WATER POWER TO AID RAILROAD GROWTH

"White Coal" to Be Most Important Single Element in Advancing Efficiency.

TO HELP ELECTRIFICATION

Operation of Trains With Great Speed, Comfort and Economy Making Amazing Progress.

"White coal," the term used by the electrical engineering fraternity to signify water power, bids fair to be the most important single element in advancing the efficiency of the transportation systems of America during the next century, in the opinion of railroad leaders. The work of corralling a powerful supply of water and utilizing it—by producing electricity—to run trains with admittedly greater certainty, speed and comfort than with steam has progressed with amazing rapidity, and at present constitutes a problem which every executive of a major railroad in the country is studying.

The announcement of President Ralph Budd of the Great Northern last week outlining plans for the electrification of his company's lines throughout certain of the Rocky Mountain districts as soon as financial arrangements can be consummated, caused renewed discussion of the situation in railway circles. While this work is not expected to begin until 1924 it is considered as significant of what may be expected from other railways.

A survey of the electrification of railway lines shows at least eight companies which either have considerable of accomplishment to their credit along this line or have ambitious programs in view. The Chicago, Milwaukee & St. Paul, with its 660 miles of electrified lines through the mountain region of Montana, is generally conceded to be the pioneer; the New York, New Haven & Hartford in its expansive electrification program; the Baltimore & Ohio with its five-mile electrified tunnel through Baltimore; the New York Central and Pennsylvania with electrification at numerous points where traffic is dense; the Norfolk & Western; Illinois Central, particularly around Chicago; Atchison, Topeka & Santa Fé, and Great Northern constitute the carriers that are responsible for the bulk of this form of transportation development in America.

Plans for Present Limited.

Plans for the actual continuance of this work are at present limited to the Santa Fé in some of its far-western sections, the Illinois Central in and around Chicago, and the New York Central, which will electrify its lines into its new $60,000,000 passenger terminal at Cleveland to be erected soon.

Many of these railroads, of course, are not enabled to use "white coal" in generating their electrical power, because of the absence of latent water reserves, but are required to fall back on coal. In the case of the St. Paul, however, the distribution of natural resources made water power the most feasible element for producing the energy needed in the quest for lower operating costs and more efficiency.

"The progress in electrification accomplished by the Chicago, Milwaukee & St. Paul Railway is the greatest single step made in this field in any part of the world," according to the officials of the General Electric Company, who with Westinghouse manufacture the equipment for the carrier. "In many ways this work has been unique in the history of the application of electricity to the haulage of main line trains. With the exception of the Butte, Anaconda & Pacific Railway, no other heavy traffic road has turned to electricity solely for the purpose of reducing operating costs and for expediting traffic over its lines. In the earlier projects like the Baltimore & Ohio belt line lectrification, Cascade Tunnel on the Great Northern Railway, the New York, New Haven & Hartford and the New York Central lines entering New York City, the Hoosac Tunnel section of the Boston & Maine Railroad and others; electrification has been undertaken as a necessity because of tunnel and terminal operation which made the use of steam locomotives extremely objectionable, if not impossible."

Initial Work of C., M. & St. P.

The initial electrification of the Chicago, Milwaukee & St. Paul included the conversion of four steam engine divisions extending from Harlowton, Mont., to Avery, Idaho, a distance of 440 miles. Electric service was started in December, 1915, and was gradually extended over the entire Rocky Mountain and Missoula divisions, steam engines being entirely superseded about a year later. In the Fall of 1919 electrical operation began on the coast and Columbia divisions extending from Orthello, Wash., to the Pacific Coast, a distance of more than 200 miles.

During the first few months of operation, the late C. A. Goodnow, Vice President of the company, in charge of the electrification, said:

"Our electrification has been tested by the worst Winter in the memory of modern railroaders. There were times when every steam locomotive in the Rocky Mountain district was frozen, but the electric locomotive went right along. Electrification has in every way exceeded our expectations. This is so, not only as respects tonnage handled and mileage made, but also the regularity of operation."

While the actual work of placing poles and wires along the right of way is comparatively small, the necessity of the retirement of certain steam facilities naturally brings the cost of railway electrification to a high figure. An electric locomotive unit now costs about $150,000 as compared with about $50,000 for a steam locomotive, according to computations of R. J. Marony, Vice President of the St. Paul. This figure, however, does not include the investment hazard which is an inherent part of such an undertaking, the executive pointed out. St. Paul's electrification is operated entirely from "white coal" hydro-electric power generated at the several plants of the Montana Power Company. It is understood that the Great Northern will also obtain its power from the Montana company.

Density of traffic is the controlling factor in railroad electrification, according to engineers who have made a life study of the problem. W. S. Murray, who electrified the New Haven lines, has summarized his views in his recent "superpower" report to the United States Geological Survey. This report, done at the instance of the Department of the Interior, describes a system that would furnish power to the railroads and the industries within the territory between Boston and Washington that has now become more familiarly known as the superpower zone.

"A considerable saving in time and, hence, an increase in capacity will be made by lengthening the operating divisions, which will be from 200 to 400 miles long instead of 100 miles. An electric passenger locomotive will run in the morning from New York to Boston and will return in the afternoon or at night, making a total run of 450 miles a day. A similar round trip will be made between New York and Washington, or New York and Syracuse. The electric locomotive can be kept at work on the road for twenty hours a day and, if operated at an average speed of twenty-five miles an hour, can run 500 miles a day.

"Some of the advantages of electric operation," says Mr. Murray, "are the conservation of national resources, both of coal and labor; an increase in the capacity of main and yard tracks; an improvement of the physical condition of terminals and an increase in the value of the property, as shown by the New York Central and Pennsylvania terminals in New York City; benefits both to the traveling public and to residents along the route through the elimination of noise and smoke, the possibility of providing multiple-level terminals and freight warehouses; and economy in operation through the use of fuel and machinery for generating energy by a few skilled operators in economical stations as contrasted with a large number of technically ignorant operators with small, uneconomical machines.

"The availability of the electric locomotive for service is at least twice as great as that of the steam locomotive. It requires no water, fuel stations, ashpits or turntables. The repair shop capacity required is less than a third of that needed for steam locomotives. The expense of track maintenance is reduced, and the ballast is cleaner. The engine house expense is reduced nearly to a negligible amount. In the electric locomotive energy can be regenerated where the profile permits it, thus saving some energy and much wear of brake shoes, bettering the handling of trains, and consequently saving expense in freight car maintenance."

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