**S P E C I F I C A T I O N** of the Labor and material required in the construction of a three-track steel Car-Barge for the Canadian Pacific Railway Company.

Dimensions:

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| Length between Perpendiculars :... ... ... | 256'0" |
| Length, over all: ... ... ... ... ... ... | 260'0" |
| Beam, moulded: ... ... ... ... ... ... | 42'0" |
| Depth, moulded, :..... | 12'0" |

General Description:

Barge to be constructed of Steel.

The construction from aft to break of House forward to be on the Longitudinal System, with Deck-Beams running transversely.

A transverse Web-frame to be placed every 12'0" in the way of Longitudinal Floors.

Forward of break of House ordinary Frames will be used.

There will be five Transverse Watertight Bulkheads, dividing the Hull into six compartments.

There will be two Partial Transverse Watertight Bulkheads, to form Freshwater tanks.

Hull to be divided longitudinally from aft to No. 2 Transverse Bulkheads by two Watertight Bulkheads.

A Longitudinal Truss the full depth of Hull will be built on middle line, and will extend beyond No. 2 Transverse Bulkheads as shown on the Drawings.

Water tanks to be constructed between No. 3 Transverse Bulkhead and the Partial Transverse Bulkheads. These are for Fresh Water.

The Forepeak and two Wing-spaces in the after compartment to be fitted for water ballast.

Instead of the usual Bulwarks, there will be Trusses extending from aft to break of House.

There will be three railway tracks, to hold five cars each track.

There will be heavy Bumpers placed aft of break of House.

There will be all Deck-fittings for securing Apron, Cars and Barge.

All the necessary machinery for handling will be required - such as Boiler, Windlass, Capstan, Pumps, together with all valves and Piping necessary to meet the requirements of the Dominion Government Inspectors in B.C. and of the Company.

Barge to have a short Forecastle Deck, arranged for housing machinery, Coal Bunker, Galley and Crew's Quarters, etc.

House-Work and Pilot House will be constructed on Forecastle Deck.

HULL:

Hull, generally, to be of steel. The whole of the steel plates, angles and Bulbs to have the Manufacturer's brand.

All Steel Plates used must be free from black oxide by weathering and chipping.

Hull to be of single bottom construction, with flat plate Kell combined with external forward wood keel; To have a dead rise of 2'0", and turn of Bilge of 2'9" radius.

Forward end to be given a Ship's form of bow, and after end to be rounded up on bottom scow-fashion, with two under

Balanced Rudders of substantial design, of Stern Wheel type.

Hull to be built to Specification, Drawings and Details as furnished. All sizes as given must be conformed to, and all workmanship must be thorough and efficient. Every detail must be satisfactory to the Company's representative.

Material and Workmanship:

All framing and Plating to be of Siemens-Martin Steel, of Standard Ship quality, equal to Lloyd's or British Corporation requirements.

All work to be done in the best manner, put together, iron to iron, without fitting or stopping pieces, and all Framing and Plating to be fairly and truly done. Liners, where necessary, to be required width.

Keel and False-Keel:

Keel to be a Plate Keel, 38" x 1/2" for three-fifths length, running to 3/8" at the ends. Angles 3-1/2" x 6" x 5/8", are riveted to Keel-plate to receive wooden Keel. Angles to be riveted to Keel-Plate with 3/4" rivets spaced 3 3/8" centres. The Angles and Keel-plate enclosed between the Angles must be carefully scraped, cleaned thoroughly, free from sweat, and then coated with Bitumastic Solution before inserting the Wooden Keel.

The 12" x 15" Wooden Keel to be put in in 12'0" lengths, butted at ends and each butt coated with Bitumastic Solution.

The Wooden Keel is to be held in place by 1" Screw-Bolts spaced at 12" centres, and driven through the 3-1/2" x 6" Angles. No ends of Bolts to be left projecting beyond the nuts.

Keel-plate to be lapped. Laps to be 4-1/2", double-riveted with 3/4" countersunk rivets spaced four diameters apart. Liners must be neatly fitted, and may be of iron.

STEM:

Stem to be of Forged steel, 7-1/2" x 2-1/4", of uniform section, and to extend 10'0" under bottom. To be fitted to receive Keel-plate, either by a check in the Stem-bar, or by neatly fitting Keel-Plate to the lower portion of the Stem-bar. Bar to overlap Keel-plate at least 2'0".

Stem to run up 4'6" above forecastle Deck.

STERN:

Stern to be built with Brackets of 1/2" Plate, extending from under side of Deck Beams to each longitudinal frame, except in way of bulkheads. The brackets to extend along Longitudinal Frames 2'0", and to be riveted with 3/4" rivets spaced five diameters apart.

Angles to be riveted to After edge of Brackets, to receive Plating in way of Apron.

The Bracketing at Truss to be as shown on the Drawing, the vertical Web forming Centre Through-plate, and bottom chord of Truss to be carried around Stern and Bracketted to top chord as shown.

Longitudinal Floors and Side Longitudinals:

Floors to be"Z" Bars, 8" x 3-1/2" x 3-1/2" x 7/16". Lengths to be butted and connected with double Butt-Straps. Straps to be treble-riveted. Thickness of Straps to be 5/16" and 1/4". The 5/16" Strap to be countersunk for rivets. Straps to be 17" x 7", twelve rivets.

Butts of Longitudinal Floors to be well shifted, at least 4'0" apart.

The longitudinal Floors to finish at the Second Transverse Bulkhead from forward, and to be bracketted to Bulkhead in the manner indicated on Drawings with Brackets extending 2'0" up bulkhead and 4'0" fore and aft.. Brackets to be riveted to Bulkhead and Longitudinal Frames with 3/4" rivets five diameters apart. Brackets to be 3/8" plate.

Side Longitudinals to be similarly treated.

Transverse Webs:

Transverse Webs to be placed every 12'0" in the way of the longitudinals, except where Bulkheads take their place. These Webs to be constructed as shown on Section.

The Brackets of Bilge to run up 4'6" intersection of Dead-rise with side, and to extend 3'9" along bottom from intersection of side with dead-rise.

Angle-iron Braces to be riveted on as shown on Section, and to be of size shown on Section.

FRAMES:

Forward of the Second Transverse Bulkhead the frames will be ordinary Frames, 6" x 3" x 3/8", Bulb Angles, or equivalent section to approval.

Frames to be spaced 23" centres.

Frames to be bracketted to Deck-Beams as shown on Drawings.

Floor Plates to be in accordance with Lloyd's requirements and as indicated on Drawings.

Frames to be bent and bevelled, thoroughly faired. Burr caused by punching to be removed before rivetting Frames and Floor together.

Centre Keelson in Way of Ordinary Frames:

The Centre Through-plate which forms the bottom chord of the Centre Truss will be carried through to No. 1 Bulkhead, and will run intercostal for four more Frame-spaces. From the forward side of the Second Transverse Bulkhead, two top Angles will be riveted back to back. Angles to be bulb-angles, 7-1/2" x 3". The Angles at Keel-plate, from the Second Transverse Bulkhead on the Centre Through-plate, will be 4" x 4" x 7/16".

Keelsons ans Stringers: in way of Ordinary frames:

The Keelson in way of Ordinary Frames to be built intercostal, as shown on Drawings. Angles to be bent and fitted to the form of vessel, as required.

Breast Hooks:

Breast Hooks will be fitted at Stem to extend 4'0" aft of Stem; to be 1/2" thick, riveted to Stringers, with Angle-bar on face running from Stringer to Stringer. There will be two Breast-hooks in the Hold.

BULKHEADS:-

Five Transverse Bulkheads will be constructed as shown on the Drawings. The Boundary Angles to be 3" x 3" x 7/16". Stiffeners to be 4" x 3" x 3/8", spaced about 2'6" apart.

Plating of Bulkheads to be 5/16".

The two Partial Bulkheads, to form the Freshwater Tanks, to be similarly constructed to other Transverse Bulkheads, and to be connected to Longitudinal Bulkheads with 3" x 3" x 7/16" Boundary-angles.

The two Longitudinal Bulkheads to be constructed as shown on Drawings. These Bulkheads to run frommaft to Second Transverse Bulkhead as shown. Stiffeners to be 4" x 3" x 3/8", spaced

4'0" apart. There will be one Longitudinal Stiffener, 4" x 3" x 3/8".

Plating of Bulkheads to be 5/16".

All the above Bulkheads to be watertight, and the riveting must conform to Lloyds Rules for Bulkheads.

Longitudinal Central Truss:

Truss to be constructed as shown on the Drawings.

Centre Through-plate to act as bottom chord. Top Chord to be 23" x 3/8", built intercostal. The intercostal Angles to be 3" x 3" x 3/8". The Continuous Angles to be 3" x 3" x 3/8".

Struts or Stanchions to be double 6" Channels, spaced 12'0" apart.

Ties to be 4-1/2" x 3" x 3/8", riveted to an 18" square plate where they cross; also, to be riveted to top and bottom chord as shown.

DECK-BEAMS:

The Deck-beams on Main Deck will be Channel or Bulb. If Channel, size to be 7" x 3" x 3"x 3/8". If Bulb, size to be 8" x 3" x 7/16".

Beams to be spaced as shown on Drawings.

Beams to run right through from side to side, and to have a camber of 10-1/2".

Beams to be connected to sides by means of lugs riveted to side Plating; also, by Brackets riveted to Lugs and Beams. Brackets and Lugs to extend down sides 33", and brackets to extend along Beams 33". All to be riveted to Lloyd's requirements as to diameter of rivets and spacing.

Deck-Beams of Forecastle Deck to be as shown on Drawings, Bracketed to Frames at sides as shown. Run of Under Beams as directed.

Shell Plating:

Shell Plating to be of Scantling as shown on Drawings. Plates to average about 18'0" in length. Plates to be lapped. Lap to look aft.

Lap-joints to be triple-riveted for half length, and double-riveted at ends.

The Longitudinal Lap-Joints to Shell-Plating to be double rivetted.

All riveting to be countersunk and to Lloyd's requirements.

Decks:

The Main Deck Stringer-plate to be 60" x 7/16". The balance of Deck-plating to be 3/8". Plates to be lapped.

Both Longitudinal and Transverse laps to be double-riveted. Rivets to be 3/4" countersunk. Pitch to be four diameters for end-joints of Deck Plates. Pitch to be four and half diameters for fore and aft seams of Deck-plating.

The Forecastle Deck to have a Deck Stringer-plate 48" x 5/16", riveted to Beams. Joints to be butted and secured by Butt Straps on underside.

Rivetting and Straps to conform to Lloyd's Rules.

The whole of the Forecastle Deck to be wood, 3-1/2" x 3-1/2", Fir.

Fitting-strips of wood to make up the height of the Stringer-plate will not be allowed on Deck Beams.

The Stringer-plate to be coated with Bitumastic Solution before wooden deck is laid thereon.

The wood Fir Deck to be specially and carefully selected, thoroughly dry, and entirely free from sap.

The Boundry-Planks to be of approved Hardwood.

The edges of planks to be bevelled to form a Caulking - seam. Three threads of Oakum to be driven into each seam, and horsed, after which the deck is to have one more thread of oakum and to be payed with Marine glue.

The Deck-bolts to be sunk in plank and to be plugged. with plugs dipped in white lead before being driven.

Deck to be cleaned off flat; the planks before caulking, and the pitch, etc., after caulking.

Trusses in Way of Bulwarks:

The Truss at Bulwarks to be constructed as shown on the Drawing. To be 6'0" high. To have Webs every 12'9". Web-plate to be 3/8".

Bottom chord of Truss to be 15" x 3/8". Top chord to be 6" x 6" x 7/16" Angles.

Struts or Stanchions to be 3" x 3" x 3/8" Angles, doubled.

Tie-plates to be 6" x 1/2", riveted to top and bottom chords.

Web to be flanged on top and face for 3".

A fore and aft Plate, flanged 3" on deck, to be rivetted to Deck, and to run up Web 15", to be 3/8" thick.

Another fore and aft Plate, 12" x 5/16", to be riveted to Web at top as shown on Drawings .

Bottom chord to be riveted to Deck with 3" x 3" x 3/8" Angles.

Car-braces:

Car-braces to be fitted as per Drawing, ten on each side, with connections to Bulwark Web every 12'0" as indicated on Drawings.

Guards:

Angles to receive Guards to be 4-1/2" x 3-1/2" x 7/16"; to be placed on sides shown.

Angles and Shell-plating between the Angles to be thoroughly cleaned, chipped and free from sweat and water; to be coated with Bitumastic Solution before wood is inserted.

Guards to be 10" x 10" Fir, straight-grained and free from sap.

Waling pieces to be 10" x10" , spaced 12'0" centre to centre.

Guards to have a 5" x 5/8" face-bar.

The whole to be securely fastened to Angles and Plating with as few as possible through the Shell.

Rudder-Trunk:

Rudder-trunk to be of Cast Iron, strongly ribbed, and carried up to under side of Deck. Trunk to be built to Drawings and arranged with watertight Stuffing-box, also, to take weight of Rudders.

Rudders:

Rudders to be two in number; to be set between Centre Truss and Longitudinal Bulkhead. To be of Stern-Wheel balanced type, with wooden blades, all as per drawing.

Tillers:

Tillers to be of forged steel, of approved size and length of Arm, with suitable Connecting-rods and all necessary gear.

Hatches:-

Hatches to be made in Deck. Size of Hatches to be 24" x 20". Number of Hatches, about twenty-three.

These Hatches to have angles-iron Coamings, riveted to Deck. Covers of Hatches to fit over Coaming, and to be of

Steel, hinged as per Detail.

Ladders to be placed at one of the Hatches leading to each compartment.

Wooden Grating to be fitted inside each Hatch, as shown.

Manhole Doors:.

Manhdle Doors to be fitted to each compartment used for water.

All water Tanks to have Filling- plugs on Deck, fitted with a 2" American Pipe-thread, Female end.

A plug to be fitted in each filling connection.

The Water Tanks, such as the Freshwater Tanks, the Forepeak, the Afterpeak Tanks, must all be fitted with ooverflow and Vent-pipes. The overflows and Vents to both be 2" pipes.

All compartments to have Draining-plugs in bottom, finished flush with plating.

Scuppers:

Scuppers to be fitted to Deck as directed. There will be four Scuppers each side on Main Deck. Each scupper to be 3" lead or cast Iron Pipe, fitted with proper Grating on Deck and flanged at Ship's side overboard.

Cementing, etc.,

The whole of the interior of the Hull, except as otherwise specified, including Deck Beams and under side of Deck-plating to be coated with Bitumastic Ebamel. The bottom to be cemented as follows:-

Cement and Concrete to fill up to top of Bulb-angles forming Centre Through-plate.

A coat of Pure Portland Cement to be placed on bottom, with a firm Cement finish at sides. The Concrete to be filled

on top of this coat, and to be free from large stones. The top to be coated with one coat of Pure Cement, forming a smooth finish.

The whole to weigh about 75 tons.

Cement to run out to turn of Bilge.

The water Tanks to be cemented with three coats of good Cement. Bottom of Tanks to be 2-1/2" thick with Cement.

Limbers:

Limbers to be arranged in all compartments, enclosed by watertight Bulkheads.

Height of all limbers to be arranged to suit the Cemented bottom.

Limbers to be 3" in diameter.

Hawsepipes:

Hawsepipes to be of Cast Iron, heavy construction; to be two in number.

The Hawsepipes to be set on top of Main Deck.

Port pipe to be used for anchoring, and shelf to be fitted to receive shank of anchor when housed.

Starboard pipe to be used for towing, end of towline being shackled on to 50 fathoms of cable passed over wildcatted windows.

CHAIN-Locker:

Chain-Locker to be arranged in Forehold abaft Peak Bulkhead. To be framed of wood 2" thick, and connected up to Windlass with wood Chain Pipe of sufficient diameter to prevent chain chafing when it is in use. End of chain to be securely fastened to Keelson.

Anchors and Chains:

Barge to have one 16-3/4 cwt Self-housing Stockless Anchor,

with 150 fathoms of 1-1/4" Stud-link chain; one Stream Anchor to Lloyd's requirements to be supplied.

Caulking:-

All caulking of shell-plating, Bulkheads, Decks, etc., to be carefully and efficiently done to the entire satisfaction of the Company's representative.

All watertight Compartments to be tested and approved of.

Rail-Timbers:

Timbers for rails to be 6" x 12", as shown. To be faired off on top and to finish level at after end.

The wing Timners to be increased in depth gradually to accomplish above object, the centre timbers remaining the same right through,

Timbers to be well bedded to Deck, with paint and felt, and through fastened with 3/4" Carriage-bolts every 18".

Planks to average 24'0" to form scuppers. Butts to be coated with Bitumastic Solution.

Lugs to be placed on Deck to keep Rail-timbers from spreading, as directed, say three to each length of plank.

Stands and Cleats:

Stands for Cleats to be riveted to Deck, in positions indicated on Drawings. Stands to be constructed of two pieces of 3" x 3" x 3/8"f Angle riveted to Deck. Length of each piece to be 3'0".

Two pieces of plate of similar length, flanged outward 3" at top, to be riveted to Angles on Deck. A 1/2" plate to be riveted to flang d portion of vertical plates. The whole to be 15" high when finished. The distance between heel and heel of Angles on Deck to be 8".

There will be eight Stands in number on the Main Deck.

Fairleads:

There will be two Fairleads riveted to Main Deck aft, in position shown on Plans.

Cleats:

There will be eight Cleats, bolted to Stands on Main Deck. Cleats to have base 7" x 1-1/4" x 3'0" long. Distance from tip horn to tip of horn to be 3'6". Cleats to have three Studs, cast solid with base on top of cleat. A detail of Cleat will be supplied.

Buffers:

Buffers of wood, of approved form, to be fitted across each track in positions shown on plan, abaft of break of House. These Buffers to be supported by heavy Steel Brackets. Detail of Buffer and Brackets to be supplied.

Deck to be strengthened in way of Buffer-Brackets, if considered necessary by the Company's representative.

Clamps and Attachment:

All necessary Clamps and Attachments for fastening Barge to apron to be supplied and installed, similar to Company's other Barges. Detail of connections will be supplied.

Forecastle Plating:

The Plating on Barge side in way of Forecastle House to be 1/4" Plate, the Sheer Strake being 5/16" and extending 3" above wood Deck.

Sheer: The Barge to have a sheer of 3'0", commencing about 60'0" from stem as shown.

Portlights:-

Portlights to be of Brass, 12" diameter clear glass, without Deadplates. There will be twelve in number; to be fitted round topside Plating in way of Forecastle Accommodation above the Main Deck.

Davits: The Davits to be supplied for Boat to regulation size, as shown on Drawings.

Boat:

One boat to be supplied as shown on Drawings, to Company's requirements, fully equipped.

Hull Painting:-

During construction, all Ironwork inside and out to receive one priming coat of red oxide paint, except in way of Bitumastic, and the Hull outside to have one coat Anticorrosive and one coat of Antifouling up to indicated Waterline.

All other outside Irownworkto have two coats of paint of desired color; abd all inside Ironwork, where not Bitumastic to receive three good coats of oxide paint.

# J O I N E R'S  W O R K

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General Clause:

The Joiner work is to be built plainly and substantially, to give accommodation as atranged in Plans. The work is to be finished complete, including all Hardware, Plumbing and fixed Furniture, but does not include Wire Mattresses or any Upholstering other than may be mentioned in this Specification.

Houses on Main Deck:

Houses on Main Deck to be arranged as shown on Plans. The Bulkheads to be 1-1/8" T & G., Fir. Doors to be 1-1/4" Steamed Fir. Galley Bulkheads in way range to be fitted up as follows:

1" x 3" Studs spaced 18" centres, to be nailed to Bulkhead. Galvanized Sheet-iron to be fastened to the Studs, forming a Screen Bulkhead.

Thimbles made with 3/8" pipe 2" long, spaced 12" apart, will be used to separate Galvanized Iron already referred to from a similar Galvanized Screen Bulkhead.

Between the two Bulkheads Silicate-Cotton will be packed.

The space between inside Screen Bulkhead and wooden Bulkhead will be air-space. Holes to be bored in wooden Bulkheads, near Deck to free this space of air.

All woodwork in air space to have three coats of paint before being closed in.

Galley to be fitted with all necessary Shelving, Dishracks, Drainboards, Sinks and Drains.

Mess-room to be fitted with plain soft-wood table and benches. Mess-room table to have raised bead all round edges, to save dishes being broken.

Scupper to be fitted in Galley, of the same size as previously referred to, and in addition thereto.

Toilets: Baths:

One Toilet to be fitted up with Standard Enamel fittings, with flush arranged from Service Tank on top Deck. Floors to be cemented, having similar Scuppers fitted as in Galley.

Bath to be fitted up as shown in plan, with all necessary Piping, Drains and Discharges. Floor of Bath to be cemented.

Bath-tub to be Standard Mfg. Co's.

All Bulkheads in Toilet and Bath to be constructed similarly to wood Bulkheads previously mentioned.

Coal-Bunker Bulkheads:-

Coal-Bunker Bulkheads to be of steel, 1/4" plate, with 2-1/2" x 2-1/2" x 1/4" Angle-Stiffeners spaced 2'6" centres, securely riveted to Deck and Beams.

A Plate Door for Bunker to be provided, with gear for lifting and lowering.

Floor of Coal Bunker to be laid with 2" plank, to protect deck.

Chute to be arranged over Bunker, as shown on Plan, for coaling purposes.

All Plating in Bunker to be coated with Bitumastic Solution.

Bulkhead aft of Boiler:

To be of steel, of similar construction to the above.

Painting Steelwork in Way of Houses:

All Steelwork on Ship's sides, from break of House, forward; also, steel Bulkheads, to be thoroughly painted and caulked, except as otherwise specified.

Crew Space:

Bulkheads in Crew Space to be similar to other wood Bulkheads; to be fitted up with ordinary soft-wood Bunkers, with bench in front.

Houses, Forecastle Deck:

Carlings of Houses to be 2-3/4" x 3" under Pilot-House. Balance of Carlings to be 1-3/4" x 3". All to be spaced 22" centres. Carlings to project beyond House 12"; to be finished with a face-piece 3/4" x 5-1/2". The projection under Carling to be covered by a 3/4" x 12" piece, and the whole neatly moulded.

Coamings:-

Coamings to be 6" x 6", bedded to Deck in Canvas, well red-leaded and securely fastened to Deck, with bolts 5/8" diameter. Coaming to be rabeted to suit the outside sheathing and inside lining.

Studs:

Studs to be 1-3/4" x 2-3/4". Studding to be morticed into coamings and plate at top. Studs to be spaced 22" centres.

Plates:

Plates to be 2-3/4" x 3-1/2". Through-bolts from Plate, through Coaming and Deck, to be fitted. Bolts to be 5/8" diameter. Bolts to be at all corners, and also close to all Bulkheads.

Outside Walls:

To be 1-1/8" T. & G. clear Fir, thoroughly dry. Groove and tongue to be white leaded before being driven home. All

to be finished flush and planed off smooth. The inside of sheathing and Studs to be painted before the inside sheathing is put up.

Inside Walls:

To be finished plain, with vertical-laid 3/4" T. & G. Fir. T. & G. to be painted on inside before being put in place.

Bulkheads:

Where not otherwise specified. Bulkheads to be of single 3/4" x 3" double-beaded Fir, laid diagonally and fastened to Carlings, Sills and Studding, to approval.

Staterooms:

Captains and Purser's Rooms to be fitted up plainly; to have Hardwood Berth front, with drawers underneath. Also, Settee, Washstand, Clothes-locker, and Mirror. Desk to be Placed in Captains and Purser's Rooms.

Builders to furnish Basins for Stands, but not the Receivers.

Office:

Officer to be fitted up with Desk and Drawers, to approval.

Store:

Store to be fitted with all necessary Shelving.

Sashes:

Sashes to be of 7/8" Hardwood, glazed with clear Double-thick Window-glass, and fitted with Brass Weather-strips on bottom, and Rubber Bumpers.

Doors:

Doors to be plain Ship's Doors, 1-1/4" thick, to approval.

Deck:

Deck to be 1-1/4" Fir T. & G. beaded on under side; to be covered with heavy canvas on felt. Canvas to be fitted as follows:-

Strips of light canvas, bedded in white lead, to be placed

at seams. Canvas to be laid over strips after being damped. Canvas to be thoroughly stretched while damp, and nailed with 5/8" double pointed tacks, 3/8" apart. The canvas to have four good coats of paint, the first coat to be put on as soon as canvas is laid.

Covering-boards to be 1-1/4" x 5", with large Half-round on face.

Light Screens:

Light Screens to be of regulation size.

Name-board:

Name-boards to be fitted as directed.

Rail Round Forecastle:

Rail to be of wood, with coaming 4" x 3".

Stanchions to be 3" diameter, spacec 3' 6" centres.

Top and bottom Plates to be 3/4" x 3", to receive Wire Netting, to be fitted. Wire netting of approved pattern to be fitted.

Rail to be 2" x 6". Height of rail to be 3'6".

Ladders:

Ladders to be fitted to reach all decks as required.

Two to lead to Forecastle Deck, and one to Pilot-house.

Iron Handrails to be fitted to each ladder.

Pilot House:-

Pilot House to be constructed similar to house underneath. Windows of Pilot-house to be 2'0" x 2'6", similar in construction to other Sashes.

Rail, with Wire Netting, similar to Forecastle Deck, to be fitted all round Pilot House.

Coal Chute:

Coal-Chute to be built aft of Pilot-house as shown on Drawings, with hinged cover to raise up when ceiling. Detail to be supplied.

Scuppers:

Scuppers to be put in where required; to be finished thoroughly watertight, with lead-pipe and Brass Gratings, as directed. One Scupper on each side to be led down by pipe, discharging under Guard.

Hardware and Fastenings:

All outside fastenings to be done with galvanized nails, or Brass screws,

All Hardware to be of Brass, of heavy Marine pattern.

Painting:

All outside woodwork to have three good coats of white lead and oil, and all inside work to have two coats of whie and one of Zinc.

Store Room:-

A stire Room to be fitted up in After Compartment below Main Deck, or in other approved places with all Shelving required for General Stores.

Hatchway and Ladder to be provided to suit requirements.

Stearing Gear:-

Suitable Hand-gear to be fitted in Pilot-House, with all necessary Fairleads, Rods, Chains and Sheaves. Rods to be led full length on top of Deck, along inside of inboard rail-timber of Wing Tracks, and to be carried below Deck in way of After Compartment to reach Tillers. Rods to be 1" diameter, and Chains 13/16" diameter.

Pilot Wheel:

Large Pilot-wheel to be furnished, to approval.

Mooring-Pipes, Fairleads and Cleats:

One Mooring-pipe each side to be fitted in Plating at Forecastle head; to be 15" diameter. Plating to run up forward to height of rail and finish as shown.

Four Cleats, similar to those shown on the Main Deck, to be placed on Forecastle Deck as directed.

Fairleads to be provided for the Two After Cleats.

Towing-Bitts:

Towing-bitts to be 18" x 18", Hardwood; to be stepped on Main Deck and run up on Forecastle as shown on Plan. To be well kneed to Main Deck and Forecastle Deck, all to approval.

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# M A C H I N E R Y

Boiler:

One water-tube Boiler of Hollander design, having a heating surface of 500 ft, to be supplied and installed. To be designed to fit space between Decks; to comply with and pass the Canadian Marine Board of Inspection for 125 lbs of pressure, with all necessary fittings, complete. To have all Piping, from Pumps to Boiler, from Boiler overboard, etc., installed to the satisfaction of the Company's Inspector. To be arranged with steel Casings and smoke Stack. Smokestack to rise to a height of 20'0" above Forecastle Deck.

Whistle:

One 4" Steam Whistle; to be mounted above Pilot House, with cord for signalling:

Feed Pump and Injector:

One Brass-lined Duplex Pump, of sufficient capacity to supply Boiler, to be installed, with all Suction and Discharge pipes, complete. Also, Steam and Exhaust.

Also, one 1" diameter Penberthy Injector to be supplied and connected up to Boiler.

Both Pump and Injector to be connected from Freshwater Tanks.

Pump to have a discharge to Boiler and Freshwater Service Tank.

Bilge and Fire Service Pumps:

One brass-lined Duplex Pump, 7"x 6" x 10", to be fitted with suction from sea and Bilges, and to discharge to Fire Hydrants and overboard.

Bilge-suction Main to be 5" diameter, Galvanized Iron pipe; to have Branch connections from every compartment; to have Separate Suction and Discharge into Ballast-tanks.

All suctions to have Independent-control Valve, with proper Brass Deck Plug.

Spanner to suit spindles of rods to be supplied.

Control Valves for Suction and Discharge to be supplied with Pump.

Pump to be supplied with all necessary Steam and Exhaust Pipes.

Fire Hydrants:

Two Fire Hydrants, with 2" connections, to be laid along Deck and fitted where directed; one to be forward and one aft.

Bilge Boxes:

Cast Iron Bilge-Boxes to be installed with each suction.

STeam Heating:

All rooms to be supplied with approved Cast Iron Radiators taking steam from Boiler through Reducing-valve set to 15 lbs pressures. Discharges led overboard.

Galley Sink to be connected to reduced line also.

Hand Fresh Water Pumps:

Hand Freshwater Pump to be installed alongside of Galley, and arranged to draw from Main Tank and deliver direct to Sink or Service tank as required.

Freshwater Service Tank:

One freshwater Service Tank, of not less than 400 gallons

capacity to be installed on Forecastle Deck; to be fitted with all Piping necessary for Vents, Filling and Discharge. Filling-pipe to be connected from Steam Feed-pump and Hand-pump, and Discharge-pipe to be connected to supply Galley and Toilet.

Mast and Jackstaff:

Mast and Jackstaff to be fitted as shown, with Stays as indicated.

Windlass and Capstan:

Windlass and Capstan to be supplied and installed in positions indicated on Plans.

Windlass to have sufficient power to lift Anchor rapidly, as well as drive Capstan.

Capstan to be fitted on Forecastle Deck, and Gearing from Windlass to be arranged to approval. All to meet with the approval of the Company's representative.

## GENERAL

The whole of the material, except where otherwise specified, to be supplied and installed to the approval of the Company's representative. The Workmanship must be through in all Details, and when the Barge is completed to be handed over to the Canadian Pacific Railway Company at Vancouver or Victoria, as the case may be, with steam up.

The Canadian Pacific Railway Company will furnish and lay the Steel rails.

Notwithstanding any omissions, the Barge must be complete in every detail and in working order, to the entire satisfaction of the Canadian Pacific Railway Company.

CANADIAN PACIFIC RAILWAY COMPANY.

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Specification for Three-track Steel

Bridge.

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S P E C I F I C A T I O N of the labor and material required in the construction of a Three-Track Steel Car-Barge for the Canadian Pacific Railway Company.

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Dimensions:

| | |
|---|---|
| Length between Perpendiculars: ... ... ... | 256'0". |
| Length, over all: ... ... ... ... ... ... | 260'0". |
| Beam, moulded: ... ... ... ... ... ... | 42'0". |
| Depth, moulded: ... ... ... ... ... ... | 12'0". |

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General Description:

Barge to be constructed of Steel.

The construction from aft to break of House forward to be on the Longitudinal System, with Deck-beams running transversely.

A Transverse Web-frame to be placed every 12'0" in the way of Longitudinal Floors.

Forward of break of House ordinary Frames will be used.

There will be five Transverse Watertight Bulkheads, dividing the Hull into six compartments.

There will be two Partial Transverse Watertight Bulkheads, to form Freshwater Tanks.

Hull to be divided longitudinally from aft to No. 2 Transverse Bulkheads by two Watertight Bulkheads.

A Longitudinal Truss the full depth of Hull will be built on middle line, and will extend beyond No. 2 Transverse Bulkhead,

as shewn on the Drawings.

Water-tanks to be constructed between No. 3 Transverse Bulkhead and the Partial Transverse Bulkheads. These are for Fresh water.

The Forepeak and two Wing-spaces in the After Compartment to be fitted for water ballast.

Instead of the usual Bulwarks, there will be Trusses extending from aft to break of House.

There will be three railway-tracks, to hold five cars each track.

There will be heavy Bumpers placed aft of break of house.

There will be all Deck-fittings for securing Apron, Cars and Barge.

All the necessary machinery for handling will be required - such as Boiler, Windlass, Capstan, Pumps, together with all Valves and Piping necessary to meet the requirements of the Dominion Government Inspectors in B. C. and of the Company.

Barge to have a short Forecastle Deck, arranged for housing Machinery, Coal Bunker, Galley and Crew's Quarters, etc.

House-work and Pilot-house will be constructed on Forecastle Deck.

Hull: Hull, generally, to be of Steel. The whole of the Steel Plates, Angles and Bulbs to have the manufacturer's brand.

All Steel Plates used must be free from black oxide by weathering and chipping.

Hull to be of single-bottom construction, with flat Plate-Keel combined with external forward wood Keel. To have a dead rise of 2'0", and turn of Bilge of 2'9" radius.

Forward end to be given a ship's form of bow, and after end to be rounded up on bottom scow-fashion, with two under-

Balanced Rudders of substantial design, of Stern-wheel type.

Hull to be built to Specification, Drawings and Details as furnished. All sizes as given must be conformed to, and all workmanship must be thorough and efficient. Every detail must be satisfactory to the Company's representative.

Material and Workmanship:

All Framing and Plating to be of Siemens-Martin Steel, of Standard Ship quality, equal to Lloyd's or British Corporation requirements.

All work to be done in the best manner, put together, iron to iron, without fitting or stopping-pieces, and all Framing and Plating to be fairly and truly done. Liners, where necessary, to be of required width.

Keel and False-Keel:

Keel to be a Plate Keel, 38"x ½" for three-fifths length, running to 3/8" at the ends. Angles, 3½"x 6"x 5/8", are riveted to Keel-plate to receive Wooden Keel. Angles to be riveted to Keel-plate with ⅞" rivets spaced 3 3/8" centres. The Angles and Keel-plate enclosed between the Angles must be carefully scraped, cleaned thoroughly, free from sweat, and then coated with Bitumastic Solution before inserting the Wooden Keel.

The 12"x 15" Wooden Keel to be put in in 12'0" lengths, butted at ends and each butt coated with Bitumastic Solution.

The Wooden Keel is to be held in place by 1" Screw-bolts spaced at 12" centres, and driven through the 3½"x 6" Angles. No ends of Bolts to be left projecting beyond the nuts.

Keel-plate to be lapped. Laps to be 4½", double-riveted with ¾" countersunk rivets spaced four diameters apart. Liners must be neatly fitted, and may be of iron.

Stem: Stem to be of Forged Steel, 7½"x 2½", of uniform section, and to extend 10'0" under bottom. To be fitted to receive Keel-plate, either by a check in the Stem-bar, or by neatly-fitting Keel-plate to the lower portion of the Stem-bar. Bar to overlap Keel-plate at least 2'0".

Stem to run up 4'6" above Forecastle Deck.

Stern: Stern to be built with Brackets of ½" Plate, extending from under side of Deck-beams to each Longitudinal Frame, except in the way of Bulkheads. The Brackets to extend along Longitudinal Frames 2'0", and to be riveted with ¾" rivets spaced five diameters apart.

Angles to be riveted to After edge of Brackets, to receive Plating in way of Apron.

The Bracketting at Truss to be as shewn on the Drawing, the vertical Web forming Centre Through-plate, and bottom chord of Truss to be carried around Stern and bracketted to top chord as shewn.

Longitudinal Floors and Side Longitudinals:

Floors to be "Z" Bars, 8"x 3½"x 3½"x 7/16". Lengths to be butted and connected with Double Butt-straps. Straps to be treble-riveted. Thickness of Straps to be 5/16" and ½". The 5/16" Strap to be countersunk for rivets. Straps to be 17"x 7", twelve rivets.

Butts of Longitudinal Floors to be well shifted, at least 4'0" apart.

The Longitudinal Floors to finish at the Second Transverse Bulkhead from Forward, and to be bracketted to Bulkhead in the manner indicated on Drawings with Brackets extending 2'0" up Bulkhead and 4'0" fore and aft. Brackets to be riveted to Bulkhead and Longitudinal Frames with $\frac{3}{4}$" rivets five diameters apart. Brackets to be 3/8" Plate.

Side Longitudinals to be similarly treated.

Transverse Webs:

Transverse Webs to be placed every 12'0" in the way of the Longitudinals, except where Bulkheads take their place. These Webs to be constructed as shewn on Section.

The Brackets of Bilge to run up 4'6" from intersection of Dead-rise with side, and to extend 3'9" along bottom from intersection of side with Dead-rise.

Angle-iron Braces to be riveted on as shewn on Section, and to be of size shewn on Section.

Frames: Forward of the Second Transverse Bulkhead the Frames will be ordinary Frames, 6"x 3"x 3/8", Bulb Angles, or equivalent section to approval.

Frames to be spaced 23" centres.

Frames to be bracketted to Deck-beams as shewn on Drawings.

Floor-plates to be in accordance with Lloyd's requirements and as indicated on Drawings.

Frames to be bent and bevelled, thoroughly faired. Burr caused by punching to be removed before rivetting Frames and Floors together.

Centre Keelson in Way of Ordinary Frames:

The Centre Through-plate which forms the bottom chord of the Centre Truss will be carried through to No. 1 Bulkhead, and will run intercostal for four more Frame-spaces. From the forward side of the Second Transverse Bulkhead, two top Angles will be riveted back to back. Angles to be Bulb-angles, 7½"x 3". The Angles at Keel-plate, from the Second Transverse Bulkhead on the Centre Through-plate, will be 4"x 4"x 7/16".

Keelsons and Stringers in Way of Ordinary Frames:

The Keelsons in way of Ordinary Frames to be built intercostal, as shown on Drawings. Angles to be bent and fitted to the form of vessel, as required.

Breast-Hooks:

Breast-hooks will be fitted at Stem to extend 4'0" aft of Stem; to be ½" thick, riveted to Stringers, with Angle-bar on face running from Stringer to Stringer. There will be two Breast-hooks in the Hold.

Bulkheads:

Five Transverse Bulkheads will be constructed as shown on the Drawings. The Boundary-angles will be 3"x 3"x 7/16". Stiffeners to be 4"x 3"x 3/8", spaced about 2'6" apart.

Plating of Bulkheads to be 5/16".

The two Partial Bulkheads, to form the Freshwater Tanks, to be similarly constructed to other Transverse Bulkheads, and to be connected to Longitudinal Bulkheads with 3"x 3"x 7/16" Boundary-angles.

The two Longitudinal Bulkheads to be constructed as shown on Drawings. These Bulkheads to run from aft to Second Transverse Bulkhead as shown. Stiffeners to be 4"x 3"x 3/8", spaced

4'0" apart. There will be one Longitudinal Stiffener, 4"x 3"x 3/8".

Plating of Bulkheads to be 5/16".

All the above Bulkheads to be watertight, and the riveting must conform to Lloyd's Rules for Bulkheads.

Longitudinal Central Truss:

Truss to be constructed as shewn on the Drawings.

Centre Through-plate to act as bottom chord. Top chord to be 23"x 3/8", built intercostal. The Intercostal Angles to be 3"x 3"x 3/8". The Continuous Angles to be 3"x 3"x 3/8".

Struts or Stanchions to be double 6" Channels, spaced 12'0" apart.

Ties to be 4½"x 3"x 3/8", riveted to an 18" square plate where they cross; also, to be riveted to top and bottom chord as shewn.

Deck-Beams: The Deck-beams on Main Deck will be Channel or Bulb. If Channel, size to be 7"x 3"x 3"x 3/8". If Bulb, size to be 8"x 3"x 7/16".

Beams to be spaced as shewn on Drawings.

Beams to run right through from side to side, and to have a camber of 10½".

Beams to be connected to sides by means of Lugs riveted to side Plating; also, by Brackets riveted to Lugs and Beams. Brackets and Lugs to extend down sides 33", and Brackets to extend along Beams 33". All to be riveted to Lloyd's requirements as to diameter of rivets and spacing.

Deck-beams of Forecastle Deck to be as shewn on Drawings, bracketted to Frames at sides as shewn. Run of Under Beams as directed.

Shell-Plating:

Shell-plating to be of Scantlings as shewn on Drawings. Plates to average about 18'0" in length. Plates to be lapped. Lap to look aft.

Lap-joints to be triple-riveted for half length, and double-riveted at ends.

The Longitudinal Lap-joints to Shell-plating to be doulbe-riveted.

All rivetting to be countersunk and to Lloyd's requirements.

Decks: The Main Deck Stringer-plate to be 60"x 7/16". The balance of Deck-plating to be 3/8". Plates to be lapped.

Both Longitudinal and Transverse laps to be double-riveted. Rivets to be $\frac{5}{8}$", countersunk. Pitch to be four diameters for end-joints of Deck-plates. Pitch to be four and a half diameters for fore and aft seams of Deck-plating.

The Forecastle Deck to have a Deck Stringer-plate 48"x 5/16", riveted to Beams. Joints to be butted and secured by Buttstraps on under side.

Rivetting and Straps to conform to Lloyd's Rules.

The whole of the Forecastle Deck to be wood, $3\frac{1}{2}$"x $3\frac{1}{2}$", Fir.

Fitting-strips of wood to make up the height of the Stringer-plate will not be allowed on Deck-beams.

The Stringer-plate to be coated with Bitumastic Solution before wooden Deck is laid thereon.

The wood Fir Deck to be specially and carefully selected, thoroughly dry, and entirely free from sap.

The Boundary-planks to be of approved Hardwood.

The edges of planks to be bevelled to form a Caulking-seam. Three threads of oakum to be driven into each seam, and horsed, after which the Deck is to have one more thread of oakum and to be payed with Marine Glue.

The Deck-bolts to be sunk in plank and to be plugged with plugs dipped in white lead before being driven.

Deck to be cleaned off flat; the planks before caulking, and the pitch, etc., after caulking.

Trusses in Way of Bulwarks:

The Truss at Bulwarks to be constructed as shewn on the Drawings. To be 6'0" high. To have Webs every 12'0". Web-plate to be 3/8".

Bottom chord of Truss to be 15"x 3/8". Top chord to be 6"x 6"x 7/16" Angles.

Struts or Stanchions to be 3"x 3"x 3/8" Angles, doubled.

Tie-plates to be 6"x ½", riveted to top and bottom chords.

Web to be flanged on top and face for 3".

A fore and aft Plate, flanged 3" on Deck, to be riveted to Deck, and to run up Web 15"; to be 3/8" thick.

Another fore and aft Plate, 12"x 5/16", to be riveted to Web at top as shewn on Drawings.

Bottom chord to be riveted to Deck with 3"x 3"x 3/8" Angles.

Car-Braces: Car-braces to be fitted as per Drawing, ten on each side, with connections to Bulwark Web every 12'0", as indicated on Drawings.

Guards: Angles to receive Guards to be 4½"x 3½"x 7/16"; to be placed on sides as shewn.

Angles and Shell-plating between the Angles to be thoroughly cleaned, chipped and free from sweat and water; to be coated with Bitumastic Solution before wood is inserted.

Guards to be 10"x 10" Fir, straight-grained and free from sap.

Waling-pieces to be 10"x 10", spaced 12'0" centre to centre.

Guards to have 5"x 5/8" Face-bar.

The whole to be securely fastened to Angles and Plating with as few bolts as possible through the Shell.

Rudder-Trunk:

Rudder-trunk to be of Cast Iron, strongly ribbed, and carried up to under side of Deck. Trunk to be built to Drawings and arranged with watertight Stuffing-box; also, to take weight of Rudders.

Rudders: Rudders to be two in number; to be set between Centre Truss and Longitudinal Bulkheads. To be of Stern-wheel Balanced type, with wooden blades, all as per Drawing.

Tillers: Tillers to be of Forged Steel, of approved size and length of Arm, with suitable Connecting-rods and all necessary gear.

Hatches: Hatches to be made in Deck. Size of Hatches to be 24"x 20". Number of Hatches, about twenty-three.

These Hatches to have Angle-iron Coamings, riveted to Deck. Covers of Hatches to fit over Coaming, and to be of

Steel, hinged as per Detail.

Ladders to be placed at one of the Hatches leading to each compartment.

Wooden Grating to be fitted inside each Hatch, as shewn.

Manhole Doors:

Manhole Doors to be fitted to each compartment used for water.

All Water Tanks to have Filling-plugs on Deck, fitted with a 2" American Pipe-thread, Female end.

A Plug to be fitted in each Filling-connection.

The Water Tanks, such as the Freshwater Tanks, the Forepeak, the Afterpeak Tanks, must all be fitted with Overflow and Vent-pipes. The Overflows and Vents to both be 2" pipes.

All compartments to have Draining-plugs in bottom, finished flush with Plating.

Scuppers: Scuppers to be fitted to Deck as directed. There will be four Scuppers each side on Main Deck. Each Scupper to be 3", lead or Cast Iron pipe, fitted with proper Grating on Deck, and flanged at Ship's side overboard.

Cementing, Etc:

The whole of the interior of the Hull, except as otherwise specified, including Deck-beams and under side of Deck-plating, to be coated with Bitumastic Solution. The bottom to be Cemented as follows:-

Cement and Concrete to fill up to top of Bulb-angles forming Centre Through-plate.

A coat of Pure Portland Cement to be placed on bottom, with a firm Cement finish at sides. The Concrete to be filled

on top of this coat, and to be free from large stones. The top to be coated with one coat of Pure Cement, forming a smooth finish.

The whole to weigh about 75 tons.

Cement to run out to turn of Bilge.

The Water Tanks to be Cemented with three coats of good Cement. Bottom of Tanks to be 2½" thick with Cement.

Limbers: Limbers to be arranged in all compartments, enclosed by Watertight Bulkheads.

Height of all Limbers to be arranged to suit the Cemented bottom.

Limbers to be 3" in diameter.

Hawse-Pipes: Hawse-pipes to be of Cast Iron, heavy construction; to be two in number.

The Hawse-pipes to be set on top of Main Deck.

Port-pipe to be used for Anchoring, and shelf to be fitted to receive shank of Anchor when housed.

Starboard-pipe to be used for towing, end of towline being shackled on to 50 fathoms of cable passed over wildcatted windows.

Chain-Locker:

Chain-locker to be arranged in Forehold abaft Peak Bulkhead. To be framed of wood 2" thick, and connected up to Windlass with wood Chain-pipe of sufficient diameter to prevent chain chafing when it is in used. End of chain to be securely fastened to Keelson.

Anchors and Chains:

Barge to have one 16¾ cwt Self-housing Stockless Anchor,

with 150 fathoms of 1½" Stud-link chain; one Stream Anchor to Lloyd's requirements to be supplied.

Caulking: All caulking of Shell-plating, Bulkheads, Decks, etc., to be carefully and efficiently done to the entire satisfaction of the Company's representative.

All Watertight Compartments to be tested and approved of.

Rail-Timbers:

Timbers for rails to be 6"x 12", as shewn. To be faired off on top and to finish level at after end.

The Wing Timbers to be increased in depth gradually to accomplish above object, the centre timbers remaining the same right through.

Timbers to be well bedded to Deck, with paint and felt, and through-fastened with ⅝" Carriage-bolts every 18".

Planks to average 24'0" in length, with butts shifted, and butts left open 2" to form Scuppers. Butts to be coated with Bitumastic Solution.

Lugs to be placed on Deck to keep Rail-timbers from spreading, as directed, say three to each length of plank.

Stands for Cleats:

Stands for Cleats to be riveted to Deck, in positions indicated on Drawings. Stands to be constructed of two pieces of 3"x 3"x 3/8" Angle riveted to Deck. Length of each piece to be 3'0".

Two pieces of plate of similar length, flanged outward 3" at top, to be riveted to Angles on Deck. A ⅜" Plate to be riveted to flanged portion of vertical plates. The whole to be 15" high when finished. The distance between heel and heel

of Angles on Deck to be 8".

There will be eight Stands in number on the Main Deck.

Fairleads: There will be two Fairleads riveted to Main Deck aft, in positions shewn on Plans.

Cleats: There will be eight Cleats, bolted to Stands on Main Deck. Cleats to have base 7"x 1½"x 3'0" long. Distance from tip of horn to tip of horn to be 3'6". Cleats to have three Studs, cast solid with base on top of Cleat. A Detail of Cleat will be supplied.

Buffers: Buffers of wood, of approved form, to be fitted across each track in positions shewn on Plans, abaft of break of House. These Buffers to be supported by heavy Steel Brackets. Detail of Buffer and Brackets to be supplied.

Deck to be strengthened in way of Buffer-brackets, if considered necessary by the Company's representative.

Clamps and Attachments:

All necessary Clamps and Attachments for fastening Barge to Apron to be supplied and installed, similar to Company's other Barges. Detail of connections will be supplied.

Forecastle Plating:

The Plating on Barge side in way of Forecastle House to be ½" Plate, the Sheer Strake being 5/16" and extending 3" above wood Deck.

Shear: The Barge to have a sheer of 3'0", commencing about 60'0" from Stem, as shewn.

Portlights: Portlights to be of Brass, 12" diameter clear glass, without Deadplates. There will be twelve in number; to be fitted round topside Plating in way of Forecastle Accommodation above the Main Deck.

Davits: The Davits to be supplied for Boat to regulation size, as shewn on Drawings.

Boat: One Boat to be supplied as shewn on Drawings, to Company's requirements, fully equipped.

Hull Painting:

During construction, all Ironwork inside and out to receive one priming coat of red oxide paint, except in way of Bitumastic; and the Hull outside to have one coat of Anticorrosive and one coat of Antifouling up to Indicated Waterline. All other outside Ironwork to have two coats of paint of desired color; and all inside Ironwork, where not Bitumastic, to receive three good coats of oxide paint.

# J O I N E R ' S  W O R K.

General Clause:

The Joiner work is to be built plainly and substantially, to give accommodation as arranged in Plans. The work is to be finished complete, including all Hardware, Plumbing and fixed Furniture, but does not include Wire Mattresses or any Upholstering other than may be mentioned in this Specification.

Houses on Main Deck:

Houses on Main Deck to be arranged as shewn on Plans. The Bulkheads to be 1 1/8" T. & G., Fir. Doors to be 1¾" Steamed Fir. Galley Bulkheads in way of range to be fitted up as follows:

1"x 3" Studs spaced 18" centres, to be nailed to Bulkhead. Galvanized Sheet-iron to be fastened to the Studs, form a Screen Bulkhead.

Thimbles made with 3/8" pipe 2" long, spaced 12" apart, will be used to separate Galvanized Iron already referred to from a similar Galvanized Screen Bulkhead.

Between the two Bulkheads Silicate-Cotton will be packed. The space between inside Screen Bulkhead and wooden Bulkhead will be air-space. Holes to be bored in wooden Bulkhead, near deck, to free this space of air.

All woodwork in air-space to have three coats of paint before being closed in.

Galley to be fitted with all necessary Shelving, Dish-racks, Drainboards, Sinks and Drains.

Mess-room to be fitted with plain soft-wood table and benches. Mess-room table to have raised bead all round edges, to save dishes being broken.

Scupper to be fitted in Galley, of the same size as previously referred to, and in addition thereto.

Toilets: Bath:

One Toilet to be fitted up with Standard Enamel fittings, with flush arranged from Service Tank on top Deck. Floors to be Cemented, having similar Scuppers fitted as in Galley.

Bath to be fitted up as shewn in Plan, with all necessary Piping, Drains and Discharges. Floor of Bath to be Cemented.

Bath-tub to be Standard Mfg Co.'s.

All Bulkheads in Toilet and Bath to be constructed similarly to wood Bulkheads previously mentioned.

Coal-Bunker Bulkheads:

Coal-Bunker Bulkheads to be of Steel, $\frac{1}{4}$" Plate, with 2$\frac{1}{2}$" x 2$\frac{1}{2}$"x $\frac{1}{4}$" Angle-stiffeners spaced 2'6" centres, securely riveted to Deck and Beams.

A Plate Door for Bunker to be provided, with gear for lifting and lowering.

Floor of Coal Bunker to be laid with 2" plank, to protect Deck.

Chute to be arranged over Bunker, as shewn on Plan, for coaling purposes.

All Plating in Bunker to be coated with Bitumastic Solution.

Bulkhead Aft of Boiler:

To be of Steel, of similar construction to the above.

Painting Steelwork in Way of Houses:

All Steelwork on Ship's sides, from break of House, forward; also, Steel Bulkheads, to be thoroughly painted and caulked, except as otherwise specified.

Crew Space:

Bulkheads in Crew Space to be similar to other wood Bulkheads; to be fitted up with ordinary soft-wood Bunkers, with Bench in front.

Houses, Forecastle Deck:

Carlings of Houses to be 2⅜"x 3" under Pilot-house. Balance of Carlings to be 1⅜"x 3". All to be spaced 22" centres. Carlings to project beyond House 12"; to be finished with a face-piece ⅜"x 5½". The projection under Carling to be covered by a ⅜"x 12" piece, and the whole neatly moulded.

Coamings: Coaming to be 6"x 6", bedded to Deck in canvas, well red-leaded and securely fastened to Deck with bolts 5/8" diameter. Coaming to be rabbeted to suit the outside sheathing and inside lining.

Studs: Studs to be 1⅜"x 2⅜". Studding to be morticed into coamings and plate at top. Studs to be spaced 22" centres.

Plates: Plates to be 2⅜"x 3½". Through-bolts from Plate, through Coaming and Deck, to be fitted. Bolts to be 5/8" diameter. Bolts to be at all corners, and also close to all Bulkheads.

Outside Walls:

To be 1 1/8" T. & G. clear Fir, thoroughly dry. Groove and tongue to be white leaded before being driven home. All

to be finished flush and planed off smooth. The inside of sheathing and Studs to be painted before the inside sheathing is put up.

Inside Walls:

To be finished plain, with vertical-laid $\frac{3}{8}$" T. & G. Fir. T. & G. to be painted on inside before being put in place.

Bulkheads: Where not otherwise specified, Bulkheads to be of single $\frac{3}{8}$"x 3" double-beaded Fir, laid diagonally and fastened to Carlings, Sills and Studding, to approval.

Staterooms:

Captain's and Purser's Rooms to be fitted up plainly; to have Hardwood Berth-front, with Drawers underneath. Also, Settee, Washstand, Clothes-locker, and Mirror. Desk to be placed in Captain's and Purser's Rooms.

Builders to furnish Basins for Stands, but not the Receivers.

Office: Office to be fitted up with Desk and Drawers, to approval.

Store: Store to be fitted with all necessary Shelving.

Sashes: Sashes to be of 7/8" Hardwood, glazed with clear Double-thick Window-glass, and fitted with Brass Weather-strips on bottom, and Rubber Bumpers.

Doors: Doors to be plain Ship's Doors, $1\frac{1}{4}$" thick, to approval.

Deck: Deck to be $1\frac{1}{4}$" Fir T. & G., beaded on under side; to be covered with heavy canvas on felt. Canvas to be fitted as follows:-

Strips of light canvas, bedded in white lead, to be placed

at seams. Canvas to be laid over strips after being damped. Canvas to be thoroughly stretched while damp, and nailed with 5/8" double-pointed tacks, 3/8" apart. The Canvas to have four good coats of paint, the first coat to be put on as soon as canvas is laid.

Covering-boards to be 1½"x 5", with large Half-round on face.

Light-Screens:

Light-screens to be of regulation size.

Name-Board:

Name-boards to be fitted as directed.

Rail Round Forecastle:

Rail to be of wood, with Coaming 4"x 3".

Stanchions to be 3" diameter, spaced 3'6" centres.

Top and bottom Plates to be ⅝"x 3", to receive Wire Netting, to be fitted. Wire Netting of approved pattern to be fitted.

Rail to be 2"x 6". Height of Rail to be 3'6".

Ladders:

Ladders to be fitted to reach all Decks as required.

Two to lead to Forecastle Deck, and one to Pilot-house.

Iron Handrails to be fitted to each Ladder.

Pilot-House:

Pilot-house to be constructed similar to house underneath. Windows of Pilot-house to be 2'0"x 2'6", similar in construction to other Sashes.

Rail, with Wire Netting, similar to Forecastle Deck, to be fitted all round Pilot-house.

Coal Chute:

Coal-Chute to be built aft of Pilot-house as shewn on Drawings, with hinged cover to raise up when coaling. Detail to be supplied.

Scuppers: Scuppers to be put in where required; to be finished thoroughly watertight, with lead-pipe and Brass Gratings, as Directed. One Scupper on each side to be led down by pipe, discharging under Guard.

Hardware and Fastenings:

All outside Fastenings to be done with Galvanized nails, or Brass screws.

All Hardware to be of Brass, of heavy Marine pattern.

Painting: All outside woodwork to have three good coats of white lead and oil, and all inside work to have two coats of white and one of Zinc.

Store Room:

A Store Room to be fitted up in After Compartment below Main Deck, or in other approved place, with All Shelving required for General Stores.

Hatchway and Ladder to be provided to suit requirements.

Steering-Gear:

Suitable Hand-gear to be fitted in Pilot-house, with all necessary Fairleads, Rods, Chains and Sheaves. Rods to be led full length on top of Deck, along inside of inboard rail-timber of Wing-tracks, and to be carried below Deck in way of After Compartment to reach Tillers. Rods to be 1" diameter, and Chains 13/16" diameter.

Pilot-Wheel:

Large Pilot-wheel to be furnished, to approval.

Mooring-Pipes, Fairleads and Cleats:

One Mooring-pipe each side to be fitted in Plating at Forecastlehead; to be 15" diameter. Plating to run up forward to height of rail and finish as shewn.

Four Cleats, similar to those shewn on the Main Deck, to be placed on Forecastle Deck as directed.

Fairleads to be provided for the two after Cleats.

Towing-Bitts:

Towing-bitts to be 18"x 18", Hardwood; to be stepped on Main Deck and run up on Forecastle Deck as shewn on Plan. To be well kneed to Main Deck and Forecastle Deck, all to approval.

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# M A C H I N E R Y.

Boiler: One Water-tube Boiler of Hollander design, having a heating capacity of 500 ft, to be supplied and installed. To be designed to fit space between Decks; to comply with and pass the Canadian Marine Board of Inspection for 125 lbs pressure, with all necessary fittings, complete. To have all Piping, from Pumps to Boiler, from Boiler overboard, etc., installed to the satisfaction of the Company's Inspector. To be arranged with Steel Casings and Smoke-stack. Smokestack to rise to a height of 20'0" above Forecastle Deck.

Whistle: One 4" Steam Whistle; to be mounted above Pilot-house, with cord, for signalling.

Feed-Pump and Injector:

One Brass-lined Duplex Pump, of sufficient capacity to supplyBoiler, to be installed, with all Suction and Discharge-pipes, complete. Also, Steam and Exhaust.

Also, one 1" diameter Penberthy Injector to be supplied and connected up to Boiler.

Both Pump and Injector to be connected from Freshwater Tanks.

Pump to have a discharge to Boiler and Freshwater Service Tank.

Bilge and Fire Service Pumps:

One Brass-lined Duplex Pump, 7"x 6"x 10", to be fitted with Suction from sea and Bilges, and to discharge to Fire Hydrants and overboard.

Bilge-Suction Main to be 5" diameter, Galvanized Iron pipe; to have Branch connections from every compartment; to have Separate Suction and Discharge into Ballast-tanks.

All Suctionsto have Independent-control Valve, with proper Brass Deck-plug.

Spanner to suit spindles of rods to be supplied.

Control Valves for Suction and Discharge to be supplied with Pump.

Pump to be supplied with all necessary Steam and Exhaust Pipes.

Fire Hydrants:

Two Fire Hydrants, with 2" connections, to be laid along Deck and fitted where directed; one to be forward and one aft.

Bilge-Boxes:

Cast Iron Bilge-boxes to be installed with each Suction.

Steam Heating:

All Rooms to be supplied with approved Cast Iron Radiators, taking steam from Boiler through Reducing-valve set to 15 lbs pressure. Discharges led overboard.

Galley Sink to be connected to Reduced line also.

Hand Freshwater Pump:

Hand Freshwater Pump to be installed alongside of Galley, and arranged to draw from Main Tank and deliver direct to Sink or Service-tank, as required.

Freshwater Service Tank:

One Freshwater Service Tank, of not less than 400 gallons

capacity to be installed on Forecastle Deck; to be fitted with all Piping necessary for Vents, Filling and Discharge. Filling-pipe to be connected from Steam Feed-Pump and Hand-pump, and Discharge-pipe to be connected to supply Galley and Toilet.

Mast and Jackstaff:

Mast and Jackstaff to be fitted as shewn, with Stays as indicated.

Windlass and Capstan:

Windlass and Capstan to be supplied and installed in positions indicated on Plans.

Windlass to have sufficient power to lift Anchor rapidly, as well as drive Capstan.

Capstan to be fitted on Forecastle Deck, and Gearing from Windlass to be arranged to approval. All to meet with the approval of the Company's representative.

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## G E N E R A L.

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The whole of the material, except where otherwise specified, to be supplied and installed to the approval of the Company's representative. The workmanship must be thorough in all Details, and when the Barge is completed to be handed over to the Canadian Pacific Railway Company at Vancouver or Victoria, as the case may be, with steam up.

The Canadian Pacific Railway Company will furnish and

lay the Steel rails.

Notwithstanding any omissions, the Barge must be complete in every detail and in working order, to the entire satisfaction of the Canadian Pacific Railway Company.

lay the steel rails.

Notwithstanding any variations, the barge must be complete in every detail and in working order, to the entire satisfaction of the Canadian Pacific Railway Company.

Specification of #3 Car Ferry.
Sent to us by Capt. Troup Nov. 8th 1909

SPECIFICATION of the labor and material required in the construction of a Three-Track Steel Car-Barge for the Canadian Pacific Railway Company,

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Dimensions:

Length between Perpendiculars;.....256'0"
Length, over all:.....260'0"
Beam, moulded:..... 42'0"
Depth, moulded:..... 12'0"

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General Description:

Barge to be constructed of Steel:

The construction from aft to break of house forward to be on the Longitudinal System, with Deck-beams running transversely.

A Transverse Web-frame to be placed every 12'0" in the way of Longitudinal Floors.

Forward of break of House ordinary Frames will be used.

There will be five Transverse Watertight Bulkheads, dividing the Hull into six compartments.

There will be two partial Transverse Watertight Bulkheads, to Form Freshwater Tanks.

Hull to be divided longitudinally from aft to No. 2 Transverse Bulkheads by two Watertight Bulkheads.

A Longitudinal Truss the full depth of Hull will be built on middle line, and will extend beyond No. 2 Transverse Bulkhead,

as shewn on the Drawings.

Water-tanks to be constructed between No. 3 Transverse Bulkhead and Partial Transverse Bulkheads. These are for Fresh Water.

The Forepeak and two Wing-spaces in the after compartment to be fitted for water ballast.

Instead of the usual Bulwarks, there will be trusses extending from aft to break of House.

There will be three railway-tracks, to hold five cars each track.

There will be heavy Bumpers placed aft of break of House.

There will be all Deck-fittings for securing Apron, Cars and Barge.

All the necessary machinery for handling will be required - such as Boiler, Windlass, Capstan, Pumps, together with all Valves and Piping necessary to meet the requirements of the Dominion Government/Inspectors in B. C. and of the Company.

Barge to have a short Forecastle Deck arranged for housing machinery, Coal Bunker, Galley and Crew's Quarters, etc.

House-work and Pilot-house will be constructed on Forecastle Deck.

Hull:

Hull, generally, to be of Steel. The whole of the Steel Plates, Angles and Bulbs to have the manufacturer's brand.

All steel plates used must be free from black oxide by weathering and chipping.

Hull to be of single-bottom construction, with flat plate Keel combined with external forward wood keel; To have a dead rise of 2'0", and turn of Bilge of 2'9" radius.

Forward end to be given a Ship's form of bow, and after end to be rounded up on bottom scow fashion, with two under-

Balanced Rudders of substantial design, of Ster-wheel type.

Hull to be built to Specification, Drawings and Details as furnished. All sizes as given must be conformed to, and all workmanship must be thorough and efficient. Every detail must be satisfactory to the Company's representative.

Material and Workmanship:

All Framing and Plating to be of Siemens-Martin Steel, of Standard Ship quality, equal to Lloyd's or British Corporation requirements.

All work to be done in the best manner, put together, iron to iron, without fitting or stopping-pieces, and all Framing and Plating to be fairly and truly done. Liners, where necessary, to be of required width.

Keel and False-Keel:

Keel to be Plate Keel, 38" x ½" for three-fifths length, running to 3/8" at the ends. Angles, 3½" x 6" x 5/8", are riveted to Keel-plate to receive Wooden Keel. Angles to be riveted to Keel Plate with ¾" rivets spaced 3-3/8" centres. The Angles and Keel-plate enclosed between the Angles must be carefully scarped, cleaned thoroughly, free from sweat, and then coated with Bitumastic Solution before inserting the Wooden Keel.

The 12" x 15" Wooden Keel to be put in 12'0" lengths, butted at ends and each butt ~~with~~coated with Bitumastic Solution.

The Wooden Keel is to be held in place by 1" Screw-bolts spaced at 12" centres, and driven through the 3½" x 6" Angles. No ends of bolts to be left projecting beyond the nuts.

Keel-plate to be lapped. Laps to be 4½", double-riveted with ¾" countersunk rivets spaced four diameters apart. Liners must be neatly fitted, and may be of iron.

Stem:

Stem to be of forged steel, 7½" x 2¼", of uniform section, and to extend 10'0" under bottom. To be fitted to receive Keel-plate, either by check in the Stem-bar, or by neatly-fitting Keel Plate to the lower portion of the Stem-bar. Bar to overlap Keel-plate at least 2'0".

Stem to run up 4'6" above Forecastle Deck.

Stern:

Stern to be built with Brackets of ½" Plate, extending from under side of Deck-beams to each Lonitudinal Frame, except in way of Bulkheads. The Brackets to extend along Longitudinal Frames 2'0", and to be riveted with ¾" rivets spaced five diameters apart.

Angles to be riveted to After edge of Brackets, to receive Plating in way of Apron.

The Bracketting at Truss to be as shewn on the Drawing, the Vertical Web forming Centre Through-plate, and bottom chord of Truss to be carried around Stern and bracketted to top chord as shewn.

Longitudinal Floors and Side Longitudinals:

Floors to be "Z" Bars, 8" x 3½" x 3½" x 7/16". Lengths to be butted and connected with Double Butt-straps. Straps to be treble-riveted. Thickness of Straps to be 5/16" and ¼".

The 5/16" Strap to be countersunk for rivets. Straps to be 17" x 7", twelve rivets.

Butts of Longitudinal Floors to be well shifted at least 4'0" apart.

The Longitudinal Floors to finish at the Second Transverse Bulkhead from Forward, and to be bracketted to Bulkhead in the manner indicated on Drawings with Brackets extending 2'0" up Bulkhead and 4'0" fore and aft. Brackets to be riveted to Bulkhead and Longitudinal Frames with $\frac{3}{4}$" rivets five diameters apart. Brackets to be 3/8" plate.

Side Longitudinals to be similarly treated.

Transverse Webs:

Transverse Webs to be placed every 12'0" in the way of the Longitudinals, except where Bulkheads take their place. These Webs to be constructed as shewn on Section.

The Brackets of Bilge to run up 4'6" from intersection of Dead-rise with side, and to extend 3'9" along bottom from intersection of side with Dead-rise.

Angle-iron Braces to be riveted on as shewn on Section, and to be of size shewn on Section.

Frames:

Forward of the Second Transverse Bulkhead the Frames will be ordinary Frames, 6" x 3" x 3/8", Bulb Angles, or equivalent section to approval.

Frames to be spaced 23" centres.

Frames to be bracketted to Deck-beams as shewn on Drawings.

Floor-plates to be in accordance with Lloyd's requirements and as indicated on Drawings.

Frames to be bent and bevelled, thoroughly faired. Burr caused by punching to be removed before reveting Frames and Floors together.

Centre Keelson in Way of Ordinary Frames:

The Centre Through-plate which forms the bottom chord of the Centre Truss will be carried through to No. 1 Bulkhead, and will run intercostal for four or more frame-spaces. From the forward side of the Second Transverse Bulkhead, two top Angles will be riveted back to back. Angles to be Bulb-angles, 7½" x 3". The Angles at Keel-plate, from the Second Transverse Bulkhead on the Centre Through-plate, will be 4" x 4" x 7/16".

Keelsons and Stringers: in Way of Ordinary Frames:

The Keelsons in way of Ordinary Frames to be built intercostal, as shewn on Drawings. Angles to be bent and fitted to the form of vessel, as required.

Breast-Hooks:-

Breast-hooks will be fitted at Stem to extend 4'0" aft of Stem; to be ½" thick, riveted to Stringers, with Angle-bar on face running from Stringer to Stringer. There will be two Breast-hooks in the Hold.

Bulkheads:

Five Transverse Bulkheads will be constructed as shewn on the Drawings. The Boundary Angles to be 3" x 3" x 7/16". Stiffeners to be 4" x 3" x 3/8", spaced about 2'6" apart.

Plating of Bulkheads to be 5/16".

The two Partial Bulkheads, to form the Freshwater Tanks, to be similarly constructed to other Transverse Bulkheads, and to be connected to Longitudinal Bulkheads with 3" x 3" x 7/16" Boundary Angles.

The two Longitudinal Bulkheads to be constructed as shewn on Drawings. These Bulkheads to run from aft to Second Transverse Bulkhead as shewn. Stiffeners to be 4" x 3" x 3/8", spaced

4'0" apart. There will be one Longitudinal Stiffener, 4" x 3" x 3/8".

Plating of Bulkheads to be 5/16".

All the above Bulkheads to be watertight, and the riveting must conform to Lloyd's Rules for Bulkheads.

Longitudinal Central Truss:

Truss to be constructed as shewn on the Drawings.

CentreThrough-plate to act as bottom chord. Top chord to be 23" x 3/8", built intercostal. The Intercostal Angles to be 3" x 3" x 3/8". The Continous Angles to be 3" x 3" x3/8".

Struts or Stanchions to be double 6" Channels, spaced 12'0" apart.

Ties to be 4½" x 3" x 3/8", riveted to an 18" square plate where they cross; also, to be riveted to top and bottom chord as shewn.

Deck-Beams:

The Deck-Beams on Main Deck will be Channel or Bulb. If Channel, size to be 7" x 3" x 3/8". If Bulb, size to be 8" x 3" x 7/16".

Beams to be spaced as shewn on Drawings.

Beams to run right through from side to side, and to have a camber of 10½".

Beams to be connected to sides by means of lugs riveted to side Plating; also, by Brackets riveted to lugs and Beams. Brackets and Lugs to extend down sides 33", and Brackets to extend along Beams 33". All to be riveted to Lloyd's requirements as to diameter of rivets and spacing.

Deck-beams of Forecastle Deck to be as shewn on Drawings, bracketed to Frames at sides as shewn. Run of Under Beams as directed.

Shell-Plating:

Shell-plating to be of Scantlings as shewn on Drawings.

Plates to average about 18'0" in length. Plates to be lapped. Lap to look aft.

Lap-joints to be triple-riveted for half length, and double riveted at ends.

The Longitudinal Lap-joints to Shell-plating to be double riveted.

All riveting to be countersunk and to Lloyds requirements.

Decks:

The Main Deck Stringer-plate to be 60" x 7/16". The balance of Deck-plating to be 3/8". Plates to be lapped.

Both Longitudinal and Transverse laps to be double-riveted. Rivets to be $\frac{3}{4}$", countersunk. Pitch to be four diameters for end-joints of Deck Plates. Pitch to be four and a half diameters for fore and aft seams of Deck-plating.

The Forecastle Deck to have a Deck Stringer-plate 48" x 5/16", riveted to Beams. Joints to be butted and secured by Buttstraps on under side.

Riveting and Straps to conform to Lloyd's Rules.

The whole of the Forecastle Deck to be wood, $3\frac{1}{2}$" x $3\frac{1}{2}$", Fir.

Fitting-strips of wood to make up the height of the Stringer-plate will not be allowed on Deck-beams.

The Stringer-plate to be coated with Bitumastic Solution before wooden deck is laid thereon.

The wood Fir Deck to be specially and carefully selected, thoroughly dry, and entirely free from sap.

The Boundary-planks to be of approved Hardwood.

The edges of planks to be bevelled to form a Caulking-seam. Three threads of oakum to be driven into each seam, and horsed, after which the deck is to have one more thread of oakum and to be payed with Marine Glue.

The Deck-bolts to be sunk in plank and to be plugged with plugs dipped in white lead before being driven.

Deck to be cleaned off flat; the planks before caulking, and the pitch, etc., after caulking.

Trusses in Way of Bulwarks:

The Truss at Bulwarks to be constructed as shewn on the Drawings. To be 6'0" high. To have Webs every 12'0". Web-plate to be 3/8".

Bottom chord of Truss to be 15" x 3/8". Top ~~of~~ chord to be 6" x 6" x 7/16" Angles.

Struts or Stanchions to be 3" x 3" x 3/8" Angles, doubled.

Tie-plates to be 6" x ½", riveted to top and bottom chords.

Web to be flanged on top and face for 3".

A fore and aft Plate, flanged 3" on Deck, to be riveted to Deck, and to run up Web 15"; to be 3/8" thick.

Another fore and aft Plate, 12" x 5/16", to be riveted to Web at top as shewn on Drawings.

Bottom chord to be riveted to Deck with 3" x 3" x 3/8" Angles.

Car-Braces:

Car-braces to be fitted as per Drawing, ten on each side, with connections to Bulwark Web every 12'0", as indicated on Drawings.

Guards:

Angles to receive guards to be 4½" x 3½" x 7/17", to be placed on sides as shewn.

Angles and Shell-plating between the Angles to be thoroughly cleaned, chipped and free from sweat and water, to be coated with Bitumastic Solution before wood is inserted.

Guards to be 10" x 10" Fir, straight-grained and free from sap.

Waling-pieces to be 10" x 10", spaced 12'0" centre to centre.

Guards to have a 5" x 5/8" Face-bar.

The whole to be securely fastened to Angles and Plating with as few bolts as possible through the Shell.

Rudder-Trunk:

Rudder-trunk to be of Cast Iron, strongly ribbed, and carried up to under side of Deck. Trunk to be built to Drawings and arranged with watertight Stuffing-box; also, to take weight of Rudders.

Rudders:-

Rudders to be two in number; to be set between Centre Truss and Longitudinal Bulkheads. To be of Stern-wheel Balanced type, with wooden blades, all as per Drawing.

Tillers:

Tillers to be of Forged Steel, of approved size and length of Arm, with suitable Connecting-rods and allnecessary gear.

Hatches:

Hatches to be made in Deck. Size of Hatches to be 24" x 20". Number of Hatches, about 23.

These Hatches to have Angle-iron Coamings, riveted to Deck. Covers of Hatches to fit over Coaming, and to be of

Steel, hinged as per Detail.

Ladders to be placed at one of the Hatches leading to each compartment.

Wooden Grating to be fitted inside each Hatch, as shewn.

Manhole Doors:

Manhole Doors to be fitted to each compartment used for water.

All Water Tanks to have Filling-plugs on Deck, fitted with a 2" American Pipe-thread, Female end.

A plug to be fitted in each Filling-connection.

The Water Tanks, such as the Freshwater Tanks, the Fore-peak, the Afterpeak Tanks, must all be fitted with Overflow and Vent Pipes. The Overflows and Vents to both be 2" pipes.

All compartments to have Draining-plugs in bottom, finished flush with Plating.

Scuppers:

Scuppers to be fitted to Deck as directed. There will be four Scuppers each side on Main Deck. Each scupper to be 3", lead or Cast Iron pipe, fitted with proper Grating on Deck, and flanged at Ship's side overboard.

Cementing, Etc.:

The whole of the interior of the Hull, except as otherwise specified, including Deck-beams and under Side of Deck-plating, to be coated with Bitumastic Enamel. The bottom to be cemented as follows:-

Cement and concrete to fill up to top of Bulb-angles forming Centre Trhough-plate.

A coat of Pure Portland Cement to be placed on bottom, with a firm Cement finish at sides. The concrete to be filled

on top of this coat, and to be free from large stones. The top to be coated with one coat of Pure Cement, forming a smooth finish.

The whole to weigh about 75 tons.

Cement to run out to turn of Bilge.

The Water Tanks to be cemented with three coats of good Cement. Bottom of Tanks to be 2½" thick with Cement.

Limbers:

Limbers to be arranged in all compartments, enclosed by Watertight Bulkheads.

Height of all Limbers to be arranged to suit the cemented bottom.

Limbers to be 3" in diameter.

Hawsepipes:

Hawsepipes to be of Cast Iron, heavy construction; to be two in number.

The Hawsepipes to be set on top of Main Deck.

Port-pipe to be used for anchoring, and shelf to be fitted to receive shank of anchor when housed.

Starboard-pipe to be used for twoing, end of tow line being shackled on to 50 fathoms of cable passed over wildcatted windows.

Chain-Locker:

Chain-locker to be arranged in Forehold aft Peak Bulkhead. To be framed of wood 2" thick, and connected up to Windlass with wood Chain-½i½e of sufficient diameter to prevent chain chafing when it is in use. End of chain to be securely fastened to Keelson.

Anchors and Chains:

Barge to have one 16¾ cwt Self-housing Stockless Anchor,

with 150 fathoms of 1¼" Stud-link chain; one Stream Anchor to Lloyd's requirements to be supplied.

Caulking:

All caulking of Shell-plating, Bulkheads, Decks, etc., to be carefully and efficiently done to the entire satisfaction of the Company's respresentative.

All Watertight Compartments to be tested and approved of.

Rail-timbers:-

Timbers for rails to be 6" x 12", as shewn. To be faired off on top and to finish level at after end.

The Wing Timbers to be increased in depht gradually to accomplish above object, the centre timbers remaining the same right through.

Timbers to be well bedded to Deck, with paint and felt, and through-fastened with ¾" Carriage-bolts every 18".

~~Planks to average 24'0" in length, with butts shifted, and butts left opened 2" to form Scuppers. Butts to be coated~~

Planks to average 24'0" in length, with butts shifted, and butts left opened 2" to form Scuppers. Butts to be coated with Bitumastic Solution.

Lugs to be placed on Deck to keep Rail-timbers from spreading, as directed, say three to each length of plank.

Stand for Cleats:

Stands for Cleats to be riveted to Deck, in positions indicated on Drawings. Stands to be constructed of two pieces of 3" x 3" x 3/8" Angle riveted to Deck. Length of each piece to be 3'0".

Two pieces of plate of similar length, flanged outward 3" at top, to be riveted to Angles on Deck. A ½" plate to be riveted to flanged portion of vertical plates. The whole to be 15" high when finished. The distance between heel and heel

Of Angles on Deck to be 8".

There will be eight Stands in number on the Main Deck.

Fairleads:

There will be two Fairleads riveted to Main Deck aft, in positions shewn on plan.

Cleats:-

There will be eight Cleats, bolted to Stands on Main Deck Cleats to have base 7" x 1¼" x 3'0" long. Distance from tip of horn to tip of horn to be 3'6". Cleats to have three Studs, cast solid with base on top of Cleat. A Detail of Cleat will be supplied.

m Buffers:

Buffers of wood, of approved form, to be fitted across each track in positions shewn on Plans, abaft of break of House. These Buffers to be supported by heavy Steel Brackets. Deatil of Buffer and Brackets to be supplied.

Deck to be strengthened in way of Buffer-brackets, if considered necessary by the Company's Representative.

Clamps and Attachments:

All necessary Clamps and Attachments for fastening Barge to Apron to be supplied and installed, similar to Company's other Barges. Detail of connections will be supplied.

Forecastle Plating:

The Plating on Barge side in way of Forecastle House to be ½" Plate, the Sheer Strake being 5/16" and extending 3" above wood deck.

Sheer:

The Barge to have a Sheer of 3'0", commencing about 60'0" from Stem, as shewn.

Portlights:

Portlights to be of Brass, 12" diameter clear glass, without Deadplates. There will be twelve in number; to be fitted round topside Plating in way of Forecastle Accommodation above the Main Deck.

Davits:

The Davits to be supplied for Boat to regulation size, as shewn on Drawings.

Boat:

One Boat to be supplied as shewn on Drawings, to Company's requirements, fully equipped.

Hull Painting:

During construction, all Ironwork inside and out to receive one priming coat of red oxide paint, except in way of Bitumastic, and the Hull outside to have one coat Anticorrosive and one coat of Antifouling up to indicated Waterline. All other outside Ironwork to have two coats of paint of desired color; and all inside Ironwork, where not Bitumastic to receive three good coats of oxide paint.

# J O I N E R ' S  W O R K .

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General Clause:

The Joiner work is to be built plainly and substantially to give accommodation as arranged in Plans. The work is to be finished complete, including all Hardwood, Plumbing and fixed Furniture, but does not include Wire Mattresses or any Upholstering other than may be mentioned in this Specification.

Houses on Main Deck:

Houses on Main Deck to be arranged as shewn on Plans. The Bulkheads to be 1-1/8" T & G., Fir. Doors to be 1¼" Steamed Fir. Galley Bulkheads in way range to be fitted up as follows:-

1" x 3" Studs spaced 18" centres, to be nailed to Bulkhead. Galvanized Sheet-iron to be fastened to the Studs, forming a Screen Bulkhead.

Thimbles made with 3/8" pipe 2" long, spaced 12" apart, will be used to separate Galvanized Iron already referred to from a similar Galvanized Screen Bulkhead.

Between the Two Bulkheads Silicate-Cotton will be packed. The space between inside Screen Bulkhead and Wooden Bulkhead will be air-space. Holes to be bored in wooden Bulkhead, near Deck, to free this space of air.

All woodwork in air-space to have three coats of paint before being closed in.

Galley to be fitted with all necessary Shelving, Dish-racks, Drainboards, Sinks and Drains.

Mess-room to be fitted with plain soft-wood table and benches. Mess-room table to have raised bead all round edges, to save dishes being broken.

Scupper to be fitted in Galley, of the same size as previously referred to, and in addition thereto.

Toilets: Bath:

One toilet to be fitted up with Standard Enamel Fittings, with flush arranged from Service Tank on top Deck. Floors to be cemented, having similar Scuppers fitted as in Galley.

Bath to be fitted up as shewn in Plan, with all necessary Piping, Drains and discharges. Floor of Bath to be cemented.

Bath-tub to be Standard Mfg Co.'s.

All Bulkheads in Toilet and Bath to be constructed similarly to wood Bulkheads previously mentioned.

Coal-Bunker Bulkheads:

Coal-Bunker Bulkheads to be of Steel, $\frac{1}{4}$" Plate, with $2\frac{1}{2}$" x $2\frac{1}{2}$" x $\frac{1}{4}$" Angle Stiffeners spaced 2'6" centres, securely riveted to Deck and Beams.

A Plate Door for Bunker to be provided, with gear for lfiting and lowering.

Floor of Coal Bunker to be laid with 2" plank, to protect Deck.

Chute to be arranged over Bunker, as shewn on Plan, for coaling purposes.

All plating in Bunker to be coated with Bitumastic Solution.

Bulkhead Aft of Boiler:

To be of Steel, of similar construction to the above.

Painting Steelwork in Way of Houses:

All Steelwork on Ship's sides, from break of House, forward; also, steel Bulkheads, to be thoroughly painted and caulked, except as otherwise specified.

Crew Space:

Bulkheads in Crew Space to be similar to other wood Bulkheads; to be fitted up with ordinary soft-wood Bunkers, with bench in front.

Houses, Forecastle Deck:

Carlings of Houses to be 2¾" x 3" under Pilot-house. Balance of Carlings to be 1¾" x 3". All to be spaced 22" centres. Carlings to project beyond House 12"; to be finished with a face-piece ¾" x 5½". The projection under Carling to be covered by a ¾" x 12" piece, and the whole neatly moulded.

Coamings:

Coaming to be 6" x 6", bedded to Deck in canvas, well red-leaded and securely fastened to Deck, with bolts 5/8" diameter. Coaming to be rabbeted to suit the outside sheating and inside lining.

Studs:

Studs to be 1¾" x 2¾". Studding to be morticed into coamings and plate at top. Studs to be spaced 22" centres.

Plates:

Plates to be 2¾" x 3½". Through-bolts from Plate, through Coaming and Deck, to be fitted. Bolts to be 5/8" diameter. Bolts to be at all corners, and also close to all Bulkheads.

Outside Walls:

To be 1-1/8" T & G clear Fir, thoroughly dry. Groove and tongue to be white leaded before being driven home. All

to be finished flush and planed off smooth. The inside of sheating and Studs to be painted before the inside sheating is put up.

Inside Walls:

To be finished plain, with vertical-laid ⅜" T & G Fir. T & G to be painted on inside before being put in place.

Bulkheads:

Where not otherwise specified, Bulkheads to be of single ⅜" x 3" double-beaded fir, laid diagonally and fastened to Carlings, Sills and Studding, to approval.

Staterooms:

Captain't and Purser's Rooms to be fitted up plainly; to have Hardwood Berth-front, with Drawers underneath. Also, Settee, Washstand, Clothes-locker and Mirror. Desk to be placed in Captain's and Purser's Rooms.

Builders to furnish Basins for Stands, but not the receivers.

Office:

Office to be fitted up with Desk and Drawers, to approval.

Store:

Store to be fitted with all necessary shelving.

Sashes:

Sashes to be of 7/8" Hardwood, glazed with clear Double-thick Window Glass, and fitted with Brass Weather-strips on bottom, and Rubber Bumpers.

Doors:

Doors to be plain Ship's Doors, 1¼" thick, to approval.

Deck:

Deck to be 1¼" Fir T & G beaded on under side; to be covered with heavy canvas on felt. Canvas to be fitted as follows:-

Strips of light canvas, bedded in white lead, to be placed

at seams. Canvas to be laid over strips after being damped. Canvas to be thoroughly stretched while damp, and nailed with 5/8" double-pointed tacks, 3/8" apart. The canvas to have four good coats of paint , the first coat to be put on as soon as canvas is laid.

Covering-boards to be 1¼" x 5", with large half-round on face.

Light-Screens:

Light-screens to be of regulation size.

Name-board:

Name-boards to be fitted as directed.

Rail Round Forecastle:

Rail to be of wood, with Coaming 4" x 3".

Stanchions to be 3" diameter, spaced 3'6" centres.

Top and bottom Plates to be ¾" x 3", to receive Wire Netting, to be fitted. Wire Netting of approved pattern to be fitted.

Rail to be ~~fitted~~.2" x 6". Height of rail to be 3'6".

Ladders:

Ladders to be fitted to reach all Decks as required.

Two to lead to Forecastle Deck, and one to Pilot-house.

Iron Handrails to be fitted to each Ladder.

Pilot-House:

Pilot House to be constructed similar to house underneath. Windows of Pilot-house to be 2'0" x 2'6", similar in construction to other Sashes.

Rail, with Wire Netting, similar to Forecastle Deck, to be fitted all round Pilot-house.

Coal Chute:

Coal-Chute to be built aft of Pilot-house as shewn on Drawings, with hinged cover to raise up when coaling. Detail to be supplied.

Scuppers:

Scuppers to be put in where required; to be finished thoroughly watertight, with lead-pipe and brass castings, as directed. One Scupper on each side to be led down by pipe, discharging under Guard.

Hardware and Fastenings:

All outside fastenings to be done with Galvanized nails, or Brass Screws.

All Hardware to be of Brass, of heavy Marine Pattern.

Painting:

All outside woodwork to have three good coats of white lead and oil and all inside work to have two coats of white and on one of Zinc.

Store Room:

A Store Room to be fitted up in Aftern Compartment below Main Deck, or in other approved place, with all Shelving required for General Stores.

Hatchway and Ladder to be provided to suit requirements.

Steering Gear:

Suitable Hand-gear to be fitted in Pilot-house, with all necessary Fairleads, Rods, Chains and Sheaves. Rods to be led full length on top of Deck, along inside of inboard rail-timber of Wing tracks and to be carried below Deck in way of After Compartment to reach Tillers. Rods to be 1" diameter, and Chains 13/16" diameter.

Pilot-Wheel:

Large Pilot-wheel to be furnished, to approval.

Mooring-Pipes, Fairleads and Cleats:

One mooring-pipe each side to be fitted in Plating at Forecastlehead; to be 15" diameter. Plating to run up forward to height of rail and finish as shewn.

Four cleats, similar to those shewn on the Main Deck, to be placed on Forecastle Deck as directed.

Fairleads to be provided for the two After Cleats.

Towing-Bitts:

Towing-bitts to be 18"x 18", Hardwood; to be strapped on Main Deck and run on Forecastle Deck as shewn on Plan.. To be well kneed to Main Deck and Forecastle Deck, all to approval.

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# M A C H I N E R Y .

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Boiler:

One Water-tube Boiler of Hollander design, having a heating surface of 500 ft, to be supplied and installed. To be designed to fit space between Decks; to comply with and pass the Canadian Marine Board of Inspection for 125 lbs pressure, with all necessary fittings, complete. To have all Piping, from Pumps to Boiler, from Boiler overboard, etc., installed with Steel casings and Smoke-stack. Smokestack to rise to a height of 20'0" above Forecastle Deck.

Whistle:

One 4" Steam Whistle; to be mounted above Pilot-house, with cord, for signalling.

Feed-Pump and Injector:

One Brass-lined Duplex Pump, of sufficient capacity to supply Boiler, to be installed, with all suction anddischarge ppipes, complete, also Steam and Exhaust.

Also, 1 / 1" diameter Pemberthy Injector to be supplied and connected up to boiler.

Both Pump and Injector to be connected from Freshwater Tanks.

Pump to have a Discharge to Boiler and Freshwater Service Tank.

Bilge and Fire Service Pump:

One Brass-lined Duplex Pump, 7" x 6" x 10", to be fitted with Suction from Sea and Bilges, and to Discharge to Fire Hydrants and overboard.

Bilge-suction Main to be 5" diameter, Galvanized Iron pipe, to have Branch connections from every compartment; to have Separate Suction and Discharge into Ballast Tanks.

All Suctions to have independent-control Valve, with proper Brass Deck-plug.

Spanner to suit spindles of rods to be supplied.

Control Valves for Suction and Discharge to be supplied with Pump.

Pump to be supplied with all necessary Steam and Exhaust Pipes.

Fire Hydrants:

Two Fire Hydrants with 2" connections, to be laid along Deck and fitted where directed; one to be forward and one aft.

Steam Heating:

All Rooms to be supplied with approved Cast Iron Radiators taking steam from Boiler through Reducing-valve set to 15 lbs pressures. Discharges led overboard.

Galley Sink to be connected to reduced line also.

Bilge-boxes:

Cast Iron Bilge Boxes to be installed with each Suction.

Hand Freshwater Pumps:

Hand Freshwater Pump to be installed alongside of Galley, and arranged to draw from Main Tank and deliver direct to Sink or Service-tank as required.

Freshwater Service Tank:

One Freshwater Service Tank, of not less than 400 gallons

capacity to be installed on Forecastle Deck; to be fitted with all Piping necessary for Vents, Filling and Discharge. Filling-pipe to be connected from Steam Feed-Pump and Hand-pump, and Discharge-pipe to be connected to supply Galley and Toilet.

Mast and Jackstaff:

Mast and Jackstaff to be fitted as shewn, with stays as indicated.

Windlass and Capstan:

Windlass and Capstan to be supplied and installated in positions indicated on Plans.

Windlass to have sufficient power to lift anchor rapidly as well as drive Capstan.

Capstan to be fitted on Forecastle Deck, and Gearing from Windlass to be arranged to approval. All to meet with the approval of the Company's representative.

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## G E N E R A L.

The whole of thematerial, except where otherwise specified, to be supplied and installed to the approval of the Company's representative. The workmanship must be thorough in all Details, and when the Barge is completed to be handed over to the Canadian Pacific Railway Company at Vancouver or Victoria, as the case may be, with steam up.

The Canadian Pacific Railway Company will furnish and

lay the steel rails.

Notwithstanding any omissions, the Barge must be complete in every detail and in working order, to the entire satisfaction of the Canadian Pacific Railway Company.