

the locomotives is from 25 to 50 per cent. greater than the steam locomotives which they replaced, and their reliability is indicated by the fact that the delays chargeable to motive power are less than 50 per cent. as compared with steam motive power.

Experience has shown that the fuel cost with electric operation is from 40 to 75 per cent. of that with steam operation. There are no standby losses. Prof. Goss has estimated that one-fifth of the coal burned under locomotive boilers is burned while the locomotives are standing on sidings, or in starting fires.

The first cost of electrification is high as compared with the first cost of steam motive power. The cost of steam motive power for the average steam road is about \$2,000 per mile of single track, while the cost of electric motive power runs from \$7,000 to \$12,000 per mile of single track. The cost of terminal electrifications may be even higher.

Power-house accident might put a whole railway system out of commission. The dependence of the electric locomotive on the power-house tends to make it inflexible in some respects.

Steam locomotives have passed through the development stages and are practically a standard product. They have developed to their present perfection through a period covering nearly a century. They are reliable and remarkably efficient, considering the conditions under which they operate, and their characteristics and limitations are well understood by a majority of the operating men. On the other hand, electric traction as applied to railway trains is scarcely two decades old. Progress in the electric arts has been so rapid during the past quarter of a century that apparatus which to-day represents best modern practice is likely to be on the scrap-heap tomorrow, not because it is worn out, but because it is obsolete.

Long-continued overloads overheat and burn out the electrical equipment. Such overloads are common in railway service and do not seriously injure a steam locomotive. If the overload on a steam locomotive is too great, it simply stops work, and no serious injury results.

As the rails are used as part of the main power circuit, the signal circuits for electric block signals and for interlocking plants are more complicated and expensive to maintain.

While no trainmen within the motor cars or locomotives have been killed or seriously injured, there have been a few fatalities among the men employed outside.

The losses, in a poorly-designed transmission and distribution may amount to as much as the power actually used to operate the trains.

In general it may be said that no one system of electric traction is best adapted to all classes of service. The direct current system seems best adapted to terminal work where a large number of trains are operated, and where, on account of the large number of stops per mile, rapid accelerations are necessary. On account of the denseness of the traffic the substations may economically be placed close together, and, as the distances are short, transmission losses are low. As far as fulfilling the general requirements of railway service is concerned, the series direct-current motor is the best motor available. But its use is limited because it cannot be operated at high voltages; low voltages on the trolley mean high line losses. Likewise, the alternating-current systems, with their high trolley voltages and low line losses, and motors which lack the powerful starting torque of the direct-current series motor, seem best adapted to long trunk-line service where the stops are few and the accelerating period is short as compared with the total time of the run.

Coast to Coast

Winnipeg, Man.—Excellent progress is reported upon the work of erection of the new Parliament buildings and court house at Winnipeg.

Brantford, Ont.—It is claimed that the C.P.R. will transform into an electrically operated road the new L.E. and N. Railway being constructed between Brantford and Lake Erie.

Owen Sound, Ont.—On August 1, plans for Owen Sound's drydock were filed with the Ottawa department of public works. The structure, which will be 775 feet long, will be the largest drydock on the Great Lakes.

Medicine Hat, Alta.—Several carloads of building materials have been delivered to the site of the Saskatchewan Bridge and Iron Company's factory; and the work of construction has started on the laying of brick and the erecting of the iron work.

Ottawa, Ont.—It is announced that the contract for the construction of the Morrisburg and Ottawa Electric Railway has been let; but further details concerning the contract will still be published. It is expected that the work on the line will commence very soon.

Revelstoke, B.C.—The automobile road which is being constructed to the summit in the Revelstoke national park is reaching completion. The work is starting at the upper end of the completed portion of the road, and 10 miles will be completed this summer at an estimated cost of \$27,000.

Ottawa, Ont.—A flow of water of the highest quality was struck recently at Ottawa, while excavation was proceeding for the furnace room of the new horticultural building in the city's exhibition grounds; and it is believed that by the opening of the exhibition, a supply can be piped to all parts of the grounds.

Toronto, Ont.—The new registry office which is to be constructed in Toronto, is estimated to cost \$400,000, and to be completed in 18 months. It is planned to be a 2-story structure with a basement, which is to contain a bindery in addition to regular equipment; and it will be as nearly fire-proof as possible.

West Vancouver, B.C.—The urgency of providing a water supply to West Vancouver is receiving the attention of the ratepayers and council of the municipality; and a report is to be made by the municipal engineer in the near future.

Quebec, Que.—About two weeks ago was commenced the work of setting in position the four shoes, upon which will rest the superstructure of the Quebec bridge, and which have been made by the St. Lawrence Bridge Company. Three cars were required to ship each shoe, and each has a weight of 404 tons and took 2 months to manufacture.

Brantford, Ont.—The hydro-electric branch line between Brant substation and Port Dover is to be commenced immediately. A new aluminum steel-covered cable has been completed by the commission between Brant substation and Dundas; and further protection is to be given to the city by the construction of a fourth series of cables from Niagara Falls to Dundas, according to a recent announcement made by the commission.

Fredericton, N.B.—Repairs are in progress on the road-bed of the Canada Eastern division of the I.C.R. New ties are being laid between Fredericton and Loggieville, and new sleepers are to be placed along the same portion of the line this month, as well as about 40 miles of 85-pound rails on different section of the same length of line. On the portion between Blackville and Derby Junction, 85-pound rails have already been installed.