Volume 26. Toronto, June 11th, 1914

Contents of this issue on page 3

The Canadian Engineer

A weekly paper for engineers and engineering-contractors

DEAD WEIGHT AND LIVE LOAD

SOME COMPARISONS OF WEIGHTS AND CAPACITIES IN THE FREIGHT AND PASSENGER SERVICE OF RAILROADS IN CANADA, GREAT BRITAIN AND UNITED STATES.

By GEORGE SHERWOOD HODGINS, A.S.M.E.,
Assistant Engineer (Mechanical Department) National Transcontinental Railway.

WHEN one drops a letter into a post-box he seldom reflects that part of what he pays for with the two-cent stamp is really to facilitate handling, and has nothing to do with the subject of his communication. An ordinary business man's envelope for "letter-size" paper is probably about one-twelfth of an ounce and each sheet of paper is possible one-sixteenth of an ounce in weight. It therefore happens that one envelope may contain fourteen sheets of paper, and the whole be below the one ounce which goes for two cents. If this proportion is true, the weight of the envelope is to its contents as 1 is to 14, or, roughly, about seven per cent.

When it comes to the ratio of dead weight or tare to capacity or live load or paying weight, in connection with railway cars, the same style of reasoning applies. The vehicle is the envelope and the paying load is the letter, and the more "letter" you can send and the less "envelope" required the better you are off, because you have less "incidental" expense in the matter. The tare and capacity of cars used here and in the United States differs from those of Great Britain, because the kind of traffic and the method of handling commodities in the countries differ very considerably.

Here and in the United States, the traffic is carried most frequently in box cars, which are permanently roofed and weather-proof. Rough freight or heavy materials are carried in gondolas or on flats. The haulage of shipments of coal, ore or other rough freight often takes place in localities where a huge consignment is carried for long distances without breaking bulk. Freight carried in box or refrigerator cars is best handled where "car-load" lots are insisted on, so that the vehicle may "earn" as much as possible when in service.

In the United Kingdom freight traffic approximates more to what we would call a "magnified express business." A merchant in Manchester, for example, may order a small consignment from a London house, perhaps by wire, and expects his goods to reach him on the following day. Knowing that he can get what he wants on short notice, he probably keeps only a small stock on hand in any case, and the railway company must handle this kind of business without attempting to hold their wagons for "car-load" lots. In fact, the 10-ton capacity goods wagon in England carries, on the average, about three tons.

A year or so ago, a writer in the "American Railway Number" of the London Times, said that "the modern freight car carried 2½ times its own weight and a train of the largest freight cars will transport to the sea-board the product of 5,000 acres of wheat fields." This is, of course, a splendid performance, but the cars carrying 2½ times their own weight have a percentage of tare to contents of 40 per cent. This is much above the post office rate, but it must be remembered that the paper envelope in the mails only makes one trip and is then destroyed, whereas the railway vehicle goes over the road many times and carries a large number of consignments before being relegated to the scrap heap.

Bulletin No. 31, issued by the Bureau of Railway Economics at Washington, D.C., gives the increase of freight car capacity as 28 tons in 1902, up to 36 tons in 1910. This is an increase of a ton a year. The increase has been brought about by the growth in the volume of business in the United States, and the appearance of steady improvement, then apparent, gave rise to the humorous couplet:

"Dear little box-car, don't you cry,
You'll be a freight-house by and by."

The freight-house on wheels, however, never materialized and much of the prosperity of the Republic was destroyed by laws directed against railroads, enacted by State legislatures which were dominated by a spirit hostile to the "common carrier." There is, however, a reasonable prospect of the return of good times this year.

Our illustrations show, among others, some modern examples. A Norfolk and Western high-side steel hopper gondola, No. 76154, has a capacity of 115,000 lbs., and the tare weight is 41,800 lbs. This gives a ratio of "envelope" to "letter" of 36.3 per cent. The North-Eastern Railway of England, with an open steel wagon, No. 100090, like our gondolas, has a capacity of 40 long tons, or 89,600 lbs., and a tare of 16 long tons, 1 cwt., or 35,840 lbs. This gives a ratio of dead weight to paying load of 40 per cent.

C.P. Box No. 104554, when similarly examined, is seen to have a capacity of 80,000 lbs. and a tare of 38,300 lbs. This gives a ratio of tare to load of 48 per cent. London and South-Western open goods wagon No. 6641, of 15 tons capacity, 33,600 lbs., and tare of 14,784 lbs., gives a ratio of tare to load of 44 per cent. A.C.L. Box 130064, used for the carriage of automobiles, has a tare of 38,000 lbs. and a capacity of 60,000 lbs. The ratio between the two is, therefore, 63 per cent. It must be observed that this is what might almost be called a special car, as an automobile takes up space rather than weight.