

Canadian Railway and Marine World

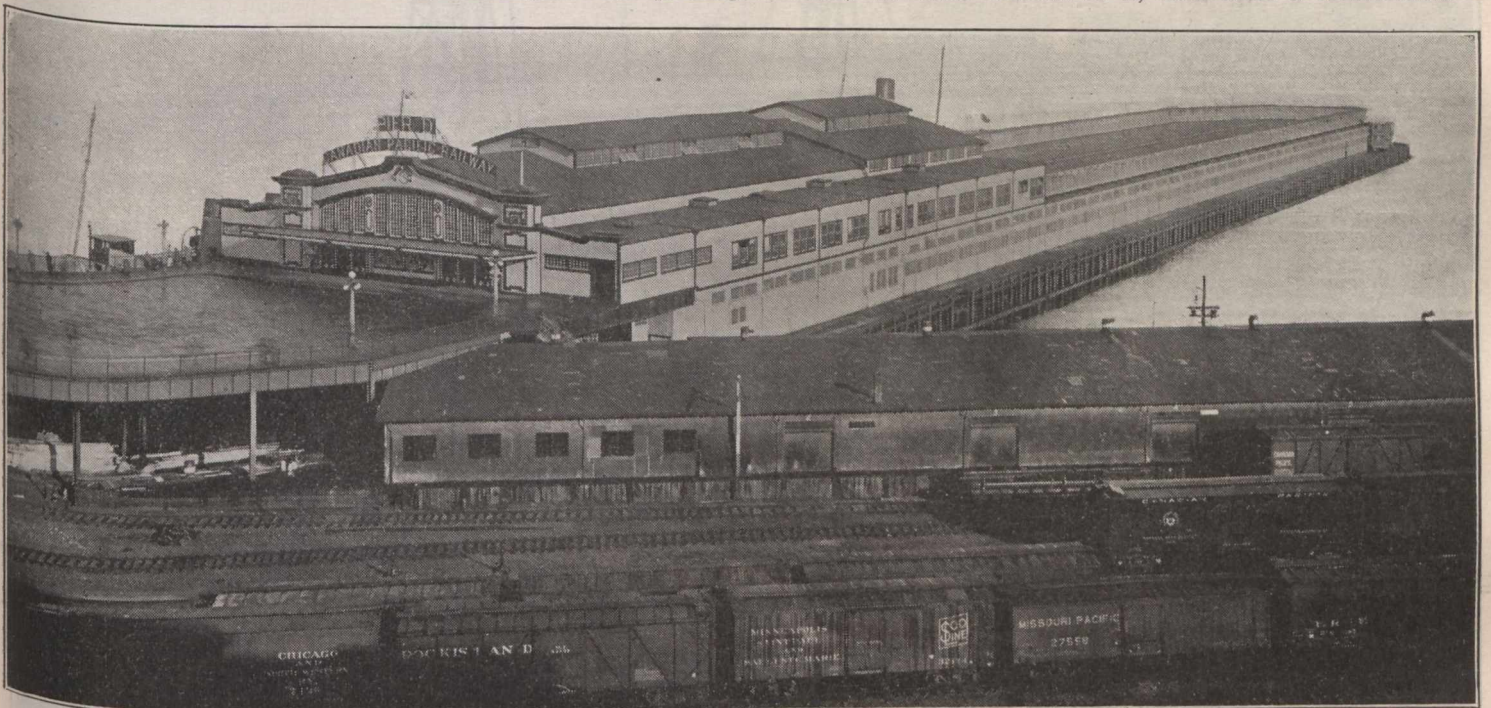
March, 1918.

The Extension of the Canadian Pacific Railway's Pier D at Vancouver.

The C.P.R. has had completed recently an extension to one of its piers at Vancouver, which makes the new pier one of the largest structures of the kind on the Pacific Coast. The extension was made necessary by the steady growth of coastwise and trans-Pacific traffic. The pier, which is known as Pier D, is located on Burrard Inlet at the foot of Granville St. It is a creosoted pile structure, and on account of the depths of water and mud encountered is of considerable interest from an engineering standpoint. The older portion of the pier was built in 1913 and measured approximately 376

feet long. The new extension, which is 537 feet long, is also installed, together with a standard gauge railway track which runs the entire length of the east side, and makes it possible to deliver open car freight directly under the ship's slings. The east and west sides of the pier are divided by a depressed standard gauge track, running down the centre of the pier and serving both sides. A one story shed, of heavy mill type construction, is built over the new pier, on top of which is a promenade, connected with the lower deck by stairways on the west and north sides. This promenade is designed for passenger traffic, but also

point of equilibrium was reached and no further settlement of the fill would occur. If at that time, an amount was dredged off the fill, roughly approximating the weight of the structure later to be placed upon it the ability of the underlying material to stand the load could be reasonably relied upon. Careful weekly soundings were kept over the entire area covered by the fill, as also along lines parallel to and outside of it. These soundings showed a slow, but fairly continuous, settlement on the part of the fill, and a slow corresponding rise at the bottom outside of it, until after a considerable



Canadian Pacific Railway Pier D, Vancouver, as completed.

ft. on the centre line by 150 ft. It carried a two story structure, the lower deck being devoted to freight, and the upper deck to passenger traffic and various offices for operating, customs and immigration officials. The primary use of the old pier was for coastwise traffic.

The extension measures approximately 537 x 150 ft. and runs to the harbor line. As the pier has two distinct uses, viz., for coastwise and trans-Pacific traffic, it is so designed, the west and north sides being primarily intended for the coast boats and the east side for trans-Pacific and miscellaneous freight traffic. The west and north sides have complete arrangements for berthing four coast steamships at one time. These arrangements comprise in general, separate freight elevators of the Barlow type for each boat and separate passenger ramps or stairways, each taking the passengers direct from the boat to the upper floor level, without interference with the freight traffic. The east side is designed with continuous sliding doors, giving openings as desired at any point along practically the entire length of the pier. Two heavy adjustable

frames for sight seeing purposes, as it affords a good view of Vancouver harbor.

The old pier was a creosoted pile structure, and a study established the desirability of making the new structure of the same general type. Test holes in or near the area of the extension showed depths of water from 40 to 70 ft. at mean low tide. The tide range is approximately 16 ft. The harbor bottom itself was a mixture of mud, silt, sand and shell, ranging from 10 to 30 ft. in depth, and below this strata of clay and gravel. Hardpan lay variously at from 70 to 140 ft. below low tide. It was apparent that a fill would have to be made, and the material for it was readily obtained from a dredging contractor who was making channel improvements at the First Narrows, about two miles from the pier site. About 250,000 cu. yds. of material were used. The fill had a dual purpose: first, to displace the soft harbor bottom, and second, to provide end and lateral support to the piles to be driven into it. The theory was that the fill would gradually both displace and compress the lighter and softer material beneath, until a

period no further settlement could be observed. As was expected, the part of the fill next to the old pier came to rest first, and permitted pile driving to be begun at a time when the outer portion of the fill was still in movement.

The type of substructure for the pier was fully considered and it was evident that creosoted wooden piling would be the cheap and logical solution of the problem. It was desired, so far as possible, to have the piling penetrate the fill, and rest on the harbor bottom beneath, thereby increasing the area of surface contact, as well as assuring full bearing power, and therefore safety, in case of any future movement on the part of the fill itself. To do this, piling lengths considerably over any known lengths for concrete piles were required. As the teredo is active in these waters a treated pile was necessary. Creosoted Douglas fir piles, with full 15 lb. treatment under boiling process, were therefore determined upon. All other established methods for pile preservation were, however, considered before final decision was made. The contract called for approximately 2,550 piles