



SEAPRO Standard Operating Procedure

SOP #	OPS-Deck - 1532121129 SOP Vessel Ops Deck-Crane
Revision #	1547491128
Implementation Date	10/01/2019
SOP Owner	SEAPRO Operations
Approved By	
Diagram or Manual Reference	Hiab documentation located in files on each OSRV and on the SEAPRO server

Purpose

Describe the purpose of this SOP is to provide an operational overview of the OSRV's Deck Crane

Scope

This SOP is applicable to all personnel;

- Who operate SEAPRO's Hydraulic Cranes.
- Assigned to work on SEAPRO's Oil Spill Response Vessels that are equipped with a Hydraulic Crane.
- Maintenance Technicians who perform preventative or corrective maintenance on SEAPRO's Hydraulic Cranes.

Prerequisites

Prior to operating the crane, personnel shall receive training on;

- Main Engine Start Up Procedures
- Operation of the OSRV Hydraulic System
- Crane Operation
- Rigging
- OSRV Operations

Responsibilities

Development and maintenance (updates) to this SOP are the responsibility of SEAPRO's Operations Manager. Contact via e-mail at; ops@seapro.org.

Tools and Equipment

- Rigging/Slings rated and suitable for the load(s) to be lifted
- Tag Lines (4)

General Precautions

- Personnel shall not ride on the hook or load.
- Do not under any circumstances use a crane to lift a load over personnel.
- Personnel shall not stand, walk or crawl beneath a slung load.
- The hoist wire rope shall be in a vertical position when tensioned to prevent swinging of the load.
- Avoid twisting or kinking of the wire rope.
- Tension shall not be applied to any kinked wire rope.



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- Bolts and nuts shall not be used to join a broken chain.
- Lifting appliances shall not be dropped from a height.
- Use tag lines to prevent loads from turning or swaying while the crane is in motion of lifting a load.
- Keep personnel well clear of the suspended loads.
- A spotter/signalman must be used for any lift.
- Do not leave a crane unattended even for a short time, unless all loads have been removed, lowered to the ground and the power shut down.
- Do not lift in high or gusty wind conditions or when sea state exceeds safe operating conditions that may put the load or personnel at risk.
- Always use the cranes load (capacity) rating charts for guidance, these have wind and weather factors built into them.
- Only use properly rated slings to raise, lower or suspend a load.
- Faulty slings shall be tagged for destruction with an Out of Service Tag and removed from service.
- Discard any wire rope used on a crane, when the visible number of broken wires in any length of rope diameter exceeds 5% of the total number of wires in the wire rope.
- Check that there are no loose objects on a load that could fall during lifting. Pay special attention to the tops of containers or pallets.
- Do not use the crane to drag the load along the deck or dock. Severe overloading may result.
- Do not exert a sideways pull on a shackle or eyebolt.
- Lower a load under crane power, except where a chain and block system is attached between the crane hook and the load.
- The work area, equivalent to that of the extended tip of the crane, should be restricted from entry to ensure unauthorized personnel do not enter the area.
- If operating in the vicinity of overhead obstructions or power lines, a spotter in addition to the signalman is required.
- If the crane operator loses sight of the Signalman, he shall take his hands off the controls until he regains sight of the Signalman.
- If any doubt exists about the interpretation of a signal, it shall be interpreted as a stop signal.
- Read, understand and follow the crane load capacity chart.
- Do not exceed crane or winch ratings
- Prior to Lifting a Load;
 - Under direction of the vessel captain, all personnel shall review the lifting task, including personnel positions and duties during the lift.
 - Determine the weight of the load
 - Determine the weight of any load handling devices
 - Add the weight of the load and the weight of the load handling devices. The sum is the total weight of the lift and shall not exceed the cranes capacity as noted on the capacity chart.
 - Determine the distance from the centerline of the crane rotation to the centerline of the load being lifted.
 - Determine the distance from the centerline of crane rotation to the centerline of the point to which the load should be moved.



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- Verify that the crane and load are positioned such that the boom will reach both the starting and ending points.
- Keep at least three wraps of wire rope on the winch.
- Operate crane controls slowly and smoothly.

Pre-Operation Startup Step-by-Step Procedure

- Using the aft starboard hatch on the work deck, enter the engine room on the OSRV.
- Using the Main Engine Start Up Procedures Check List, perform pre-start checks on both main engines.
- Check the Hydraulic Fluid level in the hydraulic oil tank (located on the forward bulkhead). Hydraulic oil should be visible in the sight glass (shown in the picture to the right).



- If Hydraulic Fluid Level is low, fill using Texaco Rando Oil HDAZ 15-32. The fill is located on the top left side of the Hydraulic Fluid tank in the engine room (shown on left).





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- Inspect Hydraulic Fluid Tank to assure the filters (both right and left side) are in place and that there are no leaks. (Filter on the left side of tank shown in picture).



- There are two hydraulic lines that run out of the lower right side of the hydraulic fluid tank. Check to see that both valves are in the open position (aligned with the hoses as shown in the picture).
- Exit Engine Room and secure deck hatch.
- Start Starboard Main Engine
- Start Port Main Engine
- Allow Engines to warm up and come to Operating Temperature
- Remove and stow the fabric cover from Crane



- Energize (turn on) the Hydraulic Systems by engaging (turning on) the breakers on the dash panel (“Port Hyd. Clutch” & “Stbd Hyd. Clutch”) on the dash panel
- Energize (turn on) the Crane by engaging (turning on) the breaker on the dash panel labeled “Crane”
- Inspect all rigging before each use
 - Fabric slings must be free from tears and rips
 - Wire rope slings must be free from kinks
- Inspect all tag lines before each use
 - Tag lines must be free from frays and damage
- Crane must be operated by trained personnel in accordance with SEAPRO operating and safety policies. Tag lines must be used to prevent loads from swinging and personnel must never stand under a suspended load





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Controls

- Personnel shall wear proper Personal Protective Equipment (PPE) for the tasks they shall be performing.
- Hydraulic systems shall be De-energized (turned off) when not needed/in use.
- Personnel shall work under the direction of the Vessel Master/Operator
- Personnel shall use the "Buddy System" while working on the deck of a SEAPRO vessel.

Field Level Risk Assessment

Working on the deck of a boat can be dangerous. Sea State and weather must be taken into consideration before work begins. The Vessel Captain is responsible for the safety of everyone aboard his/her vessel. Safety of personnel shall always take precedence over response activities.

Checklist

- Perform pre-start checks on port and starboard main engines
- Perform inspection on hydraulic oil tank, lines and valves
- Start Port and Starboard Engines
- Remove Cover from Crane
- Inspect Crane, Wire Rope and Hook
- Inspect Rigging
- Inspect Tag Lines
- Energize Hydraulic Systems (Port and Starboard)
- Energize Crane
- Attach Tag Lines to Load
- Position Hook Directly Over Load
- Attach Rigging to Hook
- Take Tension on Load
- Keeping Load as Close to the Deck (or Ground) as Possible, Lift Load Following Signals from Signalman
- Personnel Assigned to Taglines Shall Keep Load from Swinging



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Crew Members and Responsibilities (All Crew Members Have Both the Authority and Responsibility to Call Stop to Any Operation They Believe to be Unsafe)

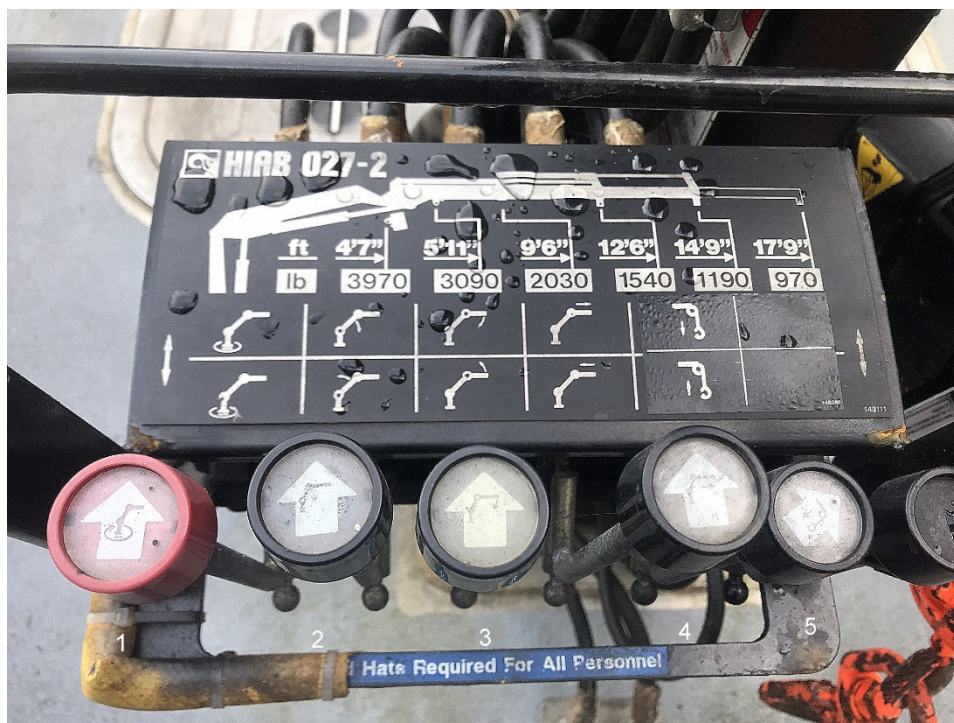
Operator – Runs/operates the crane. Responsible for all pre-use checks and safe operation of the equipment.

Signalman/Spotter -- Provides signals to the Operator to assure the safe operation of the equipment. Remains in constant line of sight with the Operator.

Rigger – Prepares load for safe lifting. Responsible for inspecting all lifting/rigging gear and using approved equipment that is rated for the load. Responsible for knowing the limits of all equipment/gear used in crane operations. The Rigger handles tag lines during crane operations. Safe operations may necessitate more than one person assigned to handle tag lines.

Observer – Keeps watch on the operation to assure a safe operation.

Crane Controls



- 1 – Turret
- 2 – Outer Boom



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3 – Inner Boom

4 – Jib

5 – Wire/Hook

Crane Operations

Following preparation of lift plan, pre-lift meeting, pre-lift hazard survey and equipment/gear inspection, the rigger shall prepare the load for lifting by attaching lifting equipment/gear to the load.

Rigger shall attach tag lines to the load so its movement can be controlled.

With all personnel safely positioned, the operator positions hook directly over the center of gravity of the load as directed by the signalman.

Be smooth and gentle in the use of crane controls. Starting or stopping the movement of a load too quickly can increase its apparent weight by up to 50%. When lifting a load from the deck, gently increase pressure on the controls until the load breaks free. The load should rise straight up when comes free of the deck. Once the load has been lifted, slowly speed up to the desired operating speed.

While moving a load, avoid sudden stops as these can “shock load” the system.

If the vessel is rolling or pitching, even only very slightly, that movement will be picked up by the load once it is free of the deck. A swinging load can be extremely dangerous. Keep the load as close to the deck as possible.



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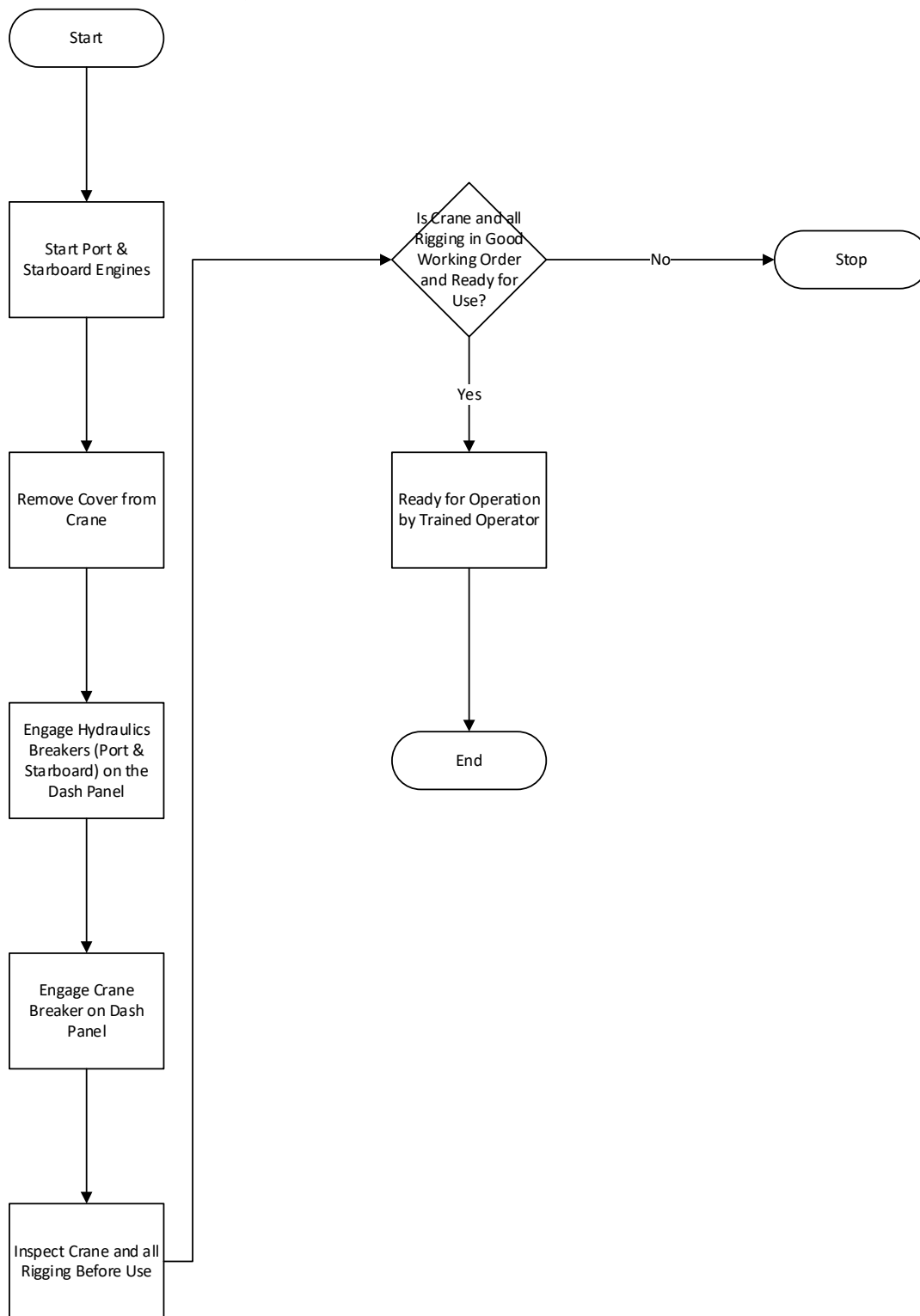
References to JSA Analysis

See JHA No.: 1532121129-1



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Process Flow Diagram



Job Hazard/Safety Analysis (JH/SA)

Work Category: Spill Operations

Work Location: Spill Site

Date: 2018-08-15

Task Description: Crane Operations

JHA No.: 1532121129-1

ID	Sequence of Job Steps	Identified Hazards and Critical Behaviors	Recommended Procedures
1	Prepare a lift plan	Miscommunication, confusion, poor coordination of efforts, proper PPE not identified and required.	All lifts require a new lift plan. Lift plans can be reused for identical tasks.
2	Pre-lift Meeting	Miscommunication, confusion, poor coordination of efforts, proper PPE not identified and required, unqualified operator, crane damage/loss of load.	Staff should participate in the meeting hold which is called Pre-lift Meeting to review the plan/procedure before making a lift. All participants should be briefed as follows (and as a minimum): <ul style="list-style-type: none">• Intended lift sequence and load path;• Establishing a Work Control Zone and keeping non-participants out;• Identified hazards;• Methods of hazard mitigation;• Load securement;• Stop Work Authority• Responsibilities for rigging, dogging and spotting duties (i.e. ensuring the crane does

			<p>not contact obstacles) should be specified;</p> <ul style="list-style-type: none"> • Hand signals and none verbal communication.
3	Pre-lift hazard survey	Personnel injury or death, crane or load damage or loss, pinch points, electrocution, load instability due to high winds or sea state,	<p>Prior to any lift a site and work area survey must be completed to identify and mitigate any hazards.</p> <ul style="list-style-type: none"> • Deck and dock areas should be free from obstructions and trip hazards. • Overhead obstructions should be cleared, or safety perimeters established. • High visibility flagging should mark safety perimeters. • Winds do not exceed safe operating limits.
4	Inspection	Crane in disrepair or missing safety equipment, injury or death due to defective equipment, high pressure injection from hydraulic failure, damage load,	<p>Lifting and rigging equipment must be inspected by the nominated Competent Person prior to commencement of operation. Inspect all wear items for signs of excessive wear or fatigue:</p> <ul style="list-style-type: none"> • Load chains, slings or wire ropes; • Shackles, rings, clips, eyes and hooks; • All components requiring lubrication; • Check gear-boxes for proper levels; • Check control stations for safe operation;

			<ul style="list-style-type: none"> • Inspect the structure and support for safe operation; • Test brake for proper operation and adjust as needed; • Confirm all limit switches and safety devices are working properly; • Confirm all controls go to neutral; • Inspect hydraulic lines and valves for leaks and corrosion; • Inspect and lube load hooks and other lifting devices, confirm safety catch is working properly; • Confirm warning labels and Load/Capacity Rating chart are readable; • Annual inspection tag is readable and current; • Boom angle indicator is present and functioning; • Weight of item(s) to be lifted is known and visible to operator; • Fire extinguisher is available;
5	Engine room pre-start check	Stress injury from lifting (hatch cover) low head room, non-ergonomic posture, trip hazards, poor visibility, air quality in confined space, exposure to hazardous materials, noise.	<ul style="list-style-type: none"> • Use proper lifting technique and avoid trunk rotation while lifting, use a cheater bar or two people to rotate latch system.

			<ul style="list-style-type: none"> • Open engine covers and use safety locking pins to secure cover. Properly ventilate engine compartment. • Navigate compartment slowly being mindful of trip hazards. Stand upright whenever possible or bend at the knees for a lower posture position. • Use safety glasses and nitrile gloves for fluid inspection or filling (non-running engine). • Use hearing protection and face shield (engine(s) running).
6	Start engines	Fire or explosion, high pressure hydraulic lines, electrical shock.	<ul style="list-style-type: none"> • Ensure fire extinguishers are available and in working condition. • Wear proper PPE when working near pressurized hydraulic, water and fuel lines. • Stay clear of un-insulated electrical connections.
7	Remove and stow fabric crane cover	Trip or entanglement hazard from improper stowage.	<ul style="list-style-type: none"> • Stow neatly in a designated location away from work area.
8	Energize hydraulic system	Electrical shock, high pressure fluid injection, eye injury, skin irritation/injury.	<ul style="list-style-type: none"> • Ensure all electrical connections, breakers and switches are properly installed, grounded and in good repair.

			<ul style="list-style-type: none"> • Check high pressure hydraulic lines, hoses and controls are in good repair and free of leaks. • Wear proper eye and skin protection.
9	The lift	Falling load, line trip hazard, pinch point or crushing injury, equipment or cargo damage, head injury.	<ul style="list-style-type: none"> • Only properly trained and qualified individuals should operate crane. • Ensure slings and rigging are adequate for the lift and have current inspection certification. • Use tag lines in sufficient number and strength to control the load. • Stay clear of the swing zone and out from under an elevated/suspended load. • Control the load hook and wire rope ball while attaching and disengaging from the load or rigging. • Hard hats, steel toes and shanks, eye and hand protection are required for all operators and crew. • Only one signaler should communicate with the crane operator. • Use a safety spotter during lift operations.

10	Post lift shut down	Personal injury, crushing, pinching, head injury.	<ul style="list-style-type: none">• Avoid pinch points while collapsing crane and securing for storage.• Be mindful of the safety hook and ball on the crane wire rope. Use a tag line or hold it steady to reduce swinging.• Make sure cover tie-down straps are secured to eliminate trip hazard.• Wear eye protection until all high-pressure lines have been disengaged.
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Crane Operational Safety Risk Map

ID	Element	Risk Level
1	People	3b
2	People	2b
3	People/Technical	1b
4	People/Technical	1b
5	People	3a
6	Technical	3c
7	People	3b
8	Technical	3c
9	People/Technical	2b
10	People	1a

Impact	High (1)	1a	1b	1c
	Medium (2)	2a	2b	2c
	Low (3)	3a	3b	3c
		Remote (a)	Possible (b)	Probable (c)
Likelihood				

Other Safety Factors

The following restrictions during lifting operations shall be observed:

- Personnel shall not ride on the hook or load.
- Personnel shall not stand, walk or crawl beneath a slung load.
- The hoist wire rope shall be in a vertical position when tensioned to prevent swinging of the load.
- The twisting or kinking of the wire rope shall be avoided.
- Bolts and nuts shall not be used to join a broken chain.
- Lifting appliances shall not be dropped from a height.
- Tension shall not be applied to any kinked wire rope.

Personal Protective Equipment Required for this Task:

Level D	Hard Hat, Gloves, Safety Glasses, Steel Toe/Shank Boots, Coveralls
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Safety Equipment Required to do this Job:

- Fire Extinguisher
- PFD
- Chemical Protective Clothing
- Cork Boots
- Confined Space Permit
- Hot Work Permit
- Hearing Protection