Commission has advised the American railways to lengthen the time of their fast freight train schedules in order to enable them to lessen their operating expenses.

There is an economical load for a locomotive. What that load is can be determined only by experience and by a series of tests. The maximum tonnage may not be an economical load, especially on what is known as a low grade line. A locomotive given the maximum tonnage which it is capable of hauling on a line with grades of 4-10% of 1%, or less, would run into overtime, the fuel consumption would be excessive and it would probably be found that the last straw, speaking metaphorically, had broken the back of the locomotive camel. On the other hand, to underload locomotives in through freight service in both directions is an inexcusable waste.

When, by tests made with a dynamometer car, it has been determined what tonnage a locomotive of a certain tractive power is capable of hauling economically over the maximum grades on a subdivision, operating officials should insist upon locomotives being so loaded, at least in one direction, and under normal weather conditions. Low temperature, a heavy fall of snow, a greasy rail, or any atmospheric condition that will retard the movement of a train will warrant running with a reduced tonnage, so as to permit reasonably good time being made from the initial to the objective terminal. It does not pay to haul maximum tonnage at the expense of excessive fuel consumption and overtime.

Theoretically, locomotives should be given their full tonnage rating in both directions, but in practice it is found that this cannot be done, as usually there is a preponderance of traffic one way, and locomotives must run in the opposite direction with reduced tonnage in order to keep the freight moving. However, under the circumstances, if locomotives haul the maximum load in one direction, the results should be satisfactory.

It might be well to demonstrate the effect of running trains with greatly reduced tonnage. The following statement makes a comparison of actual results on a certain subdivision, the period A and B representing two summer months. During B the gross tonnage handled one mile was 87,008,449, and items indicated by X in A are based on this ton mileage:

Item	Period A	Period B
Average weight of train per mile	1,737 tons	2,133 tons
Train miles	50,136 x	40,876
Pounds coal used per train mile	129	128
Pounds coal per thousand tons hauled one mile...	75	61
Cost	$22,893.55x	$18,637.98
Saving		$ 4,255.57

The saving on this 125 mile subdivision was not due to any change in the physical characteristics of the road nor to the use of more powerful locomotive, but merely to a better loading of trains, and during the month the saving amounted to $4,255.57.

It will be observed that, although the average weight of train per mile during period B was 396 tons more than during A, the amount of coal consumed per train mile was approximately the same. This will not always follow, but the statement demonstrates clearly that if a locomotive is not overloaded, it will burn almost as much coal per mile when hauling 75% or 80% of its full tonnage as when it is loaded to its capacity. The same is true of wages and other engine and train supplies.

It is surprising the effect upon almost every operating item a small increase in the average load per loaded car would have. During 1913 the average weight of contents in loaded cars on all Canadian railways was 19 tons—a very small load when it is considered that the average carrying capacity was 32.14 tons. An increase in the average contents would result in a decrease in the number of cars required to carry the same volume of traffic, and fewer cars would lessen the cost of locomotives, train, yard and round-house service, as well as some other incidental expenses.

There is now a campaign on to increase the average weight of contents of loaded cars on the Eastern lines of the C.P.R. in 1915, the increase aimed at being 3 tons a car. Based upon the traffic handled in 1913, when the average weight of the contents of loaded cars was 20.15 tons, it is estimated that the increased average load would represent a saving in three items alone of not less than $800,000, as follows:

In locomotive and round house expenses	$ 99,608.50
In car repairs	282,367.65
In ton mileage	427,502.60
Total	$809,478.75

The question might well be asked: Is it possible to secure the additional tonnage? It cannot be done without the hearty and intelligent co-operation of the officers of the railway company and its employes, with the shippers and consignees; but there are many ways in which to increase the average load: only a few need, however be mentioned:

Select cars of large capacity for heavy freight. For 100,000 bush. of wheat, if 80,000 lb capacity cars were used, the cars would be loaded up to 88,000 lbs., and the whole shipment would be carried in 68 cars. To make the shipment in 60,000 lb capacity cars the cars would carry only 66,000 lbs. each and 91 cars would be used. In the former case the average weight of contents would be 44 tons. and in the latter only 33 tons. By using large cars the figures would be: Contents, 3,000 tons; tare. 1,274 tons; total, 4,274 tons. By using small cars the figures would be: Contents, 3,000 tons; tare, 1,558 tons; total, 4,558 tons. Therefore, under the second proposition, in addition to supplying grain door, switching, inspecting and hauling 23 extra cars, the locomotives would have to haul 284 additional tons of dead weight from the point of shipment to destination and back again.

Select smaller capacity cars for light and bulky freight. As the smaller capacity cars are approximately the same dimensions as the larger, and weigh 2 tons less, they are just as suitable for hay, furniture, oats, etc., and for such commodities it is profitable to use them.

Consignees who need but one car of freight at a time usually order the minimum car load, as per the freight classification. If the matter was properly represented to them, they might be induced to order in larger units.

When a shipper holds an order for several car loads of freight for the same consignee and destination, it should not be a difficult matter to persuade him to load the full order in the minimum number of cars.

Shippers and consignees who have suffered through car shortages in the past can be shown that the simplest way to prevent a recurrence of such a condition is by loading all cars to their full capacity. Not only will this plan avoid car shortages for a number of years to come, but it will prevent the congesting of terminals, which has also been the cause of a great deal of trouble to shippers and consignees in past years.

Another way to secure the maximum freight tonnage to the minimum tare and in the minimum number of cars is by avoiding the unnecessary movement of empty cars.

When the settlement for the use of foreign cars was on a mileage instead of a per diem basis, the principle that empties should be run in only one direction, and that opposite to the direction of the preponderance of traffic, was pretty generally adhered to. A cross movement of empties was then looked upon as exceedingly bad transportation. Since the change in the system, the penalty for holding foreign cars has been so heavy (at present 45c. per day) that under most circumstances it pays to send foreign cars home empty, even when to do so they must travel in the direction of traffic.

The necessity of moving foreign empties homeward promptly has, probably, had a tendency to weaken the hold which the transportation officer a few years ago had upon the principle of moving empties in one direction only. The principle, however, is as sound today as ever it was, but it is conceded that, under the changed conditions, it must often be departed from.

The direction in which empties should move is naturally that opposite to the movement of the preponderance of traffic. The cost in that direction is comparatively small, because the locomotives returning for loads are light enough to handle them and no additional locomotive mileage is necessary. When, however, empties are moved in the same direction as the balance of traffic, additional locomotive mileage is involved—but not only so, for the empties are being sent out of a territory where they are in demand, and for every such movement, an empty must be hauled in the opposite direction to take its place, except for cars of special classes and for which there is no suitable commodity.

A conservative estimate of the cost of hauling empty cars is 1½c. per car mile. If, therefore, an empty suitable for traffic is sent in the direction of the balance of tonnage, a distance of 300 miles, the total additional mileage involved is 600 miles at a cost of $9—a sum well worth trying to save.

During last year 24% of the car mileage on Canadian railways was empty. If by some means this percentage could be reduced to say 20% it would represent a large increase in the net earnings of our railways.

Reported Settlement of Detroit River Tunnel, Michigan Central Railroad.

A rumor came to our attention recently that the M. C. R. tunnel under the Detroit River was showing evidences of settlement. This tunnel is a structure of concrete of rectangular cross section and was built by floating successive steel caissons into position and filling in around them with concrete deposited under water. There would seem to be no reason why a tunnel of this type should be more liable to settlement than a circular tube tunnel, such as that under the St. Clair River, which is driven through clay very similar to that in which the Detroit tunnel lies.

We find upon inquiry that some settlement did take place during the construction of the Detroit tunnel before it was opened to traffic, and was found to be due to an enormous additional load upon the under side of the tunnel and thereby placed small amount of leakage coming through the floor of the tunnel. This had the effect of relieving the hydrostatic pressure on the foundation soil underlying the tunnel. Measures were at once taken to stop the leakage through the tunnel floor, and when this wa[illegible] done the settlement stopped. There has [illegible] no ascertainable settlement sinc[illegible] nel was opened to the operat[illegible] and the small amount of wa[illegible] into the tunnel is steadil[illegible] probably to the gradu[illegible] pores in the concrete [illegible] Engineering News.