

connect directly with passenger accommodations on the pier. An incline is also to be built leading from the west side of this bridge to the wharf, giving access to the lower deck of the pier and freight sheds and the water front. Another viaduct over the tracks is to be built on the line of Burrard St. extended northerly, with an incline giving access to the present trans Pacific pier and other portions of the water front.

The main entrance of the passenger station will be on Cordova St. with the main waiting room located centrally in the station on the street level. Ticket offices serving the several classes of railway and steamship passengers will be located at one end of the waiting room, and the baggage checking room, luncheon and dining room, parcel room, women's waiting room, men's smoking room, news booth, information booth and other facilities will be all placed immediately adjoining the main waiting room.

On the lower floors of the station will be the baggage rooms, express company's space, immigrants' rooms, supply rooms, and other station facilities not directly used by passengers. Stairways and lifts will connect the two levels of the station and also afford communication with the office floor above. A separate foot bridge will be carried over the passenger tracks directly connected with the waiting room at one end and with stairways leading to the track level giving access to platforms without crossing tracks at grade. The track platforms will be 1,000 ft. long, and will be covered with shelter sheds of the umbrella type. The platform adjoining the station will be used only for baggage express and supplies.

Above the public rooms of the station building the space will be devoted to the company's offices. The interior arrangement of the office space will be adapted for a unit system of sub-division; that is, each panel will have heating and lighting facilities so that partitions may be placed or removed at will in order to provide for changes in arrangement of office accommodations which may be desired from time to time.

The proposed steamship station on the pier will be a two level building, the upper floor being devoted to the passenger business and offices and the lower floor to freight, baggage and express. There will be double level gangways on the west side of the pier, which will be used for the Victoria and Seattle service, the lower gangway being used for freight and the upper for passengers; these gangways to be supported on floating pontoons to maintain the landing at a constant level with respect to the boats. On the passenger or upper level of the pier will be waiting rooms, ticket offices, baggage checking room, customs office and other conveniences. Separate

at Vancouver are unusual as compared with other large terminals on account of the absence of suburban business. The aggregate number of trains is not large, but they are long and frequently are run in several sections and contain a number of classes of traffic.

The designs for the terminal have been prepared by Westinghouse, Church, Kerr and Co., in co-operation with C.P.R. officials, and the construction of the station and facilities is being carried out by the same organization.

Improved Design of Numbers for Headlights, Etc., on the C.P.R.

Owing to the rapidity with which numbers on locomotive headlights, locomotives, cars, etc., have to be read, and with all kinds of varying lights, it is of the utmost importance, and essential to safety, that they should be as plain as possible, and that all similarities should be got rid of. It is a well known fact

Ibsen		f	9 58	16 40	20.03
Lang		FN s	9 43	16.25	19 49
Milestone		W MI s	9 25	16 08	19.33
Corinne		NI f	9 13	15.55	19.20
Wilcox		CO s	9 01	15 44	19 10
Diana			8 50	15 33	19 00
Rouleau		W OA s	8 38	15 22	18.50
Pitman		f	8 25	15.08	18.37

Section of Working Time Table, C.P.R. Western Lines.

that the usual figures 3, 6 and 8 are not very distinctive and that they may be easily mistaken for one another.

With a view to remedying this, George Bury, Vice President and General Manager, Western Lines, C.P.R., has designed a series of letters which are certainly a great improvement on the ordinary ones and which it would be very difficult to mistake, as they appear to remove all possibility of error, the long loops in the 3's and 6's having been got rid of, while the difference between 5 and 6 has been made more marked.

The accompanying drawing shows the letters Mr. Bury has designed, which are being used on locomotive headlights and in working time tables on the Western Lines. A facsimile is also given of a section of a working time table, so that the figures may be compared with the ordinary ones.

It is probable that the new figures will also be used for locomotive cabs and tenders and for cars, and they may be adopted for the whole C.P.R. system.

Steel Bridges on the Grand Trunk Pacific Railway.

By J. G. Le Grand, Bridge Engineer, G.T.P.R.

Our bridges are designed in accordance with the specifications of the Department of Railways and Canals, to carry a live load to correspond to class "heavy" of the said specifications, viz., a moving load composed of two 180 ton compound engines followed by a train estimated at 4,750 lbs. per lineal foot of track.

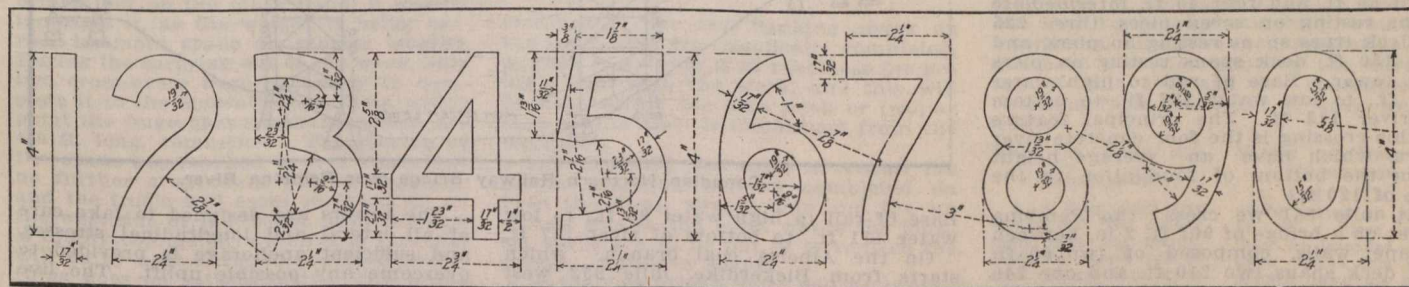
The story of a bridge can be summarized as follows:—Study of the crossing at site by the field engineers, who prepare a cross-section plan, also contour map showing the shape of the ground, kind of foundation, high and low water, velocities of stream, etc. When this information reaches the bridge department one or more general diagrams are prepared and stress diagrams of the different parts of the structure are studied. From these stress diagrams estimated weights are made and the cost of the whole crossing is computed; then comes the designing of the different parts of the substructure and superstructure. Bids are then called for, and when contracts are let complete sets of designs, both of substructure and superstructure, are sent to the bridge company, and set of substructure drawings sent to the field—then everything is supposed to go smoothly.

I will take in order a few of the bridges, beginning at Fort William, on our Lake Superior branch, then along the main line to Winnipeg, and west of Winnipeg as far as they have been built, followed by those on our branch lines.

At Fort William we have a bridge over the Kaministiquia River, 394 ft. 3 in. between parapet walls, composed of one 258 ft. swing span and one 125 ft. through truss span. This bridge has been designed to carry a single railway track and one roadway on each side, supported on brackets, each roadway capable of carrying an electric track. The distance from base of rail to water line is 33 ft., to the bottom of river 56 ft., and to rock line 95 ft. The principal feature of this bridge is that the centre pier has been carried down to rock line through a steel cofferdam 38 ft. in diameter and 63 ft. deep. This, I understand, sets a record for foundation made through open cofferdam under water. The pier between the swing span and the fixed span is composed of two twin cylinders 15 ft. in diameter, resting on two steel cofferdams 18 ft. in diameter, filled with concrete, and 65 ft. deep.

The next steel bridge on the Lake Superior branch, at the crossing of the Dog River, is 254 ft. long, composed of two 125 ft. deck spans and temporary wooden trestle on each end. Base of rail to high water is 39 ft., to low water 45 ft., and to river bottom 51 ft.

We next cross the Winnipeg River at



Locomotive Headlight Numbers used on C.P.R. Western Lines.

rooms will be provided for outgoing and incoming passengers. Two tracks will be placed on the surface of the pier within the shed, and one track on the outside of the building for the direct handling of freight between cars and steamers.

The essence of the general design has been to secure easy lines of communication between the railway trains, steamers and the city. The traffic conditions

The Huntsville, Lake of Bays and Lake Simcoe Navigation Co. is having an engine for one of its vessels compounded at the Polson Iron Works, Toronto.

The Dominion Government s.s. La Canadienne, which broke through the lock gates of the Welland canal at Port Colborne, June 20, was docked at Port Dalhousie for the repairing of two holes which were punched in her hull.

Minaki with a bridge about 410 ft. long, composed of one 300 ft. through span and one 100 ft. deck girder span. Base of rail to high water is 29 ft., to low water 33 ft., to river bottom 79 ft., which means about 50 ft. of water at high water.

Next we have a bridge over the Assiniboine River at Winnipeg, 468 ft. 8 in. between parapet walls, composed of one