5-TON STARBOARD DECK CRANE REPLACEMENT

Scope

The intent of this specification is to provide a new deck crane to be fitted in the same location as the current 5T deck crane that meets all of the performance requirements listed within this specification. Spare parts and documentation as outlined within this specification shall be included.

The successful crane supplier shall also provide installation specifications/drawings to remove the current crane and install/function test the new crane.

Note: Cost of crane supply, installation specification, spares and manuals shall form the evaluated total for bidding purposes.

References

Specific references identified within the following sub-sections shall be considered when completing the work.

Drawing #	Rev	Title & Notes
T13-1051-001	**R7**	General Arrangement Profile and Main Deck
2429-01-00		Starboard side 5MT Crane Replacement

Technical Description for Crane Supply (Pages 1-4)

Existing Configuration

The vessel has one existing provision crane located on main deck starboard at frame 60

Manufacturer: Hagglunds A/B

Type: SVESP 5 x 10

Serial No.: 345 00038-41

Power: 32 kW, electro-hydraulic

Performance Requirements

Contractor to supply a new electro-hydraulically powered fixed-length boom crane to be located at frame 60; in the same location as the existing.

Crane shall have the following specifications as a **minimum.** Proposed crane can exceed performance requirements.

Type: Fixed-length boom, with 10 meter radius

Service: Marine compatible, corrosion resistant and water resistant

Power:	Self contained electro-hydraulic.
	Available 460VAC/3ph/60Hz from ship's existing electrical distribution system
SWL:	5 tonnes @ 10.0 m
Maximum reach:	10.4 m
Minimum Radius:	2.5 m with boom fully topped.
Side towing load:	No requirement
Lifting height:	NA
Max working list:	10 degrees
Max working trim:	2 degrees
Distance Above	
Main Deck:	Centerline of Boom in Horizontal Position 4.6 Meters
Boom Angle:	Indicator to be fitted on the boom

Rates of movement:

Slewing:	360 degrees, maximum rate 1.5 rpm
Slewing Arrangement	
Above Pedestal:	Maximum radius 1.7 Meters to clear obstructions
Boom topping:	Time from Min to Max 30 seconds with 5 tonnes load. Boom to be fitted with LED floodlight with swivel to allow adjustment with boom angle.

Controls:

- Manual hydraulic levers.
- Limit Switch for luffing
- Oil level switch
- Oil temperature switch
- Oil pressure switch
- Load Moment indicating device

Operator’ Cab:

- Operator viewing height shall be located at 4.6 metres above deck.

- The cab shall be located on the left hand side of the boom.
- Cab to be insulated inside
- Safety glass to be fitted to front window, side window, and roof window
- Dome light inside
- Swing-out window in front
- Window fan, wiper
- Unit heater,
- Illuminated instrument panel with dimmer control, Stop Start pushbutton, oil level alarm, oil temperature alarm, boom angle alarm, Oil pressure gauge or meter, load indicator, cab heater control, Cab light switch, Boom light switch, Emergency Stop push button.
- Operator Instructions to be posted at console
- Load Diagram to be posted inside of crane cab

Winch:

The crane shall have one Main Winch. Winch shall be hydraulically driven. Winch shall be supplied with suitable rigging and be capable of:

Line Pull:	5 ton
Line Speed:	25 m/min
Wire:	50 metres
	Hook with swivel and safety latch

Electro-hydraulic power unit:

The crane shall have a single skid mounted electro-hydraulic power unit and stainless steel tank. Power unit shall be contained within crane

Power unit shall provide sufficient hydraulic power for performance as noted above and shall be supplied by 440VAC/3ph/60Hz.

Interference Items

Contractor shall ensure operator's cabin and access ladder are compact and shall not interfere with operations of adjacent tugger winch, nor work on main deck.

Standards:

- Transport Canada TP127 – Ships Electrical Standards
- Lloyd’s Register Rules and Regulations for the Classification of Ships

- Classification or API Certification of Cranes

Spares

- Contractor shall provide spares for supplied equipment. Spares shall be provided for Level 1 and Level 2 maintenance. Contractor shall provide list of spares being provided. All costs associated with general spares outlined shall be inclusive of the bid price.
- Furthermore, contractor to provide a list of manufacturer recommended spares for a fifteen year lifespan. List to include part numbers, lead times and local and international distributors and service centres.

Manuals (Operation and Maintenance)

- Contractor shall provide manufacturer recommended operational and maintenance manuals. Four (4) paper copies of each document shall be provided. Alternatively, (2) paper copies along with a single electronic copy may be provided. The electronic copy shall be Adobe™ portable document format (i.e. pdf) version 5.0 or later. Files to have a resolution not less then 300 dpi, manufacture approved and in the case of duplicated printed media, colouring as per of original document shall be maintained. One copy of each document shall be provided in French.

Installation Specification Requirements (Pages 5-12)

Contractor shall include in their bid the cost of supplying an installation specification that shall be required within 8 weeks of contract award for the supply of the new crane. Coast Guard shall make vessel available for a 24 hr period in St. John's, NL to allow contractor time to obtain pertinent information/drawings to create acceptable installation specification. Coast Guard will provide all drawings and Coast Guard documentation required to successful crane supplier.

The installation specification shall meet at a minimum the following requirements listed below: 'Standards', 'Strip Out Requirements', 'Installation Requirements', 'Proof of Performance' and 'Deliverables'. The installation specification shall be Lloyd's Register of Shipping approved and include Engineered Stamped drawings outlining steel work required. Lloyd's Register of Shipping inspection points and Transport Canada inspection points shall be included in the installation specification as required.

The installation specification shall call for the crane authorized service representative to oversee the Proof of Performance for the crane installation. Contractor shall include a separate cost for the authorized service representative to oversee the Proof of Performance for Coast Guard budgeting purposes during install.

Standards

Quality Assurance (QA) Standards

The Contractor shall implement a quality program based on the requirements of ISO 9001-2000. All work shall be implemented in accordance with the Contractor's proposed Quality Plan and quality procedures, work instructions and inspection plans developed there from.

The following additional standards shall be used, as required, in carrying out this installation specification. Current edition of documents, at time of contract implementation, shall be used.

- Transport Canada TP127 – Ships Electrical Standards
- Lloyd's Register Rules and Regulations for the Classification of Ships
- IEEE STD 45 - Recommended Practice for Electrical Installations on Shipboard
- COLOUR CODING STANDARD FOR PIPING SYSTEM - 30-000-000-ES-TE-001
- Classification or API Certification of Cranes
- CCG Paint and Coating Standard, (18-080-000-SG-003, 2002)
- DFP 5871 "Welding of Ferrous Metals"
- General Guidelines for the Coast Guard Fleet Identity Program, (TP 4011)

Regulations

The following regulations shall be used, as required, in carrying out this work. Current edition of documents, at time of contract implementation, shall be used.

- CANADA SHIPPING ACT – Hull Construction Regulations
- CANADA SHIPPING ACT - Marine Machinery Regulations
- CANADA SHIPPING ACT - Tackle Regulations

Strip-out Requirements

Contractor shall strip out items and material as listed in the following table:

Item	No. off or Amount	Remarks
Starboard Side Deck Crane	1	Return to Owner
Electro-hydraulic Power Pack c/w hydraulic distribution system	1	Return to Owner
Crane foundation tube and bolting flange	1	Return to Owner

Installation Requirements

Contractor shall supply and install the following as listed in the following table:

Item	No. of or Amount	Remarks
New Crane c/w with operator's cab and pedestal	1	See Section for Performance Requirements
Electro-hydraulic power pack	1	See Section for Performance Requirements
Foundations	As Required	New Foundations, either in part or in whole, shall be provided. Ensure suitable load distribution to primary structure beneath.
Electrical Power Cabling	As Required	New power cabling, breaker and safety devices shall be installed as per TP 127

Contractor shall provide installation specification for the new deck crane including all components and equipment to meet functional capability as described in Performance Requirements.

Crane Foundation

Contractor shall reconfigure, where necessary, and supply and install new steel work as required to support crane replacement.

The following items to be included, without exclusion, in the Contractor's installation specification:

- All services necessary to carry out modifications and additions.
- Cut-outs for access where required, i.e. both removal and refitting.
- Removal of scale, mud, coating adjacent to areas to be cut either for access, removal or renewal (including fairing of adjacent structure).
- Protection of adjacent areas, especially in coated tanks. Any damages to adjacent steelwork and/or coatings done during repairs, to be rectified by the crane installer.
- Fairing of adjacent structure, both plating and stiffening.
- Delivery of all materials and equipment to and from the vessel.
- Removal and disposal of oil residues, sludge, scale and debris, this to include cleaning after repairs.
- All new steel to be grit blasted to SSPC-SP10 and coated in accordance with the original coating specification.Disturbed steelwork also to be surface prepared and coated as per original specification.
- Fire watch in way of repair area.
- NDT requirements in accordance with DFO 5871 "Welding of Ferrous Materials"
- Pressure tests and/or hose tests of tanks/openings etc as required by Llyod's Register and Transport Canada that are modified during crane install.

General notes regarding steel renewal work

- All steel Plate used is to be Classification Grade "A" steel, shot-blasted to SA 2.5 and primed, unless otherwise stated. When high tensile steel is specified to be fitted, Classification certificates referring to "stamped" marks on plates, to be issued.

  The vessel/inspector to sight all plate/ section certificates prior to cutting. Material used without certificates being previously sighted will not be accepted. All materials shall be new.

- Pre-fabricated steel sections to be grit blasted to SSPC-SP10, inspected, then coated prior to delivery onboard.
  When coatings are found damaged after final welding has been carried out, the damaged area should be suitably surface prepared, adjacent coatings feathered and coatings applied in accordance with original specification.
- Where steelwork is removed, the resultant edges to be ground smooth and edge prepared in accordance with welding detail necessary for subsequent renewals.

Where plating only is removed, the remaining edges of internals to be ground smooth prior to the new plating being fitted.

Where internals only are removed, the plating in way of the removed internals to be ground smooth prior to new internals being fitted.

Any damages caused by removal of plating and or/internals to be repaired to the satisfaction of the vessel/inspector prior to any new steelwork being fitted.

Any temporary steelwork inside tanks, etc., such as lifting lugs or staging pieces, need only be cropped at welds, but remaining weld to be well rounded. Such temporary steelwork on external areas to be ground flush and any scars repaired by welding/grinding.

In general all fairing aids to be removed. Removal of temporary pieces to be by gas cutting and remains ground flush – they must not be hammered off.

When coatings are found damaged after final welding or in way of temporary steelwork removal has been carried out, the damaged area should be suitably surface prepared, adjacent coatings feathered and coatings applied in accordance with original specification.

- New steel to be fitted and faired, with due care to ensure proper alignment, i.e., moulded lines in general to be maintained. The vessel/inspector to witness "fit-up" condition prior to any production welding being carried out.
- All welding to be in accordance with DFO 5781 requirements. Approved electrodes to be used throughout repairs/renewals, together with agreed welding procedures. Where high tensile steel is being fitted, pre-heating to be carried out prior to welding, as per DFO 5781 requirements. Approved low-hydrogen electrodes must be used, these to be kept in heat ovens adjacent to the work site.

  All butt welding to be continuous full penetration welding, welded from both sides with the edges of plates being welded have firstly been properly edge prepared. The vessel/inspector to inspect the condition of all back gouging prior to final welding.

  In general, fillet welding to be double continuous welding Care to be taken to ensure all welding is returned in way of plate thicknesses at slots, scallops, brackets, etc.

  The welding sequence is to be submitted for approval to the vessel/inspector. All welding practices and sequences to be carried out with due care to minimize built-in welding stresses.

- Where horizontal members are repaired by fitting inserts, the top weld reinforcement to be ground flush. Where inserts are fitted in way of original access/drainage holes, these holes to be reinstated.

  Edges of all openings, holes, slots, etc., cut during modifications are to be ground smooth with no serrations remaining.

- After completion of all steelwork, the entire area to be inspected by vessel/Inspector and any defects found repaired to their satisfaction. After completion of repairs, where applicable, the area to be coated in accordance with the original coating specification and/or as detailed in repair specification whichever applies.
- Contractor shall be responsible for all gas freeing certificates required to carry out specification.

Painting

All new and disturbed structure and pipe shall be coated as specified in CCG Standards

Proof of Performance

Inspections

The Contractor shall provide proof of performance with respect to all work. As a minimum this shall include copies of all inspection points identified within the Contractor's proposed Quality Plan and those identified by the rules and codes. Proof of performance shall also include all inspection check points specifically detailed below:

- Verification of correct adjustment and operational condition of emergency shut-offs and back-ups.
- Verification of correct adjustment, alignment and operational condition of securing arrangements, connection of the components to associated systems, safety, control and monitoring devices.
- Inspection of components and their installation.
- Verification of plate preparation and alignment prior to assembly and, on completion of all construction operations.
- Inspection of welds, including non-destructive test examination and verification of the heat treatment process.
- Verification of reliability and sufficiency under trials up to full power under normal working conditions for a suitable endurance period
- Correct adjustment and operational condition of safety valves.
- Correct adjustment of controls and monitoring systems
- Operational condition of alarm systems,
- Verification of correct balance of rotating components.
- Control monitoring and alarm systems shall be tested to ensure audible and visual alarms are operational including any change over requirements. All automatic change-over devices shall be verified for functionality.
- Verification of correct adjustment and operational condition of valves and components within the systems.
- Verification of general workmanship including that of furnishings, insulation, outfit, joiner work, stowage, painting and cathodic protection as required.

Test and Trials

- The Contractor shall perform tests to verify that all requirements of the Specification are met. Prior to testing, the Contractor shall visually inspect all components for quality of workmanship, conformity to this specification and the intrinsic safety of equipment operation or testing apparatus.

- If damage to any component or system occurs during or after testing and prior to delivery of vessel, the damage shall be repaired and the previously completed tests of the component or system shall be retested.
- The Contractor shall provide a set of detailed instructions providing a tests and trials agenda including expected results for verification of all system changes.

As a minimum, the Contractor shall provide:

- a full and detailed test procedure
- set up and test all peripheral connections
- Instruments and services for testing and trials, instruments shall be in calibration.
- set up and calibration of all test equipment
- startup and commissioning of the system
- demonstration of equipment, component and operational functionality
- watertight and pressure testing as required
- demonstration of correct adjustment, reliability and operational condition of emergency shut-offs, fail safes and change over and back ups.
- demonstration of all control interfaces
- demonstration of correct adjustment of controls and monitoring systems
- demonstration of the operational condition of alarm systems.
- demonstration of reliability and fitness under trials to full power.
- demonstration to confirm performance requirements
- IC to arrange for a TCMS representative to observe all tests and trials.
- A completion test shall verify that all aspects of the work item have been completed. This shall mean all equipment, piping, electrical, coverings, furnishings, insulation, joiner work, outfit, etc has been installed, tested where applicable and been found satisfactory as per the requirements and proves the compartment is complete and ready for service. For tanks, this shall mean all cleaning, flushing, installations, testing has been completed and that all temporary services are removed and the tank is ready for service.

Certifications

The Contractor shall obtain and provide to the vessel/Inspector all required technical Certifications as specified in the applicable rules and codes. These shall include but not be limited to the following:

1. Equipment and Component inspection certificates including all test reports supporting the certifications.

2. Material test certificates including all test reports supporting the certifications.
3. System Installation inspection certificates including proof of compliance.
4. Lloyd's class approval certificate shall be provided for new deck crane.

Proof of Performance References

The following references describe the general requirements associated with performing tests, inspections and trials and obtaining certificates to demonstrate total compliance with the Specification requirements, as applicable, as well as specific testing requirements and procedures for each type of work being performed (Electrical, piping, HVAC, mechanical, etc.).

Society of Naval Architects and Marine Engineers (SNAME), Technical and Research Bulletin 3-39, Guide for Shop and Installation Tests.

Society of Naval Architects and Marine Engineers (SNAME), Technical and Research Bulletin 3-47, Guide for Test and Trials.

Institute for Electrical and Electronic Engineers (IEEE) Standard 45, Recommended Practice for Electric Installations on Shipboard.

Institute for Electrical and Electronic Engineers (IEEE) Standard 43-1974, Recommended Practice for Testing Insulation Resistance of Rotating Machinery.

Institute for Electrical and Electronic Engineers (IEEE) Standard 112-1991, Standard Test Procedure For Polyphase Induction Motors and Generators.

Institute for Electrical and Electronic Engineers (IEEE) Standard 115-1983, Standard Test Procedure For Synchronous Machines.

Institute for Electrical and Electronic Engineers (IEEE) Standard 120-1989, Master Test Guide For Electrical Measurements in Power Circuits.

American Society for Testing and Materials (ASTM) Standard F683, Standard Practice for Selection and Application of Thermal Insulation for Piping and Machinery.

American Society for Testing and Materials (ASTM) Standard F683, Standard Practice for Quality Control Receipt Inspection Procedures for Protective Coatings (Paint), Used in Marine Construction and Shipbuilding.

American Society for Testing and Materials (ASTM) Standard F1134, Standard Specification for Insulation Resistance Monitor for Shipboard Electrical Motors and Generators.

American Society for Testing and Materials (ASTM) Standard F1155, Standard Practice for Selection and Application of Piping System Materials.

American Society for Testing and Materials (ASTM) Standard F1510, Standard Specification for Rotary Positive Displacement Pumps, Commercial Ships Use.

American Society for Testing and Materials (ASTM) Standard F1511, Standard Specification for Mechanical Seals for Shipboard Pump Applications.

Canada Shipping Act

Transport Canada Publication TP 127 Electrical Installation

Lloyd's Rules and Regulations for the Classification of Ships

Deliverables

Drawings

- Contractor shall update all reference drawings listed within the installation specification provided. Drawings will be revised to the next revision level and denoted as "As Fitted" status.
- The Contractor shall supply new as-fitted drawings showing final arrangement of crane, power unit and structural foundations. System schematics of electrical and hydraulic distribution shall be included. All components shall be shown and labeled.
- Supplied drawings that are vector based drawings shall be updated and delivered in a vector based format. All new drawings are to be delivered in vector based format. Vector based drawings format shall be an AutoCAD™ 2004 format.
- Supplied drawings that are in a printed format shall be updated, scanned and delivered in a raster based electronic format. Raster based electronic format to be Adobe™ portable document format (i.e. pdf) version 5.0 or later. Files to have a resolution not less then 150 dpi.