

Marine Safety

Diving

Prior to commencing a diving operation the Project Manager must ensure that there is a Diving Notice of Project posted prior to commencing the work, and that a dive plan/risk assessment has been conducted. The Dive Plan should give a summary of the tasks to be performed, the safety procedures that will be used for the dive operation (listing the hazards), communications, and first aid availability. This plan needs to be discussed with all involved parties. For assistance in developing your site and task specific dive plan, contact the Safety Department.

Diving Contractors Checklist must be completed for all diving sub-contractors.

Diving subcontractor's supervisor must follow the WorkSafe BC regulations stated in part 24, which include, but not limited to possessing the appropriate diving tables, diving logs, ensuring that a standby diver is on-site, and that their divers have the appropriate medical certifications.

Boat Training and Equipment Requirements

A standard piece of equipment of every marine construction site is the work skiff (boat). All employees must possess a Pleasure Craft Operator Certification to transport other people (maximum 6 passengers) in workboats in sheltered waters in a craft less than 8 meters long.

Every skiff on our work sites must be equipped with the following items:

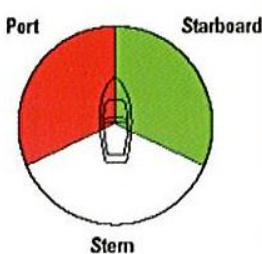
- Paddle with T-top;
- Bailing bucket;
- Skiff capacity stenciled (or welded) on the sides of the skiff;
- Pike poll


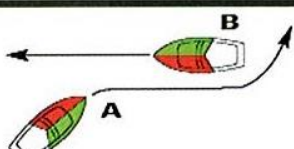
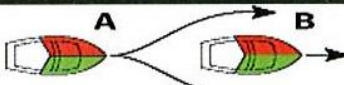
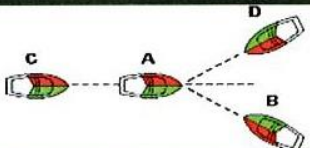
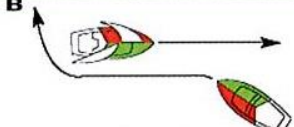

For travels beyond the worksite area the skiff must also be equipped with the following items:

- Throw rope
- Waterproof box containing:
 - Small first aid kit
 - Flares
 - Air horn
 - Light

Only individuals who have completed the Transport Canada Small Non-Pleasure Vessel Basic Safety (MED A3), VHF radio operator, Small Vessel Operator Proficiency (SVOP) and dozer boat practical course will be permitted to operate a dozer boat. In addition to the above noted pieces of equipment, dozer boats are required to have a functioning VHF radio and the daily inspection report completed.

Boat Operations

	Port	If a power-driven vessel approaches within this sector, maintain with caution, your course and speed.
	Starboard	If any vessel approaches within this sector, keep out of its way. <i>(Note: This rule may not always apply if one or both vessels are sailboats)</i>
	Stern	If any vessel approaches this sector, maintain with caution, your course and speed

	<p>A blows one blast and alters course to starboard.</p> <p>B blows one blast and alters course to starboard.</p>
	<p>A keeps clear of and must avoid crossing ahead of B.</p>
	<p>Any vessel overtaking another must keep clear.</p>
	<p>A keeps clear of B</p> <p>B keeps clear of D</p> <p>C keeps clear of A and B</p> <p>D keeps clear of A and C</p>
	<p>A power-driven vessel keeps clear of a sailing vessel</p>
	<p>A Diver is below</p>

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Refueling over Water

While refueling derricks or skiffs the following steps must be followed:

1. Ensure no smoking or hot work is taking place in the surrounding areas.
2. Complete the safety checklist as required.
3. Ensure that adequate spill absorbents are readily available.
4. Measure the quantity that is required to be able to anticipate when the tank is nearly full.
5. Check equipment (hoses, valves) for condition and repair if required. Ensure there are no hose couples or joints over the water.
6. Make sure the vessel is secure.
7. While refueling never leave the area unattended.
8. Securely fasten the storage tank.
9. Place the drum or pump in the required location with the containment in place.

Personal Flotation Devices (PFDs)

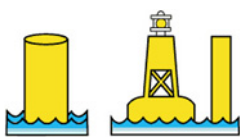
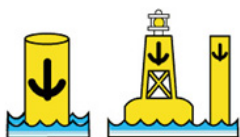
Personal flotation devices (PFDs) are required when working within 6 feet of water, and while working over water. PFDs are not required when a worker is securely attached to a fall protection system. PFDs are supplied to workers by Industra Construction Corp. and must be regularly inspected for damage. PFDs need to be properly fastened to function; it is impossible to correctly fasten a PFD while immersed in water.

When projects require employees to work beyond daylight hours, Industra will supply the workers with water activated emergency beacons to affix to the shoulder region of their PFDs. Additionally, whistles will be provided.

Man Overboard

A minimum of 0.8 meter (30 inch) ring buoys with at least 30 meters (90 feet) of over 600 pound capacity line shall be provided and readily available for emergency rescue operations at least every 50 meters (165 feet) along the water's edge. Life rings must be located on the spud wells of derricks, on or near the crane, and at the stern of the derrick. Additionally, rings may also be required for larger derricks. Drills will be conducted at a minimum annually for all employees.

Markers



Anchorage Buoy

An anchorage buoy marks the perimeter of designated anchorage areas; consult a chart for water depth.

Cautionary Buoy

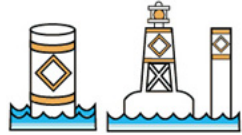
A cautionary buoy marks dangers such as firing ranges, underwater pipelines, race courses, seaplane bases and areas where no through channel exists.

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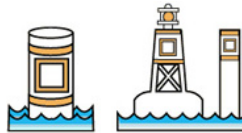
Control Buoy

A control buoy indicates speed limits, wash restrictions, etc.; obey the restrictions illustrated within the orange circle.



Hazard Buoy

A hazard buoy marks random hazards such as shoals and rocks. Information concerning the hazard is illustrated within the orange diamond.



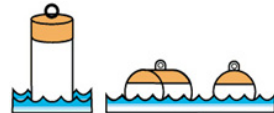
Information Buoy

An information buoy displays information such as locality, marina, campsite, etc.; Be guided by the information illustrated within the orange square.



Keep-Out Buoy

A keep out buoy marks areas in which boats are prohibited.



Mooring Buoy

A mooring buoy is used for mooring or securing vessels; be aware that a vessel may be secured to such a buoy (but never to a navigational buoy). They are often used to mark anchor locations.

Sound Producing Devices

Any powered vessel less than 39.4 ft must carry an effective sound producing device. This can be a whistle, horn, or bell. To be effective, it must be capable of producing a 4 second blast that is audible for at least one-half mile.

Distress Signals

- A gun or other explosive signal fired at intervals of about one minute
- A continuous sounding with any fog-signalling apparatus
- Rockets or shells, throwing red stars fired one at a time at short intervals of about one minute
- A signal made up by any signalling method consisting of the group SOS in Morse Code
- A signal sent by radiotelephone consisting of the spoken word MAY DAY





Notice to Mariners (NOTMAR)

When working on or around a navigational route ensure that the Coast Guard and the Port of Metro Vancouver have been notified of the specific location, job details, duration of the job, and whether “SLOW BELLS” are required. This notification must take place prior to towing to site. The derricks and scows must have the appropriate lighting for the activity. Since our equipment is classified as vessels not under command, we are required under Transport Canada regulations to exhibit two all-around red lights and two balls in a vertical line where they can best be seen. When our equipment is left unattended it requires an all-around white light where it can be best seen.

Notice to Airmen (NOTAM)

A NavCanada Notice to Airmen is required for all projects adjacent to airports. This includes providing a detailed project description, latitude and longitude coordinates, crane maximum height, and project duration. The application form can be downloaded from the NavCanada website at: www.navcanada.ca. For crane projects it can take up to a week to receive approval for the project. Once an approval letter is received it is valid for 12 months for that specific site location, and for future site visits a phone call to the local Flight Information Centre (FIC) is all that is required to proceed with the project. The nearest FIC is Kamloops which can only be reached by phone at 1-866-541-4101.

For airports that operate beyond day light periods a red all around boom light is required for the boom tip.

Wake Watch

When a shore crane is used to hoist items onto a floating barge or derrick, or when a derrick is used to hoist an item onto land, or when hoisting an item from a floating vessel to another floating vessel there is a potential for passing boat traffic to have a safety impact. Movement due to the wake can catch workers off guard with the potential for serious consequences. If the operation has the obvious risk of equipment damage or injury, then an employee must be designated as a spotter to watch for any wake producing marine traffic. All derricks must be equipped with “NO WAKE” signage to notify oncoming marine traffic. Maintenance work requiring crews to work on temporary work floats under dock structures are required to use tide boards in addition to reviewing current tide charts.

Wind Speed

Wind speeds greater than moderate (see table) may require the crane to be tied down due to the risks associated with high winds, including load instability, loss of control of the boom, forces on the boom from unexpected angles, and wave generation that could create excessive list on the

Wind Speed			
Speed	Knots	Miles/hr	Km/hr
Light	1-11	1-13	1-21
Moderate	12-19	14-22	22-35
Strong	20-33	23-38	37-61
Gale	34-47	39-54	63-87
Storm	48-63	55-73	89-117
Hurricane	over 63	over 73	over 117

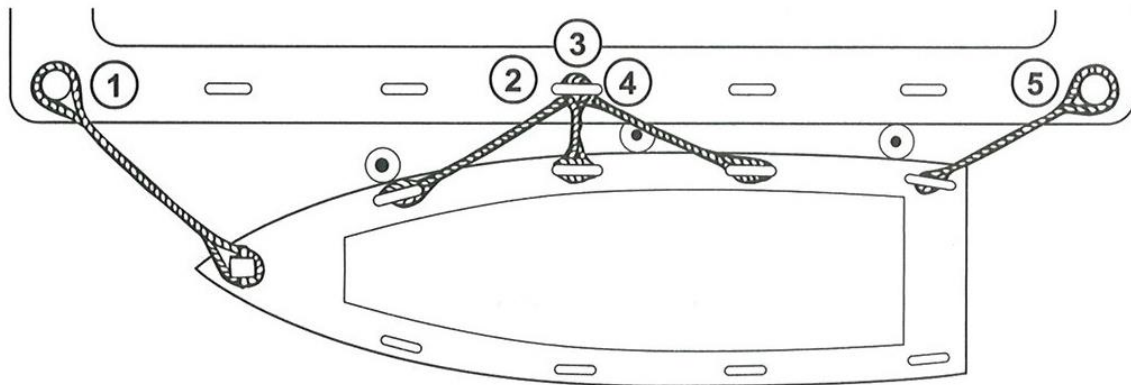
crane. Wind speeds must be continually examined by monitoring the marine forecasts. The table provides a comparison between the different wind speed definitions, where 1 knot is equal to 1.852 kilometers per hour.

Tides and Currents

Working on the water requires a thorough understanding of tides and currents. Often we are required to work at low tides to perform maintenance repairs to facilities, this may require work to take place a night, or early in the morning. When working in areas of high current, such as at Second Narrows the ebbing and flooding tides can create currents greater than 6 knots, as well as standing waves below the bridge which restrict site access and egress. It is very important to know when the peak tidal activity or river flows (such as the Freshet in the Fraser River) take place to ensure that the equipment is properly secured or moved to more sheltered waters. Work will often need to be suspended during high flow periods.

Work Boat Tie Up

When a skiff or other work boat is tied up for an extended period of time, it is important to ensure that it is secured properly. There have been numerous occasions where the crew has arrived to the site in the morning to find that their skiff is submerged. Workboats are to be secured to the leeward side of a derrick, or the downstream current side in the river. Additionally at least three docking lines should be arried: A bow line to secure the bow; a stern line to secure the stern, and at least one spring line to reduce the fore-and-aft movement, or to allow for changes in water level. Ensure docking lines do not fall into the water where they can



be drawn into and foul the propeller.

Public Safety

All permanent marine obstructions including buoys, and bridge structures must be equipped with adequate navigational lights. Posting signs is a good way to warn the public of submerged



anchor lines or other hazards that may be present. Signs should warn other boat traffic to stay clear by at least 150 meters (500 feet).

Towing

Towing is to be performed by a certified Master only. Once the tow company has control of the derrick they are in charge of the operation. We are to cooperate with their requests, such as lowering the crane boom to pass under bridges or power lines. Once in position, we can use our small dozer boats to assist with the repositioning of the derrick and scow, unless the site is adjacent to an airport, bridge, Sea bus, cruise ship, shipping or ferry terminal.

Towing or Works an Airport

Ensure that the operations are not within the Transport Canada designated a 1.6% approach slope from the runways since this is commercial air space. Request the appropriate approvals from NAVCANADA and a NOTAM for the project duration, specifically noting the crane height. Crane boom tips must also be equipped with a red beacon that activates from dusk to dawn. The specific airport's operations department should be contacted prior to beginning a project to confirm any additional requirements.

Hoisting Anchors

Anchors attached to can buoys with stud linked anchor chain must be removed with divers rigged using a basket hitch, unless we have the engineered drawings on the anchoring system including the grade of the anchor chain. We consider the anchor chain to be a part of the anchoring system, which includes the anchor. Currently we are requesting a review of a WorkSafeBC order which states that anchor chains must be at least grade 80, and that they must be inspected annually to comply with the chain specific regulations. Inspecting anchor chain that can be 600 feet long and covered with sea life is difficult. Hoisting any submerged load is a critical lift that requires the proper documentation to be completed.