

Standardisation of South African Railway Trucks for Sugar Cane Transport

REPORT OF COMMITTEE ON RAILWAY TRUCKS (STANDARD AFRICAN GAUGE).

Mr. J. W. Wickes read the following paper:—

Standardisation of South African Railway, for Sugar Cane Transport, being Report of Committee on Railway Trucks (Standard African Gauge).

On going into this subject it appears to be bristling with far more difficulties than meet the eye at first glance.

Whilst not presuming for a moment to have found a solution to our Railway truck problems, this committee at any rate begs to report our endeavours in this direction and to present them to this meeting to be taken for what they may be worth, particularly in the anticipation of raising a constructive discussion on the subject.

A very interesting paper was read by Mr. M. McMaster on the subject of "Handling of cane from field to crusher," on 14th April, 1926, in this article the Cuban system was fully described and recommended as being well worth a trial in this country. However, although the subject was again referred to in 1927 Conference no practical results in this direction occurred, and therefore we may assume that the suggestions brought forward by Mr. McMaster were ruled out as being unsuitable for our conditions; that being the case, although, we imagine that this is the most economical method that the Industry could adopt, it is of no avail going over this ground again.

This present Committee of which I am the Convenor have dealt with the subject of South African Railway waggons only. My committee met Mr. Grubb, the Department of Railways Deputy with whom we had very interesting discussions.

One great feature in this complicated subject is that of dealing with mills of various tonnages. A mill grinding a small tonnage presents problems entirely different to a mill dealing with a heavy tonnage, and in this paper we shall confine our investigations to the larger mills.

Most mills are already equipped with cane off-loading derricks or gantrys suitable for dealing with the present day South African Railways

(S.A.R.) waggons. These off-loading equipments demand a deal of power every H.P. of which is of value.

In dealing with subject of the S.A.R. waggons only, the next best solution appears to be one of improvements in the present type of waggon with a view to lessening the cost of loading for the grower and offloading at the factory.

With this object in view we now have three suggestions to put forward, all of which are designed with the main object of eliminating the wooden poles or props used almost universally to enable the full advantage to be taken of carrying capacity of truck.

No. 1. Design is of the telescopic steel tubular type of prop attached to outside of waggon, and which when truck is not used for cane transport is merely lowered down out of the way, whereby the truck may be used for ordinary goods traffic for which it was originally designed. Whilst this scheme theoretically appears a very admirable one, there is always the mechanical disadvantages of rough usage by the grab off-loader, etc., which is bound to occur and in which case the question of repairs immediately arises.

No. 2. Method suggested is to fix a wooden framing on inside of waggon clipped to top beading of truck and shored together at bottom of truck. These framings might be the property of the Cane supplier, who would require to come to some arrangement with the miller for safe return of same.

No. 3. Design is a steel superstructure to raise the existing sides of the waggons.

The two ends of existing waggon to be raised by $\frac{1}{2}$ in. steel plates supported at the corners and centre by angles and channel irons, extending to the floor of the truck and bolted to the existing ends, these forming the main supports of extensions, the top edge of plates being also flanged with angle iron. The side extensions would consist of steel slats fastened at top and bottom to angle iron longitudinally, which in turn would be fastened at ends to the corner mentioned above.

The bottom angle irons would be additionally fastened to the top beading of the existing sides of truck. Allowance for loading by hand between slats could be made.

These extension sides may be further strengthened by channel uprights extending to the floor of truck. A rough estimate of the cost of this alteration would be £25 per truck.

These sides might very easily be made to be removable at end of the cane season if desirable.

Were any of these ideas adopted it would simply mean the elimination of need for ordinary wattle wood or bamboo props, in which case it is a question of which is the more economical proposition.

This paper is written simply to show the views of the committee and especially to point out the pros and cons as we see them. Should either of the above suggestions after a fair trial on a small experimental scale be considered by the S.A.R. Administration practical enough to rig up a fair quantity of trucks for cane traffic, then the very important factor immediately comes into force whether the S.A.R. would be able to allocate these trucks for cane traffic only during the grinding season. It is a problem which in our opinion is extremely difficult of solution especially since during the off season these trucks are put on to everyday traffic and would possibly drift to all corners of the Union.

These following points are the ones generally to be considered by the sugar producing community.

(A) **The Cuban system of tipping.** So far this has not been adopted for the obvious reason that our mill yards and carriers would have to be reconstructed, and also the big factor that the S.A.R. would necessarily have to design a special truck which might be unsuitable for any other kind of traffic.

(B) Can the present system of bushwood props be supplanted by a cheaper form of fabricated framing, and if so can the S.A.R. guarantee to allocate these trucks for cane traffic only during the crushing season, and make other use of them out of the season? The main trouble in truck loading is the fact that the truck will not hold sufficient cane unless rigged out with temporary sides which the grower has to supply.

Our conditions are unique in this direction as cane transport is not the one and only industry catered for by the S.A.R. Administration, and for which the trucks have to be used.

We can therefore only suggest that an individual Company or group approached the Railways with the idea of trying out one of the above suggested systems which will replace the present bushwood props in a more substantial and permanent manner, and report progress at our next Conference.

The Convenor recently toured the sugar growing belt of Queensland, Australia. There the main bulk of cane is transported on Estate or mill 2 feet gauge trucks. Where cane is handled by Govern-

ment or State Railways, no special type of waggon is used. Usually there were the low sided ballast waggons with collapsible sides from which cane was raked off by the Davies type of rake. The rate of transport is evidently fixed per ton and not at a minimum weight as in this county, greatly to the benefit of the industry, though a doubtful advantage to the Railway system. There the canes were loaded in various ways, sometimes crossways, others again longways and in some cases end on. Their trucks are not as large as ours are and probably 15 to 20 tons was as much as the average waggon would hold. In that country on account of the fact of cane being reaped at 12 months growth, there is naturally less acreage under cultivation consequently the cane is nearer the mill than it is in some instances in this country.

As we are all well aware a distinct improvement or saving might be effected in South Africa in cost of transport, were the cane generally carried to the nearest mill. Whether or not this can be arranged is a question beyond the scope of this committee, seeing that the sugar industry as a whole has not yet evolved a solution to this problem of excessive haulage. We can only register our very strong opinion that it must eventually come about.

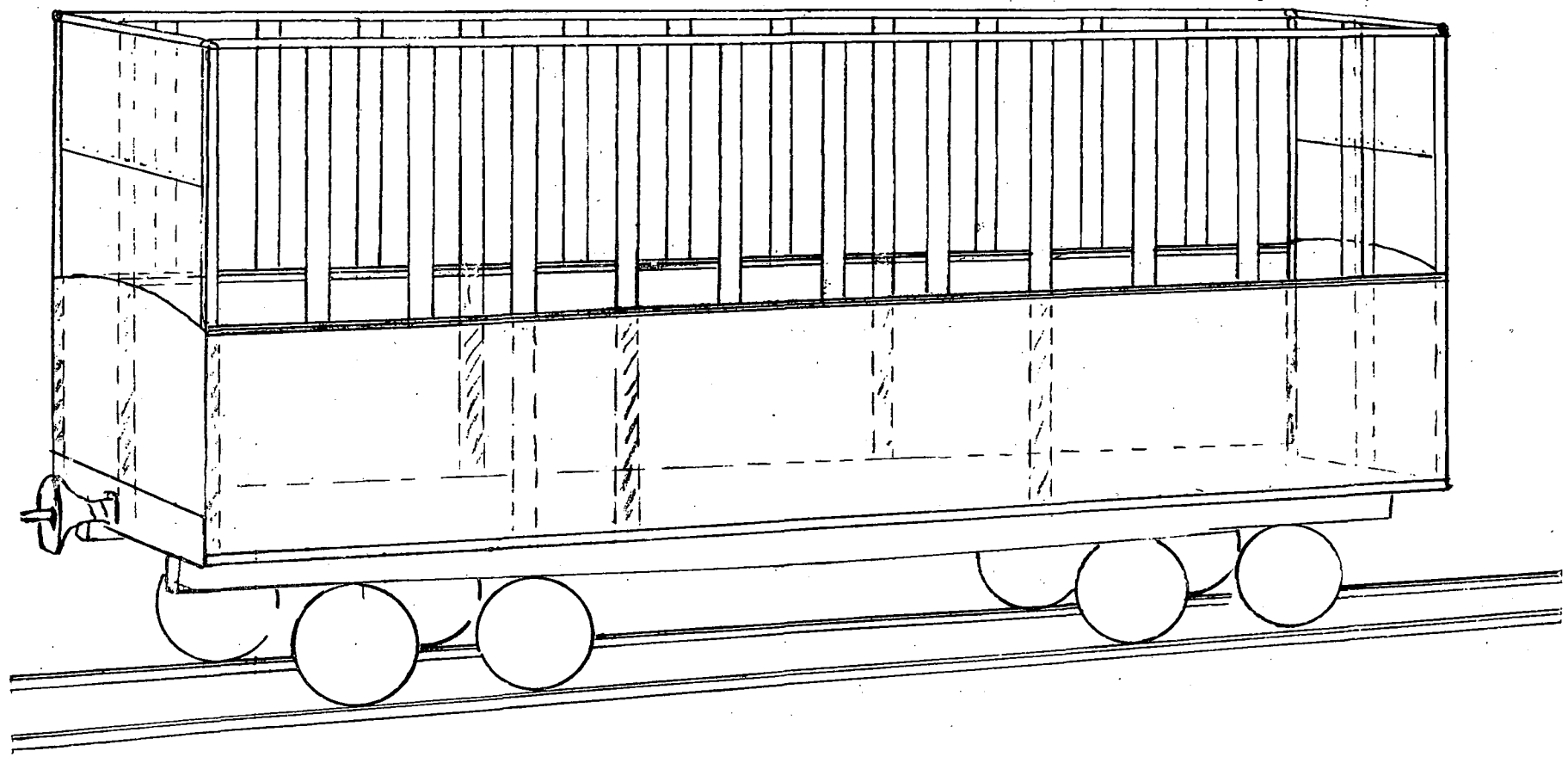
In conclusion I might say that we consider no apology is required for the text of this paper, lacking though it does in concrete ideas; we have merely given you what opinions we have been able to get together during the brief time at our disposal, and at the same time commented on what might be the advantages and some of the snags which would arise. It is of my opinion that we will gather far more practical information from the discussion which I trust will follow than from what the paper actually contains.

Committee on Railway Trucks, Standard African Gauge, — Grubb, J. E. Herrison, A. Love, J. Murray, J. R. Simpson, J. W. Wickes (Convenor).

Mr. Wickes continued:—I might say I called on Mr. Grubb, the representative of the S.A.R. on this Committee, inviting him to be present this afternoon, but unfortunately he is not able to come along. He assured me that his Department are particularly anxious to offer us any facilities they can in regard to trucks, but until we can give them some concrete ideas on the subject they feel they cannot do anything.

CHAIRMAN: I think we should particularly welcome this paper on a most important subject, that of transport, the more so as it is one of the very few engineering papers that we have at this Conference. Anyone who has seen the Cuban system

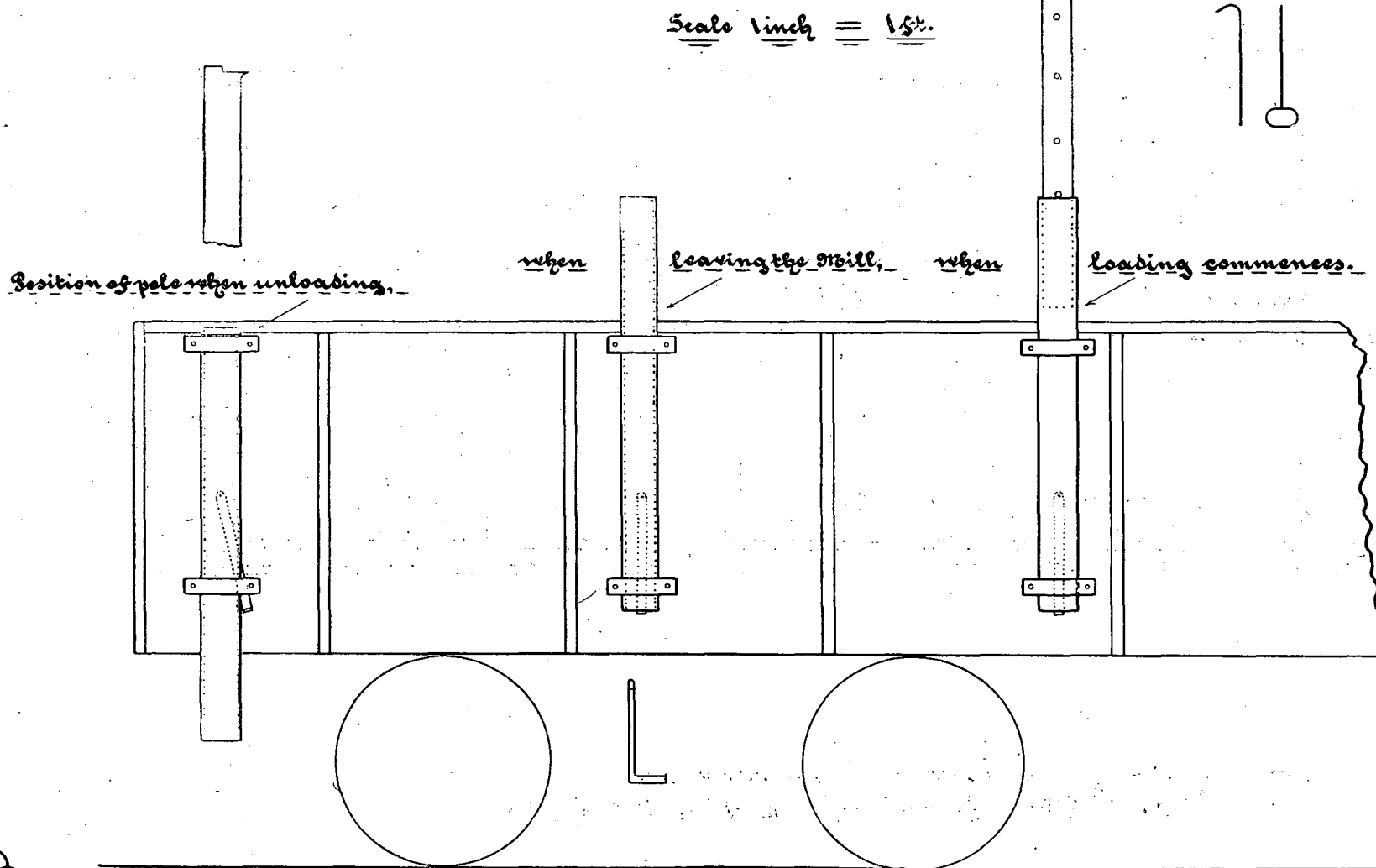
N°3 DESIGN for SAR Waggon.



Telescope loading Sole simplified;

Two lengths of 5ft piping 2 1/2" and 2" Diam. respectively, are adjusted to project 5ft. above the truck to be loaded.

Scale 1 inch = 1 ft.



of cane transport by railway in action will I think realise that it is the most perfect that has yet been evolved, but it is unfortunate that there seems to be so little chance of establishing such a system in this country. However, these various suggestions that are put before you are, it seems to me, excellent attempts to discover some method of dealing with cane transport apart from the ideal method of trucks which they have universally in Cuba.

Mr. WICKES: I might say I don't wish to take the credit of any of these designs. I am indebted to Mr. Simpson of Natal Estates for this No. 3 design, and Mr. John Murray for No. 2—which, unfortunately, I have not submitted a sketch of—and Mr. Behrens, of Amatikulu, for the telescopic design.

Mr. BEHRENS: We can criticise those drawings all right here, but I don't think we should go too far because practical experience will show the real result. We may overcome our difficulties far more easily than we imagine here. Those three designs should be given a trial to see which is the best one. To my own of the telescopic poles I have another addition to make, and I will ask you to postpone your judgment about my poles. I think I can still add to those poles to get them out of the road by pulling them out or sliding them down. I think I can work out another device to get the cane out of the trucks without the grab. I am working on that now, and as soon as I get a drawing ready I will let you have it. I can't disclose exactly how I am going to do it, but I have a fairly sound idea and feel almost certain it can be done.

Mr. J. MURRAY: Mr. Dodds spoke about the Cuban method of handling the cane. I have seen the whole thing and endorse all he says. I think it is the best method. We can't work those conditions here very well, and as far as I can see this scheme of Mr. Simpson's for having the sides raised will be the best. I would suggest that we can't alter the cane carriers we have. I would suggest an apparatus to tip the S.A.R. trucks and have a big hole to tip that cane into; then the ordinary grab could lift the cane from that hole to the cane carrier as it does now, and that would mean a quick despatch of the trucks. That would make the conditions suitable in Natal. I have a bit of a sketch here of the suggestion I put forward. That is a hydraulic tip to tip the S.A.R. trucks, a big hole to put the cane into from the trucks, which would be similar to the system they have in Cuba with the big hopper. You could put that in the mill yard within the radius of the grab, and would be much better to work than the present system of working a truck at a time.

Mr. BEHRENS: For my scheme I require only a sliding platform to put the cane on to. I don't require a big hole and I don't require the grabs any more. I may require about a dozen chain slings.

I will get the cane out of the truck; half the first time, and the other half the second time. When we change the cane trucks the carrier has something to feed on while the other is coming into position.

Mr. MURRAY: I think the only carrier I have seen working successfully is the one at the Zululand Sugar Milling Co. As far as the sloping carriers are concerned, I think they have been a failure. In Louisiana they have got them perhaps 100 feet long with movable sides. It actually travels, and none of these so far as I know have been very successful.

Mr. MOBERLY: I think that some consideration might still be given to the Cuban tipping system for the reason that it eliminates the use of the grab, and the grab is not a satisfactory method for getting an even feed. In many of the factories we get a very ragged feed and we get cane very much crumpled about and lying in all directions on the carrier. The difficulty mentioned here about the use of the trucks for other purposes I think could be overcome. This is of course an engineering problem, but I think the swinging side which swings from the top could when not in use be bolted at the bottom, making a rigid side, and there could still be a door in the centre so that you have the truck as it was before. There is one other point in connection with sidings that occurs to me—not planters' sidings, but to the cases of large transhipping sidings, such as the one at Mposa or at De Jagers. A tremendous amount of labour could be eliminated in loading by having very much higher ramps for the small trucks to run up practically to the level of the top of the S.A.R. trucks, so that you would save the present method of running up a little gangway with a Native with a bundle of cane on his shoulder.

Mr. BECHARD: I would like Mr. Wickes to tell us whether any consideration has been given to the possibility of fastening chains to the sides of the truck, say five or six chains on each side, to hook up together on top of the truck? That is another possibility of increasing the capacity of the truck. Mr. Murray's idea is probably very feasible, but when this comes up I hope that a certain amount of regard will be given to the necessity of taking samples for testing when that is done.

Mr. WICKES: That is another one of the difficulties which crop up in this question. With regard to the chain system I believe, so far as my memory serves me, there were trucks rigged up in that way some two years ago. I think I saw some in the Tongaat yard. From the mere fact that they were not in existence for long I take it they were not a success. I know for a fact that I did see trucks with longitudinal chains and vertical chains, but apparently they were no good. With regard to the allocation of these trucks for cane traffic it was the

first question which Mr. Grubb raised. Mr. Murray was with me at that particular meeting, and he gave me to understand that it was almost impossible for them to be able to allocate any particular trucks for cane traffic and cane traffic only. He said they had a staff on duty day and night with telephones clamped on their ears doing their best to keep the trucks allocated for this particular crop now, and he could not hold out much hope for that. That is a question for the railways to decide on.

Mr. SIMPSON: With regard to the chains, they were tried. There was a truck fitted up by the S.A.R. with chains and experiments were made, but one of the chief difficulties was losing the chains and getting them broken by the grab through getting in the way. They were proved a failure for that reason. With regard to the Cuban truck I don't think there is any doubt in anybody's mind that it is the best system. It must be the best on account of the huge tonnage they haul. If they could in any way be adapted to our conditions there is no doubt they would prove to be the best. But our industry has not grown like Cuba; it has grown up by very small factories, therefore what suits one place does not suit another. In going into this matter with the S.A.R. it has been proved that they could not come to any arrangement as to the one type of truck. The only thing we could get hold of is to substitute something a little more permanent than what we have at present in the way of poles. The methods that have been suggested by the Committee are probably not the best, but are there for criticism, and I think with a little bit of enthusiasm the Railways might be induced to try one or other of them or the whole three. I think they should be given a good test. I don't think they should be thrown out immediately because someone thinks they are not suitable. They ought to have a fair number and give them a fair test before condemning them.

Mr. PALAIRET: With regard to No. 2 it seems to me that there is one point about it: it states the framings are to be the property of the cane supplier. If those are the property of the cane supplier they are going to be made differently. I see no reason why No. 2 should not be adopted by having a number of these made of light material, all the same, and provided by the Railways. Simply remove them straight from the trucks as soon as finished with. Anything of that sort would only be a temporary thing. Great thought has been given to mechanical off-loading; what must come in the future is mechanical loading. To get that you have to have a truck which is going to hold its tonnage when loaded mechanically, and that is a very big problem. One should not lose sight of the fact that that must come.

Mr. WICKES: I might say I have to apologise for a slight mistake in this No. 2. It reads: "method suggested is to fix a wooden framing." As a matter

of fact I don't think we specified a wood framing; we really discussed the question of it being wood or old boiler tubes. I added the lower portion here "these framings might be the property of the cane supplier." I did that as I had an idea that a cane supplier might find it cheaper to supply this type of prop in place of the boiler-tube prop. There is another point. It has occurred to me in the last day or two that we are working from the wrong end of the stick and what the last speaker has mentioned hits it on the head. The Railways I should say are morally and legally responsible, or they should supply the growers with a truck that will carry the weight. I think the penalty is anything below 22½ tons in a railway truck. So far as I know you can't load a S.A.R. truck without additional props, without being penalised. Logically I should say the Railways should supply a truck that can carry the load and not penalise us on that point. The trucks were not originally built for cane and yet they penalise the growers if they can't be loaded up to a minimum weight which can only be loaded by using additional props.

CHAIRMAN: Can you tell us whether the Railway Department are likely to put experimental trucks on the line?

Mr. WICKES: Yes. Mr. Grubb while apologising for not being able to come here this afternoon, assured me and asked me to convey to the meeting that the Railways were very anxious to carry out any experiments with regard to suggestions which would universally suit the cane traffic. On the other hand again, the proof of the pudding is in the eating, and you can only try out these things in an experiment on a fairly large scale.

Mr. MURRAY: This committee on trucks meet every year and have a lot of talk and that is all that is done. Some time ago I made a suggestion about having the thing tried at Mount Edgecombe. Is it possible for the S.A.S.A. to form some committee among themselves and get some persons from this Association to collaborate and get something done?

CHAIRMAN: This Committee is affiliated to the Sugar Association indirectly, and if you would like to have certain definite experiments put into effect I would advise you to write to the Association asking for the necessary funds.

Mr. SIMPSON: I don't think we should put all the onus on the S.A.R. After all it is up to the Sugar Industry and ourselves to decide on something fairly definite. So far as I understand the S.A.R. have been only too pleased to meet us provided the thing has not been too expensive. I don't think we have ever been able to put up a very concrete proposition to the S.A.R.

CHAIRMAN: The difficulty in the past has been that the different factories have not been able to

agree on a suitable truck; what will suit the ideas and conditions of one factory will not suit another owing to the different conditions prevailing in every mill yard in the country.

Mr. BEHRENS: The difficulty with the S.A.R. is that they want some recommendation. As Mr. Murray says, if we could form an independent committee it would be of advantage to us. We have to wait a whole year before we meet again to ask your decision. The S.A.R. are quite willing to adopt a scheme if you think it feasible.

CHAIRMAN: It seems to me that it is a matter for this Committee which has been formed to make recommendations, and it is for them to report to the Association, as they are doing now to the Technologists' Association in the first place.

Mr. BEHRENS: Then all you can do now as Chairman is to put forward a recommendation to the S.A.R. on our findings here. That is what they are waiting for.

CHAIRMAN: The General Committee are certainly prepared to endorse any of the recommendations made by the Technical Committee on Railway Trucks. That is what the Committee on Railway Trucks is appointed for, to make recommendations by men who are best fitted to do so.

Mr. BEHRENS: You will have to leave it a good deal to the S.A.R. to work things out. We cannot work out things here for them to adopt. They have to do that themselves. All the S.A.R. want is a recommendation from you.

Dr. HEDLEY: I think this is the third time during this session that we have come up against the same kind of proposition; that is, we want closer contact with the Millers, the men who are going to benefit by our suggestions. Yesterday we sent forward a resolution that it should be brought before the Millers that the SO₂ question should be enquired into and facilities given which we want. This morning Mr. Wickes suggested that the question of clarification should be further experimented with, and again it is a matter to be brought before the Millers and the monetary value of that pointed out to them. Again, this afternoon we come up against another proposition which cannot be dealt with by purely ineffectual tossing about of words, but is a practical question, and again it is a question of asking for money. I think it might go as a general recommendation from this Association to them in some way or other than we should get in closer contact with them say through the General Committee, and give life to our recommendations. Last year my work on boilers required machinery for carrying out additional experiments this year, and it seems to me that either from the Experiment Station or some other place you want a central body with power to carry out these experiments. You bring before us each year results of committees

which are moribund when they come here and dead when the Congress is finished. I think the incoming General Committee should in some way get into closer touch with the Millers and try and put life into the suggestions which are decidedly not to our advantage but to the advantage of the Millers. Bring before them fully what the results are of the work of the members of this Association. (Applause.)

CHAIRMAN: Any resolution passed from this meeting to the Millers' Association will naturally come before them automatically. Will you make a resolution?

Dr. HEDLEY: I think it is for the Engineers to do that; they ought to father their own suggestions. If you like I will propose:

"That the results of this paper are brought before the Millers, its importance to cane traffic pointed out, and a request made for the grant of money to assist in carrying out these experiments."

Seconded by Mr. Simpson.

Mr. MOBERLY: I think we could go a little bit further and have some method by which any relevant decisions of this Congress can be brought before the Millers. That our Committee approach the Millers and ask them to have some delegates to receive from us a summary of decisions which we want brought before them for consideration and subsequent action. This is a point in question which could be brought up in that way. As Dr. Hedley says, so many of these things die after the Congress.

Dr. HEDLEY: I am quite willing to have that added to my proposal.

Mr. SIMPSON also agreed.

On being put to the meeting, the motion was agreed to unanimously.

CHAIRMAN: As regards this particular point we are on now I am not quite sure what is involved, whether the setting up of these experimental trucks is going to be a cost to the Sugar Industry or not. Is the Railway Department prepared to bear the cost?

Mr. WICKES: So far as I could gather from Mr. Grubb the Railways were quite willing to undertake the making of any experimental trucks; while he did not actually commit himself in informing me that they would do it on their account, I was given to understand that they would be very keen to carry out experiments, provided however, they were reasonable and not unduly costly. I gathered that anything on a reasonable estimate they would willingly carry through. I rather fancy the Railways would rig up a few trucks from an experimental

point at their own expense provided they are satisfied that from a structural point of view they are foolproof schemes.

CHAIRMAN: It seems to me in that case the question of funds does not arise in this particular instance, although it does in the others to which Dr. Hedley refers.

Mr. POUQUET: It seems we are taking into consideration only the Millers; what about the Planters? Every planter has not the facilities for doing mechanical loading.

Mr. WICKES: The idea I think was that these would be applicable right through, for hand loading and mechanical loading. Otherwise the Railways would not tolerate it for five minutes. We have three designs here, and there are one or two others which we could evolve, and it is then for the Sugar Industry generally to agree that the thing is worth a trial. It is no good for two or three people being keen on it and the balance not. If the thing is worth a trial then the Railways will take it over from the engineering point of view. I suggested in this paper that an individual or group might approach the Railways with regard to rigging up a few trucks for their particular mill, and to give them a fair trial, and after that of course it depends on those trials whether it is worth extending or not. To carry out the experiment with a few trucks one day at one mill and a few days at another is not worth while. For instance, with regard to Mr. Behrens' ideas, his group could follow up the experiments in that particular yard for a period during the next crushing season, and so on.

Mr. BEHRENS: We said just now that we should ask the S.A.R. to give a truck to hold 22 to 25 tons; instead of that if you bring this forward it would fall in with your wishes.

Mr. WICKES: We would go to the Railways and say these are the ideas we have, can you give us something better? That is the long and short of it. I raised that point just now simply as a means of trying to explain that the thing was fundamentally wrong in principle from the beginning, that the truck would not carry the amount it was expected to without artificial means.

Dr. HEDLEY: Annually we elect committees; is it not possible for this Congress to re-appoint these gentlemen who have carried out these experiments? Tell them to carry on with the job, and if they so decide to co-opt other people on it. Give them all the powers that are necessary from the Congress. They have already put in a lot of time and they ought to carry on to a result, successful or otherwise, the work they have initiated.

CHAIRMAN: Evidently this is a case where it is essential that the same committee should con-

tinue the work they have begun, with a view to bringing it to completion. That can be made if you like as a resolution from this meeting, although I think it is probably hardly necessary because I am sure the General Committee will see the force of it.

Dr. HEDLEY: It is only to obviate the delay which may ensue before the General Committee meets.

CHAIRMAN: I think we may certainly take it for granted that they will be re-appointed.

Mr. PALAIRET: There is one point that should not be overlooked. This question very rightly affects the planters by the amount that it is up to them to load on these trucks. I think it would be very wise if in their work this committee got in touch with the Cane Growers' Association who might be able to give some very valuable information in respect to the methods and difficulties which are at present involved, and might be involved in the loading of those trucks. It might save a great deal of dissatisfaction and might possibly simplify things.

Mr. BECHARD: Arising out of all this discussion about getting in touch with the Millers' Association, it is generally forgotten that this Association is practically a branch of the Millers' Association, and it should not be necessary for this Association to approach the Millers' Association in any way as it ought to be done automatically. On the other hand I would like to suggest that all committees requiring certain practical work to be done ought to come forward with concrete proposals of the cost of those things and that they be empowered to ask the Millers' Association for certain funds to be devoted to that certain purpose. I would like committees reporting on designs requiring practical trials, to be empowered to make estimates and to submit proposals to the Millers' Association with a view to financing it if possible.

Mr. MURRAY: In 1926 we had a Conference and Mr. More, the Assistant Manager of Railways, attended to see what sort of truck we would adopt. I was up in Pretoria about two months ago and I met Mr. More again, and he said, "Are you people still thinking about what sort of truck you will adopt? We are waiting on you." It seems to me that this is what the Railways want. They have been waiting four years and up to now nothing concrete has been put forward.

CHAIRMAN: You certainly have three promising designs here, and all we can say at this meeting is to recommend the committee to go ahead. If they want funds it is a question of applying to the Millers' Association.

Mr. BEHRENS: You can't work out those schemes perfectly here; you have to experiment. All they want is a recommendation from you.