

PORTABLE FIELD TRAMLINES.

The report of the Committee on the above subject was read by Mr. H. E. H. PALAIRET, as follows:—

It is universally recognised that the costs of transporting cane from field to mill vary over wider limits than any other cost in connection with the production of sugar; and it is also probable that there is more scope for reductions in costs in this field than in any other.

This short paper is therefore offered on what, under suitable conditions, is the most economical system of cane transport yet devised.

Portable tram track necessitates a large capital outlay, but can be operated at a very low cost. The capital expenditure depends mainly on the total mileage required; and the running cost on the total acreage served, being almost independent of the actual tons of cane handled. There is, therefore, little, if any, advantage to be gained by the use of portable track where fields are low producing or widely separated. In other words, portable track calls for a high per acre yield and a well planned layout of fields. Where these conditions are fulfilled the Planter who is connected to a Miller's main line will find portable track to be outstandingly the most economical and efficient means of handling his crop, with the following advantages:—

1. The cane is handled once only.
2. A proper check can be kept on the work of individual cutters.
3. Normal wet weather is not a retarding factor to the delivery of the trucks.
4. The Planter is not troubled with the upkeep of wagons, wheel tax, etc.; and does not need to keep so many draught animals, nor to set aside so much land for grazing.

Since, when the tramline has once been planned, it is difficult and somewhat costly to replan it; a very thorough study of the whole Estate should be made with an "Abney's Level" before any work is undertaken. Once the general route of each section has been so tested, the actual grading is a simple matter, the two following points being kept in mind:—

No hard and fast rule can be laid down for gradients, but no grade in excess of 1 in 25 should be used if this can reasonably be avoided.

The radius of curves is dependant mainly on topography, but in general, any slight expenditure on widening the sharper curves will be found well justified.

In operation, a gang of three men and one umfaan, with one rail trolley and two oxen, can lift and relay up to 30 sections (180 yards) of line in one day, according to the type of rails and sleepers used. This costs from 1d. to 1½d. per ton according to the quality of the cane.

This Committee hope, for a later Congress, to draw up definite recommended standards for all materials and equipment for these lines. It is felt that, by doing so, they will enable suppliers, by reducing the number of types handled, to maintain a better spares service and

reduce their prices. The agent of a leading Manufacturer recently made a statement to this effect, and added that it is up to our industry to specify our requirements. We hope that, in the discussion which follows, Members will put forward their opinions as to the sizes and types of trucks, rails and sleepers to adopt.

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Mr. PALAIRET continued: Just before that paper was prepared, a circular was sent out asking for opinions and experience on the various materials. The replies have, up to date, been somewhat disappointing in number, but we have prepared a small summary from what we have received. Two weights of portable rails were mentioned, companies tending to favour 14 lbs. and Planters 16 lbs. In only one case was a gauge other than 24 inches mentioned. It is, however, in connection with sleepers that the widest differences exist, weights varying from 7 lbs. to 17 lbs. with keyed, in and out clutchbolt, and clipbolt types all being specified. It is hoped that this paper will be followed by a very full discussion on the best types and weights of sleepers. For permanent light track, 20 lbs. is the only weight cited. As this size is stated to be universally used in the gold mines on the Rand, supplies of this size should always be readily available. For heavy locomotive track, 30, 35 and 40 lb. rails are used, and some estates are using second-hand S.A.R. rails of 45 lb. section. It is probable that the main cause of failure in our rails is the rusting of the webs rather than fatigue of the metal; though, in the case of second-hand S.A.R. rails, both processes are probably far advanced at the time of purchase. This being the case, it is possible that some estates have endeavoured, by tarring or other means, to extend the life of their rails; and it is hoped that any experiences on these lines will be mentioned. The replies in connection with trucks have been so varied that it would be impossible to form a summary at this stage. One point, however, has been very striking, and that is the almost universal condemnation of all types of bearing lubricated by oil; those requiring grease (white metal being most often named) meeting with almost universal favour.

In conclusion, we would add that the above points do not necessarily represent the views of this Committee, but are put forward for the specific purpose of initiating discussion, as the comments made here will largely influence us in our subsequent deliberations. I think I am expressing the views of the Committee when I say that the idea is to get the views on these various points of all in the Industry, hoping gradually to harden opinion in favour of certain types. When we see the Industry definitely tending one way, then is the time for us to adopt certain standards, and that will probably be done this way. The Committee would recommend, say, for portable track, one size of rail. It would be almost certain to be specified in British standards. It

might be possible that we would want to specify the actual pressure under which they are rolled. We might not find the present length satisfactory, and the result would be that in that case a recommendation would be drawn up which would be called the S.A.S.T.A. standard 14 lb. rail. Then anyone who wished to adopt that would simply endorse their order for so much 14 lb. rail in accordance with S.A.S.T.A. specifications. There is no danger to anybody in this move, because if you do not like it you can order what you want; but in any case, I think you would find that this Committee will take very good care not to go ahead of the Industry, if I may say so. Any help you can give will be a great assistance to us. Some have not given any replies at all, and this Committee has a lot of work in front of it. We hope to get more replies, with a view to seeing how opinion is tending. Mr. Crookes has kindly offered to explain to us the type of sleeper he is using, which is, I think, new to most people here.

Mr. VICTOR CROOKES: We have here two different types of sleepers (exhibiting sleepers). So far as I know, the 14 lb. rail is standard on the South Coast, and on the North Coast nearly all the Planters use 16 lb. rail. The advantage of the 14 lb. rail over the 16 lb. is that it is easier to bend to get round a sharp curve. There are other types of sleepers. We have the old clutchbolt sleeper, in connection with which invariably the boys lose the nuts, and then you have difficulty if you have not got any spares; whereas with the ordinary lug type with iron keys, if you happen to lose one of these keys you only have to replace it with a little wooden wedge, and you can get all our trucks past without any difficulty. We have two different types of these sleepers—one has a large lug and the other a smaller one. The large-lug sleeper will take a 16 lb. rail with a smaller key, and at the same time a 14 lb. rail with a larger key. These sleepers, with key, weigh 17 lbs., and comparing the weight of the 16 lb. rail in length and the weight of the sleeper, there is no difference at all in weight. Three boys can pick up a 14 lb. rail with the sleepers and keys, and the same boys can re-lay them. These sleepers are used for the portable line. When you are connecting the line you make the joint of the rail in the middle of the sleeper and it is wedged with the key, and when you come along to pick up the line you drive the sleeper to one side and the joints come undone, and you can pick it up without any bother; whereas with the clutchbolt you have to sit there with a spanner, and it takes double the time. The truck cannot tipple the lug type of rail over, whereas with the clutchbolt it is easier to tipple over. The heavier type sleeper will stand more strain on the top of it than the light, especially in damp ground, where the sleepers are apt to sink. We use the $2\frac{1}{2}$ ton trucks. I think nearly all the trucks on the South Coast are the standard $2\frac{1}{2}$ ton truck.

CHAIRMAN: I would like to ask Mr. Palairret a point in connection with the paper, in which he speaks of a gang of three men and one umfaan re-laying up to 180 yards a day. There seems to be one factor missing. How far can they move them?

Mr. PALAIRET: Mr. Crookes should answer that question. It was Mr. Vernon Crookes who raised that. It then came out that they could get the same results themselves on the level. It was then we learned about this new sleeper and how to handle it, and it was Mr. Crookes who satisfied us it could be done. It was for that reason it was put in the paper, to give him an opportunity of showing how it was done.

Mr. VICTOR CROOKES: One of the main factors in that particular question is, of course, the type of rail and sleeper that is used. In discussions of this subject at our meeting, it was pointed out that boys carting and re-laying the line depended on the distance that they had to cart. A boy could cart and re-lay from one line to another, giving a distance of two miles in all. They must pick up from the one line, and from there to where they are laying would be two miles. It is very hard to put this figure down if they have to cart in dead cane. Personally, I use six men and one umfaan. I have to contend with a lot of dry cane, and having to cart the rails from one field, miss a field and go into other fields, and cart them back again, brings up the cost of laying the rails. If you have the fields so that you can start at one end and follow down in rotation without changing about, it can be done with three men and one umfaan; but if you have a lot of hilly country, where the grades are steep, it is very doubtful whether three boys could keep a gang going. This was based on the yield of 30 tons per acre. I am afraid quite a lot of this ground will not give a yield of more than 20 tons to the acre. 180 is not very far, and the distance between the two lines is also another factor in that question. At least 150 yards is required between each line to be able to work three men and one boy. If you have the lines closer the boys have not so far to carry the cane and have not the quantity of cane to get through in a day, so that these three men can lay the rails.

Mr. ASKEW: You only use one type of truck there, the $2\frac{1}{2}$ ton truck?

Mr. CROOKES: That is so. Crookes Bros. are using what they call a box truck, which is only $1\frac{1}{2}$ tons; but generally the $2\frac{1}{2}$ ton truck is used by us, with a chain, and we do not cut any cane in half. The length of these rails is 18 feet, and three men can load 15 rails on a trolley and the oxen can pull that up a grade of 1 in 24. It has been suggested that this particular type of sleeper that we are using on the South Coast be widened. It would be quite a good idea, if they reduced the thickness of the metal on top, giving a wider lug for the joint, which would better distribute the pressure on the joint and save breaking of lugs. If the metal was left the same thickness as it is, I think the rail would be too heavy. There is a quarter-inch plate on the top which could be thinned down and the sleeper widened, thus preserving the same weight, but giving a wider base.

May I take this opportunity of explaining that on joining these rails, we have found that they must not be joined on the same sleeper, otherwise you get a kink in the line. They must be joined a yard apart,

which breaks the kink in the line and at the same time strengthens the joints.

Mr. FOWLIE: May I ask Mr. Crookes how he manages when working these rails on a curve. In some cases, I know, in using fishplates, a spare piece of rail is put in at acute curves. In this case, are the lines simply allowed to curve a little on the outside, or is there any other device?

Mr. CROOKES: If we find the joints are almost corresponding, we add a small piece of metal on the one side, usually on the outside, breaking the joint again. That piece of metal requires to be put in before you get to the curve, as it is not advisable to put the extra piece of metal on a curve because it makes a double kink, and one is apt to have a truck off the line. It is always advisable to have the curve even, whereas a piece of metal added when you have a straight on the one piece and a curve on the other puts the gauge slightly out.

Mr. ALF. WARNER: This has been a very excellent paper. Unless you get all your farm laid out and surveyed, portable tramline is no use. There is another thing with portable tramlines. Nearly all have small farms of 400 to 500 acres, and an allotment is from, say, 20 tons to 25 tons a day; unless everything is laid out in a proper manner it becomes very expensive. At present, I think a man is put on to cut and load two tons on to a wagon. If you put down portable tramline, you must have it very close before he can lift that cane from the ground and put it on to that tramline. It is going to cost anything from 6d. to 9d. to handle that cane on to the tramline. You cannot put the tramline in every 30 yards. I suppose 50% use tramlines in Zululand and the other 50% use S.A.R. trucks. Going back to the sleepers and the weight of rails, and so on, I would favour, as Mr. Crookes has said, this lug type of sleeper, which is the most easy and convenient way of working. If you come to a small curve and the line has to be shifted on the sleepers, you have only to give it a knock and it is out, and you put it together again; whereas with the clip bolts it is a devil of a job, and you are always losing bolts. As Mr. Crookes says, on the South Coast they use the 2½ ton truck. On the North Coast, where I am, it is the 5 ton truck they use, and I should say 16 lb. rails would be more suitable there. Unless you have a decent heavy rail on damp ground, it will bend. You cannot have the line laid properly—you have just got to cut your cane and put the line down and away you go. If you have a little bit heavier line, it will pay you to run over it. With the 5-ton truck I should favour a 16 lb. rail, but with the 2½-ton truck the 14 lb. rail. In any case, I would favour this type of line with the lug and wedges. Another thing, if the sleeper could be made a little broader, it would be better. I think they are too narrow. When a truck comes over it sinks in, and when you come along with a train of trucks with the sleeper down, over goes a truck. If

the sleeper could be thinned out to make it broader and yet not make it heavier, it would have a better grip on the ground.

Mr. ASKEW: We have some sleepers a little wider than the sample before us, and we find them all right. On the general question, what Mr. Warner says is correct. I think it is a very costly thing indeed, on a 500-acre farm, to lay down these permanent ways for the track. We use oxen and bring it down on to the Company's lines. If you can get a fair service on flat country, the 5-ton truck is much better than the 2½-ton truck.

CHAIRMAN: Mr. Watson says, in his opinion, the wider sleeper more than outweighs the difference between the light and heavier rail. It is more important to have the wider sleeper than the gaining of a couple of pounds in the weight of the rail.

Mr. PALAIRET: I would like to touch on a couple of points raised. First on the question of sleepers, I am informed that this clutchbolt sleeper was never designed for sugar work. It happened to be available when tramlines were first started, and as such it was used. The only reason it is kept on is that it is so cheap compared to the others. I do not know what people's experiences are as to its lasting qualities, but I am informed that the engineers do not regard that as a tramline sleeper. The clipbolt type, I believe, is also not supplied. You have to have them specially made. Apparently the makers supply this wedge sleeper and the in and out sleeper, which are apparently the two standards for portable lines. So if the other sleepers are going on, there must be some points that the designers do not know about in their favour. There is one thing touched on by Mr. Warner which rather shows how difficult these questions are. He suggested a 14 lb. rail for the 2½-ton truck and 16 lb. for the 5-ton truck, which rather shows that experience does not quite accurately hit it off with the calculated figures, because the correct size of rail to be used depends on one thing, the axle weight. The axle weight of 5-ton trucks is approximately the same when loaded as the 2½-ton truck when loaded, so theoretically the same weight of rail should be required for them both; but I believe it is true that in practice it does not pan out. I would mention as a matter of fact, if you take the correct engineers' formula, you will find that a 2½-ton truck fully loaded is about the correct weight for a 14 lb. rail. So apparently those of us who are getting results with 14 lb. rails are getting results not in accordance with general railway experience. So that there is another problem we have to study.

CHAIRMAN: This interesting paper has brought forward many expressions of opinion, and we must thank the Committee for the work they have done, and especially Mr. Palairt and Mr. Crookes for the remarks they have made. (Applause.)