RAILWAY PLANS.

Columbus Company to Reconstruct Its Electrical System – Substations to Be Installed at Nearly Every Car Barn.

(**Columbus Evening Dispatch, October 14, 1901**) – The Columbus Railway company is making arrangements to almost entirely reconstruct certain portions of their electrical system at a cost of nearly $75,000. The decision to do this is due to the continued increase in the loads of traffic handled by the company within the past few years and especially since the reduction in the price of tickets.

The feeder lines of the company placed in service when the electric cars supplanted the old mule style, remains about the same. When they were put in, they were large enough to accommodate the business of the company, but gradually, it has been found necessary to put in boosters or wires to feed the feeders and maintain the voltage far from the power stations of the company. This overloading of feeders has occasioned heavy loss in the transmission of power. In order to determine exactly what this average loss is, two watt-meters were calibrated together: one was then installed where the feeder line enters the power station, the other installed where the feeder taps the trolley: the difference in watts showing exactly the loss resulting in transmission both in overhead copper and ground return. Speaking on the subject, General Superintendent Hopkins said these meters have been installed for two weeks at a time under average conditions in outlying feeders such as would be affected by the installation of an alternating system. The results show the loss to be equivalent to the following percent, of total load for an average 18-hour day:

East Long street section, 23 percent;

East Oak street section, 31.2 percent;

East Main street section, 27.4 percent;

South High street section, 27.8 percent; and

North High street section (park not open), 25 percent.

Owing to the heavy peaks of loads from station to station the company has been unable to get accurate results showing loss, but from results obtained it is estimated that the average loss is 20 percent. The loss on the Westerville line varies from 40 percent during the summer months. During the periods of heavy load, when the maintaining of voltage is highly essential, the loss is far in excess of the above figures on all sections.

The entire feeder system of the road is now inadequate to meet the present demands and must be increased at once. It is, therefore, proposed to install an 850 K.W., 6,600 volt, 25 cycle, three-phase, revolving field generator directly connected to engine at the Spring street power station, together with necessary exciter, generator panel, and 6,600 volt line panels for controlling the three outgoing feeder lines. To

install a rotary converter substation at the Oak [street] and Rose avenue carhouse to handle the loads on all eastern lines: one at the Milo power station to handle the normal station load, using the steam plant now at this station for reserve; and a rotary substation at Minerva park to handle park business during summer months, and through Westerville business during winter months.

In addition to the above permanent stations, it is proposed to use a portable substation, to be located normally at the North High street carhouse to handle Olentangy park travel during the summer months, and when occasion demands. This station can be quickly moved to help out other substations.

With these substations installed, the following amounts of feeder wire would be [re]placed by substations and available for use in reinforcing direct current feeders not reached by substation feed:

Milo substation, 43,890 pounds;

Rose avenue substation, 35,530 pounds;

Westerville substation, 73,620 pounds;

total 153,040 pounds.

At eighteen cents per pound, this copper would represent a value of $27,547.20. Deducting the value of high-potential copper used in its place, $10,000.00, would leave $17,547.20 to be credited to the cost of substations and charged to the increase in the direct current feeder system, which will be ample for present needs.

The present feeder copper on the North High street circuit at the substation will be used for intermittent service only.

The cost of the proposed rotary substations is estimated as follows:

Milo station, $10,000;

Minerva, or Westerville station, $7,500;

North High street or portable station, $12,000;

Rose avenue substation, $10,000;

South High street substation (if installed), $7,500;

total cost of substation apparatus, $47,000.

To this should be credited $17,547.20, the difference between the cost of copper to be supplanted and high potential copper required, as this copper will be taken down and used for reinforcing sections still to be supplied by direct current. The investment being more than taken care of by economies resulting from increased capacity of direct current lines. This leaves an investment of $29,453, the interest that should be taken care of by the saving in loss due to transmission.

Assuming the value of a kilowatt hour of current at .6 of a cent, exclusive of fixed charges, the loss shown by watt meter readings on the sections to be fed by substations would amount to $5,363 yearly.

The plan above outlined for transmitting current to these districts should keep the loss well within fifteen percent between the main station and substation bus bars, even during periods of heavy load, which would result in a saving of $3,804 in the yearly transmission of average load from station to substation bus bar. From this should be deducted the loss from substation bus to the car. In this case, owing to the location of substations and interconnecting of direct current feeders, the loss will not exceed the loss now existing from the point where direct current feeders now tap, and where the wattmeter readings were taken to the car; hence, the company has $3,804 as the net savings in cost of power due to high tension transmission, being equivalent to 12.8 percent, on the investment, which, from a financial standpoint would seem to warrant the above outlined plan of transmission, without considering the greatly increased facilities for the handling of large crowds, the saving resulting in the transportation department due to the increased speed, and the ability to make future extensions of almost any magnitude without the attendant losses and a large outlay for copper necessary with the direct current.