MS 2072

[Collection of photographs, blueprints, specifications, cuttings articles etc, amassed by A H Tiltman, design engineer for the St Lawrence Bridge Co Ltd, re Quebec Bridge, 1907-1917]

A [Album of photographs of workshops, plate parts, machinery and Quebec Bridge under construction]

/1 Milling machine, machine shop

/2 Horizontal planing machine

/3 Vertical boring and drilling machine, machine shop

/4 Turret lathe, machine shop

/5 Double rotary facing machine

/6 Vertical boring machine with single web floorbeam bushing in position, machine shop

/7 Vertical boring and drilling machine, machine shop

/8 Transformer house, current transformed from 10,000 to 220 volts

/9 Boiler house

/10 Storage and shipping yard

/11 Model of traveller on anchor arm partially erected, testing area

/12 Storage and shipping yard

/13 Crane runway for handling unfabricated material

/14 Shipment of castings outside machine shop

/15 Plate edge planer

/16 Multiple punch

/17 Crane runway

/18 Plate shear, 84" wide

/19 Crane runway

/20 Double web floorbeam bushing, being finished (repr. C4.10)

/21	Switchboard
/22	Steam engine, power house
/23	Blacksmith's shop
/24	Riveting machine
/25	Traveller in position on partially erected cantilever arm
/26	Chord boring machine, boring floorbeam
/27	Eye bar boring machine in foreground; chord boring
/28	Manhole boring machine, shoe diaphragm in position
/29	View of model of bridge showing main portal
/30	General view of shops, crane runway in foreground
/31	Horizontal planes with truck stringer in position
/32	General view of shops, office building in foreground
/33	Pattern shop
/34	Small pin hole borer with approach span shoe in position
/35	Plate shear
/36	Batch of shoe pin plates with holes roughed out
/37	Horizontal planes, machine shop, approach span shoe in position
/38	Detail view of multiple punch with plate in position
/39	Slotting machine, machine shop, with casting machine to carry track stringer in position
/40	Riveting machine on floorbeam
/41	Model of bridge
/42	Plate edge planer and lower chord web plate
/43	Traveller, model in position on partially erected anchor arm
/44	Batch of single web floorbeams

/45	Manhole boring machine, roughing out holes in shoe pin plate
/46	Crane runway
/47	Surface planer, erection shed
/48	Milling machine, fitting stiffeners for floorbeams (repr. C4.4)
/49	Batch of sub-floorbeams
/50	Detail view of plate edge planer (repr. C4.4)
/51	Detail view of crimping machine
/52	View at site, electric motors for power house being hoisted into position
/53-54	View at site, partially completed north approach span
/55	------ " ------ north shore main pier
/56	------ " ------ north shore
/57	Cranes for carrying riveting machines
/58	Crane runway
/59	Main shop, partially erected, exterior
/60	---------- " ---------- interior
/61	---------- " ---------- exterior
/62-64	---------- " ---------- interior
/65	View of roof of main shop
/66	Cranes carrying riveting machines
/67	Angle shear
/68	Cranes carrying riveting machines
/69	General view of shops, crane runway in foreground
/70	Batch of single web floorbeams
/71	General view of shop, interior
/72	Horizontal travelling reamer with approach span member in position

/73	Erection shed and shipping yard
/74	North shore approach span
/75	General view of shops before completion, exterior
/76	South shore, finishing piers and abutments
/77	Old Quebec Bridge before collapse, south shore
/78	Truck for traveller
/79	Templet shop
/80	Air compressor plant, bridge site
/81	Grillage casting, in surface planer, erection shed
/82	General view at site
/83	Battery of drilling machines
/84	Grillage casting, in surface planer, erection shed
/85	Rib of shoe, partially assembled
/86	Detail view of shaft of chord borer on floorbeam (repr. C4)
/87	Air compressor, power house
/88	Multiple punch
/89	Templet for bottom chord gusset at AL12
/90	Bending machine
/91	Small pin hole borer
/92	Plate straightener
/93	Angle shear
/94	Bending machine
/95	Piano punch
/96	Approach span shoe
/97	Section of main shoe, being reamed
/98-99	---------- " ----------

/100 ---------- " ---------- on edges

/101 ---------- " ---------- in horizontal planing machine

/102 View of rail transport truck, in snow

/103 View of office buildings beneath crane runway

/104 Batch of single web floorbeams

/105 Men working on sections of main shoe

/106 ? George Porter, in office

/107 Group portrait of engineering and draughts personnel

/108-09 Inside the drawing office

/110 Section of bridge on site, dated May 11.15

/111 ---------- " ---------- dated June 4.15

/112 Detail view of section members on site, dated June 12-15

/113-15 View of shoe under construction

/116 View of shoe with lifting gear, bottom chord

/117 General view of shoe sections

/118 View of ends of shoe beams, bottom chord

/119 Side view of shoe plates

/120 View of beams and shoe

/121-22 View of chord section

/123 End view of shoe beams

/124 View of shoe section

/125 Workshop, interior

/126 ---------- " ---------- with (floor) beams

/127 Drilling machines

/128 Beams beneath cranes

/129 Model of bridge

/130	Beams and shoe section by crane runway
/131	Old Quebec Bridge after collapse, wreckage towards the main pier
/132	---------- " ---------- wreckage in front of laterals
/133	Detail side view of crimping machine
/134	View of drilling machinery and beams
/135	Front view of crimping machine
/136	Lattice arms in construction
/137	View of shoe section and machinery
/138	Detail view of shoe section showing rivets
/139	Workman in foreground of bridge arm sections
/140	Crimping and milling machines
/141	Erection shed, latticing and shoe sections, bottom laterals (repr. C4.7)
/142	General view of shed
/143	Cranes for carrying rivetting machines
/144	Rivetted beams
/145-6	Completed shoe beam
/147	Completed single web floorbeam
/148	Floorbeam on railway goods truck
/149	Cranes hoisting sections of shoe
/150	Cranes and shoe sections
/151	Bored plates awaiting rivets
/152	Riveted and latticed plates
/153	Sections of shoe plate members
/154-7	---------- " ---------- pedestal webs assembled for boring pin bearings (repr. C4.8)
/158	---------- " ---------- drilling holes in shoe

/159-64	---------- " ----------
/165	---------- " ---------- boring half-holes in main post shoe (repr. C4.4)
/166-8	---------- " ----------
/169	Plate edge planer
/170	Riveting machine by floorbeam
/171	Plate shear
/172	Office building
/173	Group portrait of engineers and draughts personnel
/174	Construction on site, lifting gear and girders on main post
/175	Bridge in construction, showing main portal
/176	Sunset view of complete bridge
/177-8	Detail view of lattice arms and girders of bridge on site
/179	View of completed cantilever span
/180	Central span of bridge into position on site pontoons
/181	Detail view of latticing on completed central span
/182	Wreckage of the new central span, © Chesterfield and McLaren, [Sept 1916] (repr. C5.2 & C5.3)
/183	Drawn impression of the completed new Quebec Bridge (repr. C4.6)

B [Blueprints, specifications, computations and data sheets for construction of Quebec Bridge]

1 Printed specifications for superstructure

1/1 1910 Board of engineers, Quebec Bridge. Preliminary specification for superstructure. [Issued Montreal Jan 1 by H E Vautelet, chief engineer. Stamped British Trade Commissioners, 21 Jan. Signed on cover 'A Hessell Tiltman']
8pp. + 3 blueprint drawings of cross-section of floor of St Lawrence River + addenda sheet insert

1/2 1910 ---------- " ---------- Specification for superstructure. [Issued Montreal Jun 1 by H E Vautelet, chief engineer. Stamped British Trade Commissioners, Jul 15. pp. 44-55 corrected in red ink. Signed on cover 'A Hessell Tiltman']
55pp. including contract and list of drawings exhibited

1/3 1911 ---------- " ---------- Specification for superstructure. [Issued Sept by C N Monsarrat, chairman & chief engineer. Stamped St Lawrence Bridge Co Limited. Signed on cover 'A Hessell Tiltman March 1st 1913']
41pp. including subject index

2 - Instructions for detailing Quebec Bridge. [Specifications for distances, plates, rivets, latticing etc. p.2 amended in ink]
Blueprint typescript 7pp.

3 1912 System of shipping marks, Quebec Bridge [undated]
System of assembling marks [Aug 23]
Blueprint typescript and handprinted (?) sheets

4 - "Exhibit A" carbon steel universal mill plates; "Exhibit B" carbon steel sheared plates; "Exhibit C" carbon steel universal mill plates; "Exhibit D" carbon steel sheared plates; "Exhibit E" nickel steel universal mill plates; "Exhibit F" nickel steel sheared plates. [Available thicknesses of low and high priced materials]
Blueprint typescript 6pp.

5 - Classified statement of expenditures on shop contracts, Quebec Bridge. [Columns entered in print for carbon and nickel steel; grand total estimated weight, carbon, 96,290,000; total, nickel, 33,265,000; contracts described nos. 101-149]
Printed ledger sheet (rest of ledger blank) 2 leaves

6	1907 Nov 1	American Bridge Company of New York. Standard eye-bars. [Specifications of thickness] Blueprint typescript 2pp
7	1912	Standards for rivets: heads, distances, stagger, values shearing and bearing, weight deductions Blueprint drawing and figure charts 8pp
8	1913	Pins: bending moments, bearing values and weights. [Ms. initialled calculated by AHT March 6th] 1 ms + 2 blueprint figure charts
9	-	Quebec Bridge. Estimate of cost of steel delivered at Rockfield shops. [Figures pencilled for aspects of contracts 101-148]
10	1913 Nov 21	Quebec Bridge. Estimate of weight/A H Tiltman. [Calculations, numbered M12, with handwritten amendments] Blueprints 4 sheets (1 blank)
11	1914 Jan 15	Quebec Bridge. Estimate of weight and selling price/ Tiltman. [Calculations, numbered M12A] Blueprint
12	1912	Bevels: [Instructions for system of showing bevels on shop drawings. Blueprints 2 sheets
13	1912	Latticing: end cuts, angles, lacing and lattice bars. [Instructions for system of showing latticing on drawings] Blueprints 3 sheets
14		Stress sheets
14/1	1913 Dec 1	Suspended span. Dead load concentrations and stresses/A H Tiltman Blueprint S102
14/2	1914 Jan 24	--------- " ---------- Main stress sheet [bears revision]/A H Tiltman Blueprint S103
14/3	1913 Nov 6	Cantilever arm. Dead load concentrations and stresses/A H Tiltman Blueprint S204
14/4	1913 Mar 31	-------- " --------- Main stress sheet/[signed] A H Tiltman Blueprint S205

14/5	1913 Oct 16	Anchor arm. Secondary stresses [bears 4 revisions]/A H Tiltman Blueprint S303
14/6	1913 Oct 13	------ " ------- Dead load concentrations and stresses/A H Tiltman Blueprint S304
14/7	1913 Jul 22	Stress sheet. Anchor arm [bears 2 revisions in Tiltman's hand]/J A Blueprint S305
14/8	1913 Dec 3	Anchor arm. Distortions for secondary stresses [bears 2 1914 revisions]/A H Tiltman Blueprint S310
15		Diagrams
15/1	1914 Feb 11	Anchor arm. Marking diagram - Panels, AO-A2-A4/A H Tiltman Blueprint A9
15/2	1911 May 18	Lengths of members (geometric) [bears 6 revisions, amendments in red ink]/E H K[enyon] Blueprint D2
15/3	1913 Mar 19	Anchor arm. Detail diagram and erection w[eigh]ts [bears two revisions]/B S Yerbury [initialled A H T] Blueprint D15
15/4	1914 Jan 8	Erection. Outside staging. Marking diagram/Edward Eriksen Blueprint EA10
15/5	1912 Dec 5	Lacing and tie plates in members of cantilever arm/ J A Blueprint M2
16		Contract drawings
16/1	1913 Sept 8	Anchor arm. Bottom chord L4-L5 [bears 2 revisions]/A H Tiltman Blueprint contract 114, drawing 4
16/2	1913 Apr 8	------ " ------- Bottom chord L8-L9 [bears red crayon revisions]/A H Tiltman. [Stamped 'Board of Engineers, 29 November 1913, St Lawrence Company, December 1913'. Reverse marked '2nd print from the Board' Blueprint contract 114, drawing 8
16/3	1913 Jun 3	------ " ------- Bottom chord L12-L13/A H Tiltman Blueprint contract 114, drawing 12

16/4	[1913] Sept 20	------ " ------- Diagonal posts AM12-AM13/S R T [&] G V D Blueprint contract 115, drawing 14
17	-	Quebec Bridge. [Cross section of bridge and bed of St Lawrence River] Blueprint
18	-	[Microphotographs of assorted blueprints. Visible using a magnifying glass, on many identification of the drawing number is impossible]

C		[Articles on Quebec Bridge construction, disasters and completion; miscellaneous cuttings and mss.]
1	1914 Jan 22	**Canadian Engineer 26** pp.207-11. The St Lawrence Bridge Company's shops
2	1913 May 22	**Canadian Machinery IX** pp.533-7. Plant of the St Lawrence Bridge Co Ltd
3		**Engineer**
3/1	1914 Jul 24	pp.89-92. Superstructure of the new Quebec Bridge + section of anchor arm members
3/2	1914 Jul 31	pp.119-20. Construction of Quebec Bridge members; supplement - photos of bottom chord, shoe, tension members
3/3	1915 Jan 29	pp.101-4. Progress of the new Quebec Bridge; supplement - erection of members on site, photos, 1914
3/4	1915 Oct 29	pp.416-7. Progress of erection of the new Quebec Bridge; supplement - photos of cantilever and pedestal, 1915
3/5	1916 Jun 16	pp.496-7, 504. The erection of Quebec Bridge; programe for season 1916. Photos on site
3/6	1917 Oct 19	pp.336, 338. The Quebec Bridge; hoisting central span into position. Photos on site
3/7	1917 Nov 9	pp.403-6. Erection of the suspended span of the Quebec Bridge [cont'd from article of Nov 2]; supplement - photos of hydraulic and screw jacks and pumping machinery
4		**Engineering Record**
4/1	1913 Sept 20	68/12, pp.321-4. Design of large bridges, with special reference to Quebec Bridge - Part I [of III]/Ralph Modjeski; supplement - folding insert diagram of the world's greatest cantilever bridges
4/2	1913 Sept 27	68/13, pp.354-6. Design of large bridges - Part II
4/3	1913 Oct 4	68/14, pp.383-5. Design of large bridges - Part III, + sections of large compression members
4/4	1914 Mar 14	69/11, pp.300-2. Fabrication of Quebec Bridge members

4/5	1914 Mar 21	69/12, pp.333-6. Ultimate strength of carbon and nickel steel models of Quebec Bridge members; [report on] destruction tests
4/6	1914 Mar 28	69/13, pp.366-7. Progress at site of Quebec Bridge
4/7	1914 Apr 18	69/16, pp.435-8. Important features of the new Quebec Bridge; Quebec Bridge anchor-arm spans
4/8	1914 Jun 13	69/24, pp.667-8. Main pedestals for new Quebec Bridge
4/9	1914 Jul 25	70/4, pp.110-2. Ultimate strength of carbon-steel models of Quebec Bridge members; [report on] destruction tests
4/10	1914 Aug 8	70/6, pp.160-1. Quebec Bridge girders and wind anchorage
4/11	1914 Sept 26	70/13, pp.354-5. Quebec Bridge anchor arm bottom chords
4/12	1914 Oct 10	70/15, pp.411-2. Quebec Bridge anchor arm diagonal and posts
4/13	1914 Nov 14	70/20, pp.541-3. Ultimate strength of carbon and nickel-steel models of Quebec Bridge members
4/14	1915 Jan 2	71/1, p.8. [Paragraph in article noting originality of Quebec Bridge]
4/15	1915 Jan 16	71/3, pp.80-1. Erection of new Quebec Bridge, north anchor arm
4/16	1915 Apr 17	71/16, pp.492-3. Provision for traction stresses in Quebec Bridge
4/17	1915 Jul 24	72/4, pp.93-4, 96-9. Safety first in bridge building. New methods evolved in building world's largest bridge (flying falsework, trusses) - photos
4/18	[1915 Nov]	72/21, p.643. News of the week feature: Progress up to schedule on Quebec Bridge erection at close of 1915 season; photo of south anchor arm and parts of north arms as of 9 Nov
5		Newspaper accounts of collapse, 1916
5/1	1916 Sept 16	p.19, The Standard (Montreal)
5/2	1916 Sept 23	pp.1-2, The Standard (Montreal) - photos
5/3	1916 Sept 26	p.1, The Daily Mirror (London) - photos

6		Newspaper accounts of the completed bridge, 1917
6/1	1917 Sept 22	p.1, The Standard (Montreal) - photo + details of cost and measurements
6/2	1917 Sept 29	p.1, The Standard (Montreal) - photos
6/3	1917 Nov 3	p.111, The Sphere - photos
7		Miscellaneous clippings: text and photos, sources unidentified, of rebuilding and completion (13 items)
8	[1927?]	Meccano: The Meccano book of enginnering/Meccano Ltd (45pp., ill.) pp.4-11: The story of the Quebec Bridge. Photos of south cantilever of first bridge, members of new bridge, collapse and final completion; account of development of cantilever type, first and second disasters, construction and completion (model) makeable from Meccano)
9	-	Album list: list of captions to items 1-102 of the photos in A above; in the hand of A H Tiltman. Some inaccuracies of identification; items 103-112 not listed. (Items 113-183 added from bag of assorted photos ex libris Tiltman, 1980)
10	1910 Jan	[Letter to] British Trade Commissioner, Montreal/Board of Engineers, Quebec Bridge Crested as Department of Railways & Canals, Canada; stamped received 21 Jan. Pencil memo, names of writer and recipient unknown. "Tenders not yet asked for - plans proposed but diagrams will be received from contractors - 2 mos. will be allowed after tenders are advertised for - plans have been sent to 3 British firms - Arroli [?], Cleveland, German - the principal firm ... to take information from two [... ? ...] in Canada"

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