The easy riding speed is dependent on the amount of the allowable elevation of the outer rail. If the maximum be set at 6 ins., this speed per hour would be:—

on a	3 degree curve	60	miles an hour
"	4 "	50	"
"	6 "	40	"
"	8 "	35	"
"	10 "	30	"

The safe or allowable speed would be 10 miles an hour greater.

With the track properly elevated, equipped with tie plates kept in good line and surface, and curves provided with proper easements, 10° curves are no more disagreeable to ride over at speed of 30 miles per hour than are 3° curves at 60 miles an hour.

The reduction in speed for one mile from 50 to 30 miles an hour only means the loss of 0.8 minutes. To take an extreme case—the Twentieth Century Limited runs from New York to Chicago, 980 miles, in 20 hours, or at an average of 49 miles an hour. The introduction of one hundred 10° curves, each one of which required a slacking of speed to 30 miles an hour for a distance of one mile would increase the running time of such a train by 80 minutes. Such an increase on a road 1,000 miles long would in nine cases out of ten have no ill effect. A 10° curve so long as to require the reduction of speed to an average of 30 miles an hour for a mile would in practice be a very rare occurrence.

It is evident the use of curves as sharp as 10° does not prohibit the employment of modern equipment or limit the haulage capacity of the locomotives. It has no effect on the speed of freight trains, or on passenger trains where the average speed including stops is not greater than 30 miles an hour. A few such curves only slightly affect the running time where speeds are high.

It is thus clear that a few curves not sharper than 10° are not objectionable on the very best roads where their use results in large savings. As they are not limiting, the use of one such curve is no justification for a second. The introduction of many of them, preventing the employment of high speeds for long distances, would certainly be objectionable, but an occasional one where large savings result is justifiable on even the highest class of road.

Wooden trestles to replace heavy rock borrow embankments should be used. Such trestles may be designed to safely carry the heaviest class of equipment. When protected by the installation of the best available water supply they are quite safe, and are good for ten years. Such temporary construction also gives time to ascertain the correct requirements for water ways in new countries where there is frequently a dearth of information as to rainfall, flow of streams, etc., and where unless unduly large water ways are left there is danger of washouts. This danger may be even greater than the danger from fire to wooden trestles. Their use instead of heavy rock borrow embankments is of great importance from an economic point of view. One dollar at 5% compound interest amounts in ten years to $1.63. If rock borrow costs on the original construction say $1.75 a cubic yard it will in ten years' time have amounted with interest to $2.85, while, under anything like ordinary conditions train hauled earth embankments on an operated road, made when the trestles require replacement, do not cost over 30c. per cubic yard, or less than one ninth of the total cost of a permanent rock embankment made during construction.

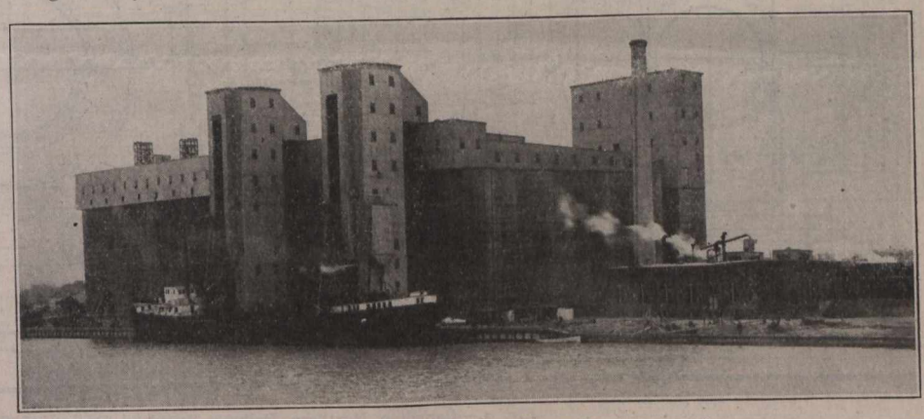
Momentum grades are a great source of saving in cost, without increasing the operating expenses. The use of momentum in overcrowding short stretches steeper than the ordinary ruling grade is almost always justifiable. The exception is where the traffic is so congested that the possibility of a delay due to the failure of an occasional train to surmount the grade is more important than the undoubted saving in interest charges which they insure. It will probably be many years before conditions prohibiting their use prevail on any portion of our Canadian railways.

The foregoing are a few of the more important considerations which the locating engineer should keep in view. He should always remember that railways are commercial enterprises, are built for profit, and that the investors are looking for and are entitled to satisfactory interest on their money; and so far as the returns on their investments depend on location they will for a given traffic be the greatest when the sum of the operating expenses and fixed charges is the least amount.

The foregoing formed the principal portion of Mr. Tye's address, as retiring President of the Canadian Society of Civil Engineers, at its annual meeting in Montreal recently.

Canadian Pacific Railway Elevator, Etc., at Port McNicoll.

Canadian Railway and Marine World for Jan., 1912, contained a very complete illustrated description of the C.P.R.'s new Georgian Bay terminal at Port McNicoll, Ont., including a 2,000,000 bush. elevator built in 1910. The business proved too large for the elevator by the time it had been in operation for only one year, and it was therefore decided to build an additional storage unit of the same capacity as the original elevator, making the total capacity 4,000,000 bush.



C.P.R. Elevator, Power House, etc., at Port McNicoll.

The new storage unit, which was completed in time to be entirely filled with the 1911 crop before the close of lake navigation, is a duplicate of the first. It is 179 ft. wide, and 226 ft. long, making the new length of the elevator 452 ft. Each unit contains 32 cylindrical bins 32 ft. 11 ins. in diameter, and 31 interspace bins; the bin walls are 80 ft. long. The entire structure is of steel and concrete. The two marine towers, which travel alongside the original elevator, fill the new storage in the same manner as they filled the first unit. The longitudinal conveyors receiving from the marine towers run the entire length of the two units. Grain for shipment from the new portion is conveyed through the basement of the first storage to the car shipping house. All machinery is electrically driven, power being generated in a steam plant built in connection with the original elevator.

The work was carried out under the direction of J. M. R. Fairbairn, Assistant Chief Engineer C.P.R., and C.W.P. Ramsey, Engineer of Construction, C.P.R., the contractors being the John S. Metcalf Co., Ltd., Montreal, and Chicago, who also built the first storage unit of 2,000,000 bush., as well as the car shipping house with a capacity of 200 cars in 10 hours, and also the following;—1,500 h.p. power plant, about 1 1-2 miles of wharves, flour shed, 700 ft. long, freight shed, 700 ft. long, Customs house, carpenter shop, coal platform, sleeping house and eating house for freight porters, pump house, fire protection and general water supply system.

Emergency Valve Location

The Board of Railway Commissioners at its sittings in Ottawa, Jan. 7, considered the advisability of standardizing the position of the emergency valve on passenger cars. In the course of the hearing, the standards of the different lines were outlined.

On the C.P.R., the emergency valve is located in the lavatory, with the handle extending out through the bulkhead, where it is readily accessible from the body of the car, meeting the contention raised that the valve and handle are both frequently located in the lavatory. On all cars over 60 ft., there is a valve in both ends, and on the mail, express and baggage cars, a communicating cord passes from end to end of the car in case the car should be filled up.

On the G.T.R. only one valve is employed, located in the women's lavatory, with the handle projecting through into the body of the car. When the valve is closed, the handle is in a perpendicular position, avoiding trouble from anyone hanging parcels on it and setting the brakes.

The Michigan Central places the valve in the men's lavatory, with the handle projecting through into the body of the car, a cord running through the car so that the valve may be operated from any position. In the latest type of car on that line, the whole valve is encased in metal to prevent tampering.

The Canadian Northern legal representative expressed the opinion that no objection would be raised to an order if it provided that the valve be located in the proper place where it could not be tampered with, and the handle be left accessible.

In view of the evidence submitted, the Chief Commissioner stated that there was no immediate necessity for action.

JOHN McCRAW, General Agent, Central Vermont Ry., New London, Conn., who was formerly in the Grand Trunk Railway service at Merritton, Ont., in remitting his renewal subscription, writes:—"To receive Canadian Railway and Marine World each month is just like getting a letter from home. I wish you continued success."