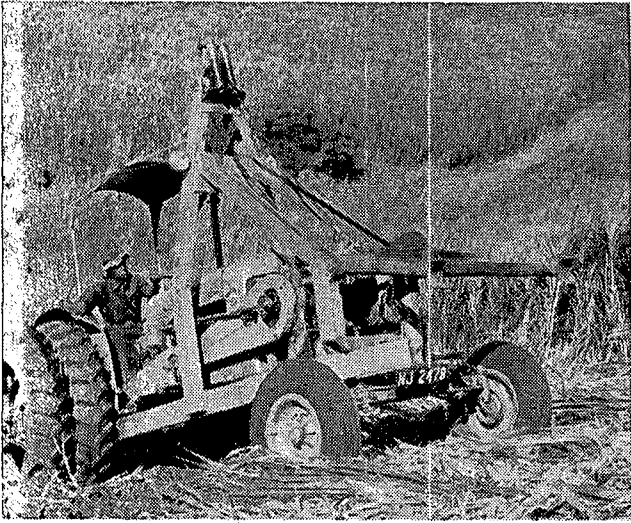
tractor's front axle is moved forward 5 ft. to support the front end of the crane. This means that the tractor can, in a couple of hours be restored to its original shape with only a spanner as a tool. The winch, mounted on the crane chassis just ahead of the tractor radiator, is driven from the pulley power take-off. The winch cable is carried up over a pulley mounted 9 ft. 6 ins. above ground and set 5 ft. 6 ins. back from the front axle. This enables the bundle to be pulled on in a single pull. Two hydraulically controlled arms are mounted on the pulley support arms to locate the machine and act as spacers preventing the tractor from running forward onto the trailer in loading. The assembly is completed by three lightweight steel ramps up which the bundle is dragged over the side of the trailer.

It is in the bundle that the real profit lies. Let me explain here however that this bundle is not suitable for transfer to tramtrucks. It is ideally suited for loading into S.A.R., Hilo trailers or direct delivery to the mill. The bundle is prepared between stakes set in a rectangle 12 ft. x 8 ft. Chains can be laid before loading or introduced later. In long cane one gets two bundles built up, loosely joined in the centre and overlapping the 12 ft. markers, or what is known as full double loading. In short cane the practice is to lock the two outside bundles with a third across the centre, giving treble loading. We found that this Mascane bundle gave us, 1,000 lbs. per man more than the shorter bundle for rear loaders.

In operation we use one crane to load two, three or four tractor and trailer outfits. One crane has loaded 500 tons in a day. We expect to get 100 tons per day delivered by each haulage tractor/trailer outfit. The crane has no difficulty moving around in the field and will get through where a tractor and empty trailer sticks. In fact the crane is used frequently to pull out or assist haulage tractors in trouble. In bad conditions or steep slopes half tracks fitted to the crane tractor assist immensely. Even without these, slopes of up to thirty degrees were handled comfortably.

Loading at night presents no difficulty as the crane provides adequate illumination. Two shifts of crane and haulage drivers have been used very successfully working 5 a.m.—1 p.m. and 1 p.m.—9 p.m. This makes for better machine utilisation.

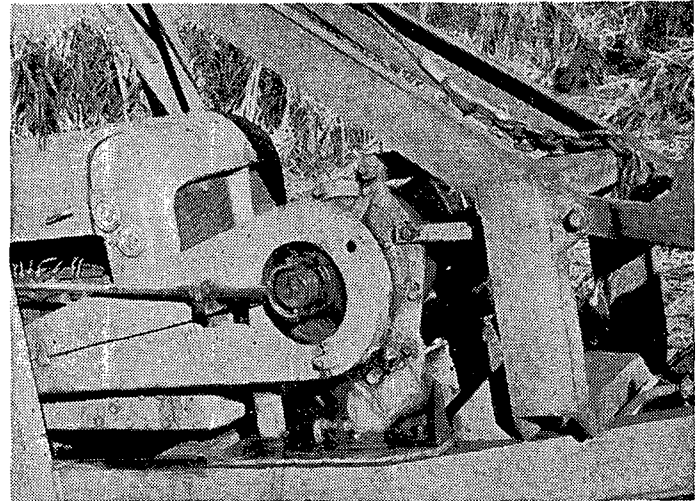
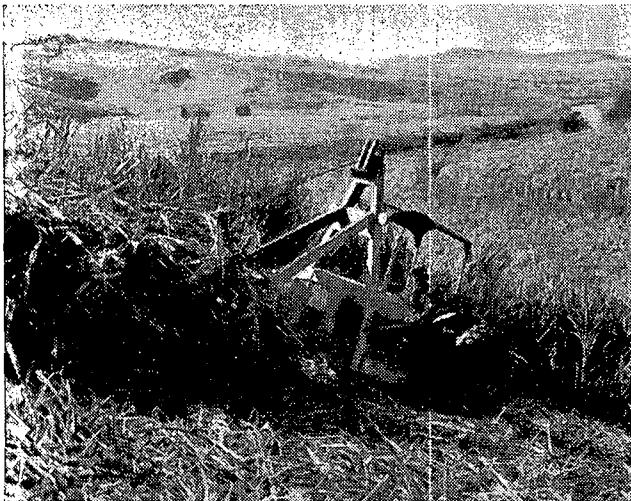
Our cane is hauled to strategically sited depots where the Mascane is off-loaded by crane into Hilo trailer or stack. In general we try to keep the hauls



The upper picture on the left shows the loader as it approaches the trailers, which are drawn up between it and the stacks of cut cane. The front arms hold the trailer in position as the cane is hauled into it by a wire rope running through the rollers above the driver's head. The rope is wound on to a winch in front of the tractor operated from the side of the tractor. Upper right: The stack ready to be hauled into the trailer from the side. The stacks are built in pairs. It takes approximately 8 minutes to load the two stacks. Lower left: The



loader has hauled the stack downhill into the trailer. The slope is about 30 degrees. Lower right: A close-up of the winch, and the control bar which is operated from the driver's seat. Centre: At the transhipment point the loads are transferred to Hilo trailers, the weight of each load being registered on a spring scale. Using this system Tongaat cutters are averaging 3 tons a day each. The cost of the unit is: £1,000 for tractor, £500 for loader superstructure and £500 for pair of trailers. Total £2,000.



not more than two miles; the average is one and a quarter miles each way. It is here that the benefits of two bundles per trip plus more weight show up.

Take the case of one of our Sections delivering a crop of 40,000 tons in a season.

(a) With a single load trailer at an average of $2\frac{1}{2}$ tons per bundle. $40,000 \text{ tons} \div 2\frac{1}{2} \text{ tons} = 16,000$ bundles = 16,000 trips =

20,000 miles
20,000 „ return empty

40,000 miles per season

(b) With a Mascane trailer at an average of 3 tons per bundle $40,000 \text{ tons} \div 3 \text{ tons} = 13,333$ bundles = 6,667 trips =

8,333.7 miles
8,333.7 „ return empty

16,667.4 miles per season

What is the cost of this saving in mileage?

For a 40,000 ton crop we estimate that the following equipment is necessary with the method described above.

1 Sideloader, winch, etc.	@ £500	£	s.	d.
1 Tractor for above	@ £1,000	500	0	0
2 Tractors for haulage	@ £1,000 each	1,000	0	0
2 Mascane trailers	@ £500 per pr.	2,000	0	0
1 set of ramps	@ £7 10s. 0d.	1,000	0	0
		22	10	0
		<u>£4,522</u>	10	0

A modification of usual procedure was tried out and might be of interest to the smaller supplier. We tried out our side-loader crane as its own loading/hauling unit, i.e., the crane pulled its trailers into position, uncoupled, ran round to load bundle No. 1, ran to next position and loaded bundle No. 2, then recoupled to the trailers and pulled them off to the crane. The time taken between arrival of empty trailer to departure of the full trailer was almost uniformly 8 minutes. Over a one mile haul one crane and trailer outfit handled eleven trips or 68 tons in nine hours. This was only one trial which seems promising enough to warrant further investigation.

To conclude may I summarize a few of the points I have tried to make:

1. Bundling frees cutters of dependence on transport.
2. Mascanes two bundles reduces mileage travelled per season.
3. Better weights per bundle per man.
4. Mascane load complies with road regulations so may be carried on public roads.

5. Sideloader's extreme versatility enables it to handle practically all conditions.

6. Sideloader is able to help the haulage tractors when in trouble with winch or towing.

7. Night loading is quite practicable.

Mr. Wilson said that Mr. Turner had stated that the Mascane trailer was not suitable to carry bundles for loading on to basket-type cane trucks. He wondered if the Mascane could not be modified so that this could be done.

Mr. Turner said that the bundle at Tongaat was a long low one, but actually any size bundle could be used. If the short 10 foot bundle were loaded it would then be suitable for loading on to tram trucks.

Mr. Steward said that he was not quite clear about these figures. He noted that while a tractor using Mascane trailers hauled 6 tons at a time the total crop of 40,000 tons had been divided by 3 and not by 6.

Mr. Turner pointed out that although the setting out of figures was perhaps bad, the answer was the same. He said that although the Mascane could carry up to 7 tons, 3 were only normally carried. He added that bundles varied in weight from $1\frac{1}{2}$ tons to $7\frac{1}{2}$ tons, but 3 tons was taken as an average. On one occasion, loading runaway fire cane, the labourers averaged over 5 tons per bundle, but 3 tons was taken as a fair figure over the season.

Mr. Armstrong asked what was the minimum economic tonnage per season for the Mascane loading scheme and what amount of cane would have to be cut to make the system economical.

Mr. Turner replied saying that he thought 20,000 tons was probably the economic limit on the low side for their conditions. For a smaller planter the last two paragraphs of the paper outlined what could be done with the unit pulling its own trailers. With this, one could come right down to a figure, perhaps even 20 tons per day.

Mr. Bentley asked when a single tractor was used, both loading and hauling, did the spacing of the stacks in the field correspond with the two coupled-up Mascane trailers. He inquired also about the ramps used for hauling the cane up on to the trailer, what was the most satisfactory design and material used in constructing these ramps?

Mr. Turner said that the two bundles were set out so that they would be in direct line with the trailers. First of all aluminium ramps were used but because of the tremendous thrust required steel had to be used at the top and eventually steel-reinforced piping was used.

Mr. Smeaton asked if the tractor had to be uncoupled to load the second trailer—did not the first trailer tend to move?

Mr. Turner said that on extremely steep slopes this could happen but if shoes were fitted this could be taken care of. On reasonably flat ground there was no movement. The arms on the front of the crane held the trailer steady.

Mr. Pearson said that working on Mr. Turner's figures of a single unit of 60 tons per day in 8 months one could possibly load with one tractor-trailer 30,000 tons per season. If you did not require to cut so much it would be possible to use the tractor with the crane in front for such operations as harrowing or ploughing.

Mr. Turner said there was no reason why the tractor should not be used for any other duty—it was merely 5 feet longer in wheel base. The disadvantages would be that you would have to move round some 1 ton of surplus material but perhaps due to the extra traction this might not be any disadvantage.

Mr. Wilson if asked when the tractor was used as indicated in the last two paragraphs, was the operator's vision sufficient to operate on a public road with safety? It would appear that his vision was considerably obstructed by the parts in front.

Mr. Turner replied that the vision forward was fully as good as with a normal tractor. In actual practice the parts of the machine in front did not obscure any vision. With the bundles loaded parallel to the line of movement and not across, the vision was quite good to the rear as well.

Mr. Steyn asked whether under steep conditions was it not possible to pull out one trailer and then go for the other one? Did these trailers have brakes, and if not, could they be fitted?

Mr. Turner said brakes would cost about £100 more. They had not used brakes, but care had to be used in operating. As far as pulling one trailer at a time was concerned, under wet conditions such as Isipingo there was no loss of output experienced pulling one at a time for very short distances. It was not practical with the present trailers to couple-up when loaded.