

Progress of Work on the Quebec Bridge During the First Erection Season.

By H. P. Borden, Assistant to Chief Engineer.

During the past season substantial progress has been made toward the erection of the new Quebec Bridge. In spite of the fact that the actual start on the work of erecting the main trusses of the anchor arm was not made until the middle of July, 1914, over 80% of the north anchor arm, amounting to some 15,000 tons, has been entirely erected, and for the most part riveted. During the winter of 1913-1914, the traveler for this work was erected on the north shore, just clear of the abutment. On May 18, 1914, the traveler was completed and moved out over the approach span, which had been put in place the season before.

Falsework.—From a position over the north anchor pier a start was then made on the erection of the steel falsework extending between this pier and the north main pier. The erection of two systems of falsework was required at this point: (1) An inside falsework, which was required to support the floor of the bridge during erection and upon which the traveler and all erection equipment and plant were handled; (2) an outside falsework, entirely independent of the first, which supported the trusses of the anchor arm during erection. The inside falsework consisted of seven bents, braced laterally and horizontally, the traveler moving ahead panel by panel as each bent was erected. These seven bents, covering a distance of 500 ft., were erected in practically two months, or at the rate of one bent a week.

On July 15, 1914, a start was made on the erection of the shoes on the north main pier. These shoes, weighing 400 tons each, had been completely erected in the shop before shipment and all holes reamed out either in place or to template, and all parts accurately matchmarked and stamped, so that the assembling at the site went ahead very quickly. By Aug. 1 they were entirely assembled and sufficient rivets driven to allow a start to be made on the erection of the bottom chords.

Placing Bottom Chords.—According to the scheme of erection, the bottom chords as a whole were erected on the outside staging from main to anchor pier before any of the web members were erected in place. The average main panel length being 86 ft., it was necessary to erect the lower chord members in four pieces for each panel, there being a transverse as well as a longitudinal field splice (both vertical). A full panel of bottom chord near the shoe weighs approximately 400 tons per truss. By Sept. 28 these chords were erected, connected up with the bottom lateral system, and the web splices riveted. The traveler moved back toward the anchor pier as the work progressed.

Erecting Web Members.—When the traveler had finished the erection of the bottom chord, it was again moved forward to the main pier and the erection of the lower half of the web members (up to the point where the diagonals and the verticals intersect) was started. These diagonals, also on account of their weight, had to be erected in four pieces between main panel points, having a vertical as well as a longitudinal field splice. As their ends are pin-connected, the erection of this portion of the web system proceeded rapidly. Each diagonal was accurately trued up and all the rivets in the vertical web splices were driven for the connection before it was connected to the vertical. No difficulty whatever was met with in the erection of these members.

The lower half of this web system was fully erected back to the north anchor pier by Nov. 9, 1914. The anchorage bars were then put in place in the anchor pier and connected up to the eye-bar heads, which had been left extending above the masonry at the foot of the well. These bars were carried up and connected to the top of the end compression diagonal, which is held in position by a special steel strut resting on the anchor pier until such time as it receives stress from the weight of the cantilever arm.

The start on the upper portion of the web system, including the top-chord eye-bars, was made on Nov. 12, the traveler moving forward panel by panel toward the main pier as the work progressed. This work went ahead even faster than the lower half of the web system, as the compression verticals were shipped in one length, and very little riveting was required. Although the longer of the tension diagonals were shipped in two pieces, they were riveted together on the ground before they were erected in place, thus saving time in actual erection.

Top-Chord Eye-Bar Erection.—The top chords are composed of two banks of eye-bars. On account of the impossibility of getting eye-bars of sufficient length to span a full panel, they are erected in two lengths, supported on the centre by a small lattice truss, thus doing away with redundant members in the web system. The eye-bars are assembled in these trusses in the storage yard, the centre pins driven, and the whole panel of eye-bars erected as a complete member; thus only the end pins need to be driven to fully erect a whole section of the chord. The erection proceeded to panel point 10, or two full panels away from the main pier, where the work ceased for the season on Dec. 5. Owing to the excellent equipment of the erection traveler, the members for both trusses were erected simultaneously, which materially expedited the work.

The erection of one complete panel of the upper section of the web, with all pins driven, was the best single day's work during the season.

The St. Lawrence Bridge Co., of Montreal is the contractor for this work. Phelps Johnson is President; G. H. Duggan, Chief Engineer; George F. Porter, Engineer of Construction; W. B. Fortune, Superintendent of Erection; S. P. Mitchell, Consulting Engineer of Erection.—Engineering News.

At the annual meeting recently of the Dominion Bridge Co., which is largely interested in the St. Lawrence Bridge Co., it was stated that 42% of the steel of the Quebec Bridge had been fabricated and 18% erected. It is anticipated that the work will be finished on time and within the original cost estimates.

Railway Financial Issues in England in 1914.—During 1914, Canadian railways placed loans on the London market aggregating £11,545,000, as follows.—Canadian Northern Ry., 4% guaranteed debenture stock £3,000,000 at 94; Canadian Northern Western Ry., 4½% Alberta guaranteed first mortgage debenture stock, £1,320,000 at 93; Central Ry. of Canada first mortgage 5% bonds, £1,225,000 at 90; Grand Trunk Ry. perpetual 4% consolidated debenture stock, £1,500,000 at 90, and three year 5½% secured notes, £1,000,000 at 98½; Pacific Great Eastern Ry. first mortgage 4½% guaranteed debenture stock, £1,500,000 at 95.

Canadian Northern Railway Earnings, Etc.

Gross earnings, working expenses, net earnings, increases, or decreases, compared with those for 1913-14, from July 1, 1914:

	Gross Earnings	Expenses	Net Earnings	Increase or Decrease
July	\$1,594,800	\$1,163,800	\$430,500	x \$83,800
Aug.	1,367,700	1,123,000	244,700	x 163,900
Sept.	2,109,900	1,519,000	590,700	x 65,800
Oct.	1,895,300	1,332,100	563,200	x440,900
Nov.	1,670,200	1,123,100	547,100	x417,700
Dec.	1,329,100	908,000	423,100	200,900
	\$9,966,500	\$7,167,200	\$2,799,300	x\$1,241,400
Decr.	\$3,398,400	\$2,157,000	\$1,241,400

x Decrease.

Approximate earnings for three weeks ended Jan. 21, \$656,600, against \$1,040,700 for same period 1913.

Canadian Pacific Railway Earnings, Etc.

Gross earnings, working expenses, net earnings, increases, or decreases, compared with those of 1913-14, from July 1, 1914:

	Gross Earnings	Expenses	Net Earnings	Decrease
July	\$10,481,971.72	\$6,703,525.89	\$3,778,445.83	\$388 347.35
Aug.	8,917,764.33	6,554,606.63	3,373,157.70	597,981.54
Sept.	10,754,139.67	6,357,091.28	4,397,048.39	48,580.30
Oct.	9,282,923.49	5,361,600.13	3,921,323.36	2,281,529.43
Nov.	8,057,353.89	5,413,867.72	2,644,072.17	2,244,173.89

\$48,494,163.15 \$31,020,110.70 \$17,474,052.45 \$5,510,562.51
Dec. \$14,977,673.21 \$9,467,110.70 \$5,510,562.51

Approximate earnings for Dec., \$7,321,000 against \$11,695,000 for Dec., 1913; and for two weeks ended Jan. 14, \$2,637,000, against \$3,413,000 for same period 1913.

Grand Trunk Railway Earnings, Etc.

The following figures show the earnings of the G.T.R., G.T.W.R., and D.G.H. & M.R. for Nov., 1914, compared with Nov., 1913:—

Grand Trunk Railway (Including Canada Atlantic Ry.)			
	1914.	1913.	
Earnings	\$2,953,700	\$3,724,300	
Expenses	2,551,900	3,028,309	
Net earnings	\$401,800	\$696,000	
Grand Trunk Western Railway.			
Earnings	\$576,200	\$557,200	
Expenses	607,300	502,500	
	\$31,100*	\$74,700	
Detroit, Grand Haven & Milwaukee Ry.			
Earnings	\$240,400	\$241,900	
Expenses	227,600	210,200	
Net earnings	\$12,800	\$31,700	

*Deficit.

TRAFFIC RECEIPTS OF THE SYSTEM.

Aggregate traffic receipts from July 1 to Dec. 31, 1914:—

	1914	1913	Incr.	Decr.
G.T.R.	\$21,387,342	\$24,374,136	\$2,986,294
G.T.W.R.	3,752,189	3,717,877	\$34,312
D.G.H. & M.R.	1,389,801	1,347,427	42,374

Totals \$26,529,332 \$29,439,440 \$2,909,608

Approximate earnings for Dec., \$4,087,967, against \$4,761,352 Dec., 1913; and for two weeks ended Jan. 14, \$1,523,267, against \$1,607,187 for same period 1914.

Grand Trunk Pacific Railway Earnings.

The approximate earnings of the Prairie Section and Lake Superior Branch, 1,104 miles, for December were \$317,894, against \$554,926 for Dec., 1913. Aggregate earnings for six months ended Dec. 31, \$3,076,890, against \$4,293,114 for the same period 1913.

C.P.R.'s Algonquin Hotel.—It is expected that the reconstructed Algonquin Hotel, St. Andrews, N. B., will be ready for occupation June 15. It will contain 220 bedrooms, many with private baths attached. The dining room will be 112x41½ ft.; the general lounge 89½x21½ ft.; and the drawing room 38½x37 ft., with an extension of 21x17½ ft. There will be large verandahs.