Unevaluated Factors in Electrification

Operation of Electric Engines Reduces Maintenance Cost of Track and Equipment and Effects Improved Service Generally—Other Advantages Over Steam Locomotives

IN the current issue of the *Electric Journal*, Q. W. Hershey, heavy traction department Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa., outlines what he calls the "unevaluated factors of electrified railroad operation." In these he includes the items, favorable to electrification, which are not usually included in financial considerations, and which are in addition to the elimination of noise, dirt and smoke, limitations as to roadways in tunnels, etc., which were important factors in early electrifications. He states that it is possible now to calculate accurately whether or not electrification will be justified in any case by the resulting economy, but he also directs attention to the following matters which have an indirect economic bearing on the problem.

As compared with the steam locomotive, the easier riding qualities of the electric engines, the more uniform distribution of driver weight, and the less nosing and track pounding, all result in lower track maintenance costs. These qualities result from the flexibility of truck and cab arrangement, the less weight of side rods, the uniform wheel effort, etc.

Due to the uniform propulsive effort, the electric engine will deliver greater drawbar pull per driver weight than the steam locomotive, and if one truck slips, the other trucks can absorb the lost effort. The nicely graduated tractive effort within the control of the engineman in the electric engine contributes to lower maintenance costs of trailing equipment.

Regenerative braking has proved to be one of the most important features of the electric engine. It removes the strain from the cars of trailing equipment and eliminates the dissipation of energy through friction, resulting in a decrease in tire wear; it eliminates troubles from hot tires, and decreases the maintenance cost of air equipment. In addition, the jarring of trains due to letting down air on long grades, with all of its consequent troubles and cost, is eliminated. Further, the engineman has at his command for emergency purposes a fully-charged train line. There is also less necessity for outside riding on the part of brakemen for the purpose of setting up retainers on long, light trains descending grades, and finally, the return of power to the line effects a very considerable economy.

Double-end operation of the locomotive, eliminating all turning, lessens congestion and facilitates dispatching due to the increased flexibility.

With the higher speed usually resulting from electrification, block signals can be set farther apart, with resulting decreased maintenance cost, and freer operating conditions along the line.

In tunnels there are better operating conditions, making higher speed possible, due to the absence of moisture which, combining with the gases of the steam locomotive, usually produces bad trackage.

The operating efficiency of the electric engine is high due to several factors. As the generation of power is transferred to the power station, where the factors are constant, the irregularities of the locomotive as a power generating plant are eliminated, as the engineman deals only with the manipulation of levers. Having at his command an unlimited amount of power, he is under no strain to keep the equipment in condition to give high efficiency. The amount of inspection necessary with the electric engine is less than with the steam engine, and the engines may be on the tracks longer, thus decreasing the necessary amount of equipment. Double-end operation makes the electric engine more adaptable for switching operation.

The release of the engineman from the strain of maintaining the mechanism, and the physical comfort of the engineman and his fireman during winter and summer, are conducive to safe operation.

The possibility of indicating the power drawn in the motor circuit by means of meters mounted in plain view along with the air gages, facilitates intelligent operation of the engine. At the same time, the generally better tractive conditions render fewer extra starts necessary.

From the standpoint of safety, the engineer's position in the electric locomotive, combined with the absence of steam and smoke, which might obstruct his view of signals and roadway, conduce to the reduction of accidents. Thus not only does additional security result, but the necessity for slow-downs to see signals is eliminated.

Finally, there is a general upbuilding of the community in which an electrified road operates, due to the better service.

Mr. Hershey points out that there have never been any very serious troubles in starting an electric system, and the railroad organization has always been able to meet the new problems resulting. The financial results of electrification have always exceeded the expectations, and this is attributable to the "unevaluated factors" outlined above.

Railway Companies to Distribute Safety-First Primers

Considerable interest is being manifested by the street railway companies in the children's illustrated safety-first primer, which was recently prepared by the Safety First Federation of America, New York, and which contains appropriate stories, rhymes and colored illustrations for vividly featuring to children the dangers of trolley cars, automobiles and fires. A number of operating companies are seriously contemplating distribution of large quantities of the primers and the safety society has lately received orders for 1000 copies from the Elmira Water, Light & Railroad Company, Elmira, N. Y., and for 500 copies from the Union Traction Company of Indiana, Anderson, Ind. The title covers of these primers when distributed will bear the name of the railway company instigating the campaign. Plans are also being made by the Federation, which have been approved by the New York Board of Education, for the distribution of 500,000 copies of these primers in the city of New York.

F. H. Elliott, executive secretary of the Safety First Federation, strongly urges the co-operation of local chambers of commerce, public safety committees and other organizations and individuals interested, with the street railways, in subscribing for the primers, because the books contain general safety rules that the whole public would naturally feel a vital interest in enforcing. Mr. Elliott, furthermore, favors the distribution of the primers by an organization which is outside of the railway companies, because the public then will not be inclined to be skeptical of the sincerity of the motives underlying the campaign.

The New York *Commercial* of Feb. 16 had a three-column article describing H. M. Byllesby & Company and the Standard Gas & Electric Company and the Northern States Power Company. In connection with the latter two organizations, the growth of the properties was shown in earnings and connected load figures.