

REPORT BY COMMITTEE ON ELECTRICAL PLANT IN SUGAR FACTORIES

Mr. Chairman and Members of the Sugar Technologists' Association,

Once again we have the honour to report to you on the activities of the Committee on Electrical Plant in Sugar Factories.

The Committee has done a considerable amount of work in various directions, the result of which will be seen in the future.

Individually also, two of the members of the Committee have been busy and the results of their labours will be shown in the papers which will be read at this Congress.

The paper by Mr. F. Macbeth has been compiled after careful observation, and the data set forth therein will be of great use to every engineer in the Industry interested in the latest method of driving milling machinery, viz., electrically.

Mr. Wyles' resumé on "The Application of Auxiliary Drives by Electric Motors" is of general interest to all engineers and managers. It is a paper on a subject of everyday importance and should be a good reference when required.

Collectively, the Committee have been at work on another subject of everyday importance, viz., "Installations."

A tour round the factories will show the following:—In most cases the generating plant and main switch-boards, etc., will be in good trim, with everything according to regulations and in some cases the power-house will almost attain the honour of being a show-place. In the factory itself, however, things may be totally different. In power and lighting installations, the Factory Regulations must be adhered to, as also should the Rules of the Institute of Electrical Engineers. However, these rules do not prevent all kinds and types of wiring being done and in a factory may be found, haphazard, armoured cable—screwed tubing—grip fittings with close-joint tubing—lead-covered cable—open wiring on cleats—and even open wiring without cleats. With the exception of the last item, all are admissible under I.E.E. Rules, but the method of installation often leads to abuse. Long feeders are led into the factory and taps taken off where required, with or without distribution-boards, and having final sub-circuits without adequate fuse protection, etc., etc. This is partly due to laxity in the enforcement of the regulations a good number of years ago, and now managers and directors of companies are sometimes loath to spend money on a more expensive method when the old way worked all right for so long.

The Committee is of the opinion, therefore, that if a certain standardisation of installations could be set out, pertaining particularly to our own industry, the heads of the various firms, especially the smaller ones, would look on the extra initial cost in a favourable light with the knowledge that the engineer would be putting forward a sponsored scheme which would be made a first-class job and,—we wish to emphasise this—it would be cheaper in the end. The Committee is also of the opinion that standardisation of this nature would appeal to the Government Inspector of Factories and would lead to a better understanding between our industry and that department.

The suggested standardisation would not apply to one method only, but would embrace all the recognised present-day methods of wiring both for power and lighting.

It is to this end, therefore, that the Committee has been at work, and as there is a tremendous amount of work to be done yet, it is hoped that the members attending this Congress will endorse the Committee's views so that the work to be done can be handed over to the incoming Committee with the mandate "carry on."

It is also hoped that the owners, managers, and engineers of the various factories attached to the industry will make full use of this Committee when advice or past experience is required regard Electrical Plant in Sugar Factories.

F. B. MACBETH.
J. B. WYLES.
D. HESLOP.
E. P. HEDLEY.
A. B. BLACKLAWS (Convener).

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Mr. WILSON: Thank you Mr. Heslop we will combine the discussion of this report along with the discussion on Mr. Wyles' paper.

Mr. B. GRANT: I would like to mention one point. I see no mention of cane knives. I think a couple of years ago I was told that cane knives were not suitable for a drive by an Auto Synchronous Motor.

Also the best point in the factory for installing that type of motor where the varying power used little effect on the Power Factor.

Mr. WYLES: Mr. Godfrey would like to see the inclusion of graphs and a more detailed description of performance. Well, on every Engineer's table

in the mills you will always find Text Books and the Electrical Engineer's Year Book where these graphs and descriptions are given in great detail. I felt in preparing this paper I had to depart from the principle of the Year Book, and get something particularly applicable to the Sugar Industry to make the paper at all interesting, otherwise it would have been purely a summary of the subject which occupies a 3, 4 and 5 volume series of Text Books in a technical library. Graphs are extremely interesting, but to apply them to each particular motor and give its characteristics would appear to me to rather labour the paper and unless there is some particular application I did not see any reason to include the graph.

In reply to Mr. McNicol, I congratulate the firm he represents on having put forward an Auto Synchronous Machine for the drive. He must admit though, the Overseas Machinery Manufacturer has often only to supply in accordance with his own cryptic remark "Coupled to suitable electric motor and starter."

Where a motor is going to be in a position that requires a special application even such as a drip proof motor, it is too often found that when the order gets home the cheapest type of motor is sent out. The object of this paper is to persuade those forming the specification this side, to specify the type of motor required.

Mr. Grant refers to the application of the power factor correction Motor to cane knives. There is no reason at all why the Synchronous Induction Motor should not be used for that application. It is virtually a slip ring induction motor with a direct current winding superimposed on the rotor. Its characteristics are the same and where high torque is required, it can be applied in the same way as the induction motor.

Mr. SHUKER: I think probably Mr. Grant is getting after the same thing I should like to enquire about. I think probably his idea is where you have a bad power factor, and you wish to correct that to some extent, and you have two motors, say both of 250 h.p. and one is of a steady duty where there is no fluctuation on load and it is only run at 50% of the load it is capable of taking, and then you have a 250 h.p. fully loaded motor which is driving the cane knives. If you had the choice of laying aside one of these motors and putting in an Auto Synchronous Motor which would you discard?

Mr. WYLES: I should preferably disperse with both motors and put in power factor correction motors of the correct horse power.

Mr. SHUKER: If you could only discard one to be replaced by an Auto Synchronous Motor which would you discard to get the maximum benefit?

Mr. WYLES: The Motor that runs more continuously underloaded than the one running steadily

at full load. If it is a steady full load it has a high power factor and should be left alone. The motor running steadily underload has a low power factor.

Mr. McNICOL: In connection with the Auto Synchronous Motor for cane knife drives I wish to tell you that the selection of the motor for this particular duty and this particular mill was acquiesced in by the Management concerned, when the benefits to be derived were pointed out.

I should like a clear cut specification, because it stops all the back-street and back-door methods. If a man states clearly what he wants he will get it, but if you use your own judgment in the matter and say you will include so and so's gear you will get it. In this country all the large English Electrical firms are well and capably represented both on the commercial and technical sides and so far as we are concerned we should prefer to leave the electrical side to the trained electrical Engineer. If we are asked to supply a motor we do it. I would rather have a clear cut specification. Some of the mills give a good idea of what they want and they get it. This remark applies to Natal Estates and probably one or two more mills, but the bulk simply leave the question open. If you could get them down to your way of thinking to get a specification, we would welcome it.

Dr. HEDLEY: I don't want to interrupt this discussion, but I want to tell you this, that some Managers and Directors have spoken to me in this particular connection, and there is creeping through the Industry a feeling that specifications for things should be drawn up. One particular company spoke very strongly on that point from both points of view, i.e., of getting what you want and obviating these back-door methods. From this point of view, the Electrical Committee can do a lot by laying down standards and seeing that the Engineers and Managers appreciate what is pointed out to them. I should like to see the Electrical Committee doing the kind of work Mr. Wyles suggests.

Mr. McNICOL: Whilst speaking of specifications, I will give you a particular case where everything is brought down to a clean cut definite specification, and that is the case with the Colonial Refining Co. of Australia. It does not matter what it is, everything is definitely laid down. A Mill, for example, was not to be less than a certain definite weight, and the specification as got out was clean cut. They have a man in London who goes and sees the stuff produced. It ties the Manufacturer up to a method of inspection. I should welcome it on the sugar side as well.

Mr. WILSON: It seems the remedy lies with the Electrical and Mechanical Engineer at the mill, and your Electrical Committee sums it up rather well in the last four paragraphs of the report. You are well aware electricity is playing quite a big part in the Industry to-day, and during the next five or ten years, I have no doubt it will play a much

bigger part. I think we should appoint a very strong Committee to draft a standard of specification in connection with the Industry.

I have with me a booklet issued by the Durban Corporation; it is the Electricity Supply By-laws, regulations and wiring regulations. They also issue what they call Durban Corporation Electrical Department Standard Specifications. Now any qualified Engineer can obtain copies of this for the sum of 5/- and on alterations being made to the various specifications, they send those specifications on to you at no extra charge. If you had a Committee together, they might be able to draw some formal specification up for the Industry. They need not be so stringent as the Electricity Supply Commission or the Durban Corporation, but they would get down to some sort of basis, and it would greatly relieve the responsibility on the machinery suppliers.

I think something should be done in connection with getting this Committee together with a view to drafting some form of standard specification in connection with the Industry. I should like to hear your views.

Mr. CAMDEN SMITH: I think a most useful purpose could be done in that direction. If a definite electrical specification was drawn up for the standard sugar factory, it would go a long way to standardising and improving the factories. As things are at present, each Factory works on its own lines. There are various different types of current used and so forth. In fact there is very little standardisation, and if the Committee took that as a main point, they would be serving a very good purpose. I put that forward as a recommendation.

Mr. GODFREY: This standard specification is all right for most conditions, but there is a vast difference between some mills and others. How would you mean a standard specification when, say, the type of Motor to be used was 30 horse-power. In some cases it might have to be of the wound rotor type. Take our Company, where we should be in a position to put in a much cheaper type of motor. On the smaller mill, with a small power at the back of it, they would have to put in a much more expensive type.

Mr. WILSON: That was my idea in suggesting the appointment of a strong Committee to take this matter up, because you would have to take into account both the large and the small concerns.

Mr. GODFREY: While on this matter of specifications, you invariably get somewhat near what you want, but sometimes you don't, but we see we get it altered. I think it would be an excellent idea if the designers, particularly the designers of switch gear and starting equipment would come into the Industry (such as the Sugar Industry) where you get this burnt carbon floating about and juice drip-

ping down. Probably the designs would then be altered. You can take the present day starter. It is too compact and cut down in size. It makes it very awkward for testing purposes. The designer in my opinion has had very little experience, or on the other hand he is only taking into consideration he is making something competitive.

Mr. PORTEOUS: I hesitated at first to get up on my feet and offer any criticism, or praise to Mr. Wyles on his most excellent paper, my reason being that it might be thought as propoganda for the E.S.C.

That map was compiled with the object of bringing to the notice of all phases of the sugar industry the idea behind the Commission's scheme. There is also an article I might say in the Year Book dealing generally with the application of such a scheme as we suggest, and I think it is well worth reading but it definitely draws up only the elementary form of the scheme.

Mr. Wyles has very ably described the result of the application of electricity in the Sugar Industry.

You have steam pipes all over the place coming from the Boiler plant to the steam units, and those pipes invariably have insulation of an inferior nature, so much so that the heat going into the atmosphere is excessive. I don't know whether Mr. Wyles has gone into it, but it would be a most interesting comparison to draw some conclusion of the heat loss in the Steam Pipes, etc., and then to consider the same amount of heat from the point of view of the Electrical Engineer. I think that would be a striking revelation of the losses taking place in one end of the factory and the other.

It is quite clear to me that there will be a tremendous amount of surplus steam in the factory available if it be completely electrified. You would have more steam than you could do with in the factory. It automatically brings down costs. You can see therefore, gentlemen, just how far any scheme the Commission proposes would go towards the complete rehabilitation of the whole Sugar Industry and the improvement in efficiency.

Even if the Industry did not care to connect itself at all with the Commission, we have an excellent example of the Natal Estates where a by-product plant is in commission and doing excellent work. We have Mr. Wilson's place too. It does not necessarily follow that the scheme will be ours. We are perfectly right in saying that the Commission are perfectly well able to take the surplus power any factory has available. I feel sure that the Industry as a whole cannot long delay the full consideration of the Commission's scheme. Mr. Wilson's remarks are the first indication we have had that the Industry is really interested in the Commission's scheme.

Mr. WILSON: I mentioned previously, if the Electricity Supply Commission would push ahead with the line to the North and South Coast, the Railway to the North and South Coast, no doubt other sugar mills would seriously consider linking up with them. It would be to their advantage.

Mr. McNICOL: I wish to take the subject of specifications from the other side, the suppliers' point of view. The issue of a specification of a general nature covering the main points of what is required would have been sufficient, but when the clients change their minds it is liable to cost a tremendous amount of money. You put your draughtsmen on the scheme and with all the work involved, it sometimes costs anything up to £400.

Mr. WILSON: Well, gentlemen, that concludes the discussion on Mr. Wyles' paper and the Report of the Electrical Committee. Mr. Wyles' paper I am sure will form a very fine contribution to our

proceedings, and we are very much indebted to him for coming along and giving this splendid paper.

Regarding the Electrical Committee, I am sure your Council will take up with the least possible delay your recommendations.

I thank the speakers who have contributed to the discussion and I ask you to join me in a hearty vote of thanks to Mr. Wyles for his paper.

Mr. WYLES: Thank you. There is one thing, gentlemen, I wish someone had criticised my applications in Appendix B. I would like some Engineers to go through those suggested applications and have them criticised.

Mr. WILSON: We should be very pleased to have written criticisms, and in all probability these will come before the Committee dealing with the matter.