

RELATION OF TRACTORS AND TRAILER TRAFFIC TO HIGHWAY DESIGN*

BY H. ELTINGE BREED

Consulting Highway Engineer, New York City

TRACTOR and trailer traffic is a sure thing. It is here to stay. There are registered in the United States today 35,000 trailers.. That is definite; so is their percentage of increase in the last two years,—over 100%. At this rate of increase we can plan for 500,000 or more tractors and trailers by the year 1930. The only uncertain factor is whether the rate of increase will itself increase, and how much. I personally believe that we should plan for at least double the number of tractors and trailers given above.

Events of the last two years have caused many doubts as to whether the great occasion always does produce the great man, but in this mechanical age of ours, the advent of the tractor and trailer is one indication that the great industrial need always produces the means to fulfill it.

Economic Situation

The crux of the economic situation as I see it is, even more than production, distribution of the products of the soil, of labor, of machines, and fairer distribution of the wealth that accrues from these products. The motor truck and the tractor and trailer have been developed to meet the need of distribution.

The railroads cannot meet this need; industries in the Middle West are being forced daily to shut down because of the shortage of freight cars for the transportation of material. Farmers the country over are frantic with anxiety about the movements of their crops. Congress, the Interstate Commerce Commission, the Car Service Bureau and many others squabble and muddle along with no prospect of adequate solution. Whatever relief we get this year and next will be from motor transportation.

Much as we need distribution, we need even more economy in distribution. It is appalling to realize that we, as consumers, pay from 3 to more than 10 times the actual cost of the finished article, be it manufactured or natural product. Whatever effects a saving in cost to the consumer is a national boon. Motor power for short-haul freight does effect such a saving. That, I believe, is the great reason for its rapid growth. Mr. Banham says: "I find that if we combine all the costs, such as additional crating, labor, etc., to make a less than carload shipment, the rate averages a dollar a hundred from Yonkers to Newark. If you take the same movement by motor trucks or tractor and trailer, with decreased boxing, weight and labor, the rate averages 20 cents. For 12 miles, then, there is a difference of 80 cents per hundred pounds in favor of the motor truck. The saving in time, in space for storage, in materials, are all in favor of transportation by motor."

Saving in Gasoline

There is also the very important saving in gasoline which results from the use of the tractors and trailer over the ordinary truck. The trailers make it possible for one tractor truck, one driver and one motor to do the work of three trucks. With the trucks they have met the industrial need. To-day, in the tie-up in New York harbor, they are coming to the rescue and moving the food-stuffs. More and more they are becoming to the great cities the strongest assurance of a sufficient food supply.

But in the uncertainty of highway design, motor transportation suffers a serious check. I say "uncertainty," because this spring improved roads went to pieces as they never did before. The Lincoln Highway, between Trenton and Philadelphia, completely busted up. Some people say that the damage was due to the hard winter. That I dis-

believe. Weather is a natural process that should not hurt a healthy protected organism, either human or highway.

The roads are organically wrong, because they are not designed for the loads they must bear. Unless they can sustain the necessary traffic, they do not fulfill their function. They hinder, instead of help, distribution. The savings effected by motor transportation more than offsets the cost of the roads that are essential to this transportation. The economic value of good roads to the country cannot be expressed wholly in terms of the dollar.

Adequate design of highways for tractor and trailer traffic means an immediate provision for three lines of traffic near all large cities and on all trunk routes, with possibility of an added 10 ft. longitudinally for the fourth line. For each line of traffic at least 9 ft. should be allowed. The additional width is necessary because tractors and trailers move at a speed of from 6 to 12 miles an hour, and other cars, going from 12 to 40 miles, must have room to pass.

Turns must be widened because of the greater length of the tractor and trailer, and curves must be super-elevated in order that they may keep in their own line of traffic.

Reduction of Grades

With the increasing cost of motor fuel, special attention must be given to reducing grades. To consumption of gasoline increases directly with an increase in grade. On a fairly level road, one can haul a heavier load for less fuel. This saving on main roads heavily travelled often compensates in two or three years for whatever additional cost is involved in reducing grades.

Because of the distribution of load over 6 to 8 wheels, and because of their slower movement, tractors and trailers are less hard in impact upon pavement than heavily loaded trucks. They would not require any greater strength of foundation or better type of surfacing than we would provide for regular heavy traffic, but all heavy traffic requires an adequate foundation and a durable type of pavement. A semi-durable pavement for heavy traffic is sheer waste.

I become more and more convinced, however, that the final success of road building depends upon the intelligence of the public. The public must not only demand good roads but must know enough about what constitutes good roads to act as a spur to the sometimes sluggish consciousness of engineers and contractors. Public knowledge prevents private graft.

Good roads require an alert, intelligent public, engineers with vision, and competent contractors. These factors, and the training in highway engineering that some universities are now giving, and the urgency of the need itself, will gradually produce highways that will be adequate to the demands of tractor and trailer traffic.

W. Reese has opened an office at 23 Steven St., Hamilton, Ont., representing "W.R." Patents, Ltd., of Leeds, Eng., manufacturers of CO₂ recorders, and the Hele-Shaw Patent Clutch Co. of Oldham, Eng. During the war Mr. Reese was inspecting engineer for the Imperial Government at the Armstrong-Whitworth plant in England, and previously he was in British Columbia as master mechanic for the Consolidated Mining & Smelting Co.

Education of the public with respect to the value of the highway as a public utility is being conducted in Virginia through the medium of moving pictures. In "Virginia's New Hour" it is proposed to show the modern road in action and to demonstrate its beneficial effects, not only upon the commercial and industrial activities of the state, but upon the whole range of life—social, religious and educational, taking in all walks of high and low degree. One of the fundamental points striven for is to turn the tide of youth back to the farm and to set in motion forces that will in due time result in placing a check upon the disproportion between the progress of the fields and that of the cities, between that of industries and that of agriculture.

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