

In regular service the duties are computed weekly on the coal basis, and are therefore records of plant efficiency. It is found that where the conditions are such that the engines can run at rated capacity on 24-hour service, the results compare favorably with those obtained at duty trials, but where the engines are not run continuously or operate below the rated capacity, or as frequently happens are subjected to both these handicaps, the duty is seriously affected and may be only from 50 to 75 per cent. of the trial duty, depending on conditions. The engines at the small pumping stations and the low-service pumping engines are particularly subject to these unfavorable conditions.

The efficiency of the boiler plant is satisfactory. All the larger boilers are of the internally fired fire tube type, and as the load is steady while the engines are running and the boilers have ample heating surface for the work, very little heat goes to waste.

Carefully conducted boiler tests have shown that the Belpaire boiler has a combined efficiency of boiler, furnace and grate of 80.3 per cent., and the Dean vertical boilers of 80.4 per cent. The horizontal tubular type boilers have shown efficiency of 74 per cent. under not particularly favorable circumstances.

In regular service the 109-inch Dean boilers gave for the year 1916 an average evaporation from and at 212° F. of 12.3 pounds of water per pound of coal. The horizontal tubular boilers show from 9.5 to 10 pounds evaporation.

These figures have proved stumbling blocks to certain worthy gentlemen who have proposed to install their fuel-saving devices and have guaranteed a 25 per cent. saving of coal.

The human element as represented by the pumping station force, particularly of the fire-room division, is of the greatest importance. Unceasing vigilance on the part of the supervising authority, careful selection of the help and firm but considerate treatment of the men is necessary to get the best results.

Many large corporations have adopted the policy of paying a bonus to the firemen, based on actual savings effected. This has in many cases effected a notable reduction in the fuel bill. This method, however, seems to be impracticable in state or municipal work.

In conclusion, a word of caution may not be out of place. While economy is desirable, it is well to remember that in the pumping service reliability is of paramount importance, and it does not seem good policy to endanger it by attempting to make small savings in machinery, supplies or labor.

CANADIAN ELECTRIC RAILWAY ASSOCIATION.

At the recent annual meeting of the Association held in the Windsor Hotel, Montreal, the following officers were elected for the ensuing year:—President, C. L. Wilson, assistant general manager, Toronto and York Radial Railway, Toronto; hon. secretary-treasurer, Acton Burrows, Toronto.

The Executive Committee is as follows:—J. D. Fraser, director and secretary-treasurer of the Ottawa Electric Railway, Ottawa; A. Gaboury, superintendent Montreal Tramways, Montreal; E. P. Coleman, Hamilton; G. Gordon Gale, vice-president and manager, Hull Electric Railway, Hull; J. S. Mackenzie, purchasing agent, Winnipeg Electric Railway, Winnipeg; H. G. Matthews, general manager, Quebec Railway, Light, Heat & Power Co., Quebec; E. L. Milliken, manager Cape Breton Electric Railway, Sydney, C.B., and Aubrey A. Burrows, Toronto.

CANADIAN ENGINEERS AT THE FRONT.

"Extraordinarily difficult conditions of transportation of men, munitions and supplies have been overcome under the direction of Canadian engineers," says Stewart Lyon, official correspondent for the Canadian Press, in a recent article written for Canadian daily newspapers.

"Engineers from allied countries who have visited Vimy Ridge and the region behind," says Mr. Lyon, "express profound admiration and amazement at the magnitude of the work done in a few months. Thousands of men built the waterworks plants, roads, etc., without which the conquest of the Ridge and the holding of it after its capture would have been impossible.

"The railway system begun by the French during the campaign of 1915, was reconstructed and brought into general use. Under the direction of Canadian engineers, galleries were constructed as quarters for the troops and dressing stations for the wounded. There were water pipes, and a supply for hundreds of thousands of men. There were also storage places for food and ammunition.

"Streams miles back, an abandoned coal shaft and a spring at Vimy Ridge, almost under the Boche lines, were the chief sources of supply. Forty-five miles of 4-inch pipe were laid sufficiently deep to protect them against shell fire.

"It has already been told in despatches of the tremendous labor involved in the construction and maintenance of roads and light railways. Some of the troubles were unique. Trees near the Front were cut down to provide material for plank roads but were found to be full of splinters of shells. Shrapnel and bullets played havoc with the teeth of the saws in the portable saw-mills, and as no saws with individual teeth could be obtained, the teeth had to be filed by hand after every break.

"The plank roads and light railways were the only possible means of getting supplies up to Vimy Ridge after our artillery had destroyed the German road system.

"Many breaks occurred in the railway in a single night, but section hands were ready in an instant to repair them. The result was an accumulation of thousands of pounds of projectiles ready for the day of the attack. During a single 24-hour period, 457 tons of explosives were carried on one light railway, which is believed to be a record on the battlefield for a position where the enemy could see every movement for miles behind the front. The result of these engineering devices was a decisive victory which forced Von Hindenburg to throw in reserves which he had hoped to use elsewhere in an offensive. The work of the Canadian engineers helped materially to bring about this result."

The following is a list of Canadian patents recently issued through the agency of Messrs. Ridout and Maybee, 59 Yonge St., Toronto, from whom further particulars may be obtained: William G. Stephenson, coupling devices or apparatus for the vestibules or gangways of corridor rolling stock for railways; Dean S. Harley, portable fire escape; Chapman Double Ball Bearing Co. of Canada, Limited, elevating trucks; Sebastian Z. de Ferranti, electrical transformers; Francis E. Matthews and Edward H. Strange, process for the purification of unsaturated hydro-carbons containing the conjugated double bond; Thomas K. Irwin, treatment of sewage and other waste liquids; Elwood Grissinger, telephone systems; Toronto Type Foundry Co., Limited, thread milling and chamfering attachment for lathes.