



RESCUE TUGS

Can tugboats protect the B.C. coastline?

By Robert G. Allan, P. Eng.

Executive Chairman of the Board, Robert Allan Ltd.

The ports, communities and people of coastal B.C. rely almost exclusively on ship-borne traffic for their livelihoods and as the means by which they obtain the majority of their daily needs for food, housing and transportation. To totally ban all shipping in B.C. waters might eliminate the risk of pollution to the coastline but would, in effect, kill the provincial economy. Virtually EVERY ship sailing these waters carries oil in one form or another as fuel, and in almost every case, a single steel membrane (the ship's shell) separates that fuel from the surrounding ocean. In spite of that fact, the number of oil spills is thankfully almost negligible. All tankers in service after 2010 carry their entire cargo capacity within double-hulled, protective structures.

The recent incident with the Russian container ship *Simushir* gave many an opportunity to voice their concerns about the sanctity of the B.C. coastline. It is a pity however that the majority of news agencies seemed incapable of distinguishing between a small container ship and a large tanker. Ultimately, oil is oil (albeit in many varieties) and the potential for any incident to spoil any segment of our coastline must be of concern to all British Columbians. Politicians and pundits of all stripes are also always keen to weigh in on subjects about which they know little and they will seize such opportunities to criticize present governments, either provincial or federal for the situation. The truth seems immaterial to the storyline, for example, "*Tanker Adrift*" shamelessly screamed the CBC's "*National*" newscast headline on October 17.

So in the interests of the truth about such incidents, both real and potential, it

The truth seems immaterial to the storyline, for example, "Tanker Adrift"

shamelessly screamed the CBC's "National" newscast headline on October 17.

is useful to understand some basic facts about shipping and the potential for shipping incidents on the B.C. coast; and what type of tugboat capability would actually be required to provide a reasonable degree of response capability; and at what cost.

In the days of sail, the west coast of Vancouver Island was known as the "Graveyard of the Pacific," a vast, rocky lee shore upon which foundered many a sailing ship in the 19th century. With the advent of steam and later diesel propulsion, ships were no longer entirely at the mercy of the weather. The safety record of shipping on the B.C. coast has subsequently been excellent for generations; not completely incident free, but nonetheless still excellent. Transportation Safety Board of Canada (TSB) statistics, while difficult to interpret with regard to reported large-vessel groundings, indicate that, in the entire western region, there have been potentially one to two vessel groundings per year for the past 16 years. The majority of these will be vessels touching bottom at their berths (generally a non-critical incident) but without examining every incident in detail it is impossible to determine. Anecdotally, one would be hard-pressed to recall more than two or three serious groundings on the outer West Coast in the past 40 years. In the summary to his report, Stafford Reid (*Major Marine Vessel Casualty Risk and Response Preparedness in British Columbia*) for Living Oceans Society, (2008) states accurately:

"The 1988 Nestucca oil barge rupture off of the west coast of Vancouver Island, followed soon after by the 1989 Exxon Valdez oil tanker grounding in Alaska galvanized public attention on oil spill prevention, preparedness and response along the Pacific West Coast. The public and government focus after these events was on the oil spill consequence of the vessel casualties, not the casualty itself. More recent vessel casualties have drawn attention to other environmental consequences, notably the grounding of two freighters: the New Carissa in Oregon (1999) and the Selendang Ayu (2004) in Alaska. These incidents raised awareness in the United States to the need to address all aspects of a major vessel casualty, and not just the oil spill impact or threat. This includes measures to salvage the vessel, to offload its cargo and fuels, and to remove wreckage so as to prevent or minimize environmental damage.

Along Canada's Pacific coast there have only been a few near-misses (emphasis added). Therefore, vessel casualty risk and their impact management have not garnered the same level of public and government attention as in the United States. It has been recent vessel and barge accidents in British Columbia that have caught public attention to both oil spill risk and the problem of addressing sunken ship wrecks; notably the 2006 sinking of the Queen of the North ferry in Wright Sound, and the 2007 LeRoy Trucking barge equipment dumping into Johnstone Strait."



Figure 1 — CCG Type 1050 OSV Style Nav-Aids Vessel with Towing Gear and Large Buoy-Handling Crane

There are no groundings or strandings of larger ships on Canada's West Coast upon which one might develop a statistical model. However if one looks at the entire west coast of Canada and the U.S. as the regional base for data, then one can cite approximately 12 incidents in the past 40 years that were or had the potential for a serious grounding incident.

This number of real or potential serious incidents has to be compared to the actual number of large vessels plying these waters. The Chamber of Shipping of British Columbia reports that there are about 3,800 ship calls per year at B.C. ports; parallel to this is shipping to major U.S. west coast ports which may transit B.C. waters. Reid cites the West Coast Offshore Vessel Traffic Risk Management Project (WCOVTRM) Report:

"The study estimated over 19,000 vessel transits from Alaska to California during the year. The majority of vessels are large commercial vessels such as container ships and bulk carriers...after deducting unknown "last port of call" vessels, 12,646 vessel arrivals in Pacific West Coast ports were considered coastwise transits."

Therefore, one can safely and conservatively assume 12,500 ship calls on the west coast of North America which may transit B.C. waters. Each of those ship calls likely has both an inbound and an outbound "move" so a number of 25,000 ship moves per year in these regional waters seems a reasonable estimate of total traffic volume (approximately 70 moves per day over the entire coastline). Note that this number deliberately does not include smaller vessel movements such as fishing vessels, tugs and barges, and ferries.

The probability of a serious "potential" incident is therefore about one in 100,000 (0.001 per cent). Note this only refers to an incident which may occur and which then might lead to a potential grounding or similar event.


The B.C. coastline measures just under 1,000 km long north to south, as the raven flies, but when all the inlets and islands are considered, it represents 25,725 kilometres of coastline.

The absence of a dedicated rescue tug anywhere on the B.C. coast has been cited as a major issue, but how does one realistically develop a rescue tug system to protect such a vast and intricate coastline? What is a suitable response time? Should tugs be able to respond in the absolute worst case conditions? What is the real probability of an incident? Who will pay for the rescue service? Where will a tug be when an incident occurs? Unfortunately

"Murphy" has the right answer to the last question and one can safely assume that any single tug will be very remote from an incident when it occurs. So how many tugs would be enough to provide sufficient response capacity to the whole coast? Many of the above questions were asked when the Tanker Exclusion Zone (TEZ) was prescribed to protect the B.C. coast from the regular transits of American oil tankers from Alaska to the refineries in Puget Sound:


"The purpose of the TEZ is to keep laden tankers west of the zone boundary in an effort to protect the shoreline and coastal waters from a potential risk of pollution. The zone boundary follows the Canada/Alaska border to a point approximately 115 miles west of Langara Island, thence southward to approximately 73 miles southwest of Cape St. James, thence to 40 miles southwest of Amphitrite Point and thence due east to just off Cape Flattery. [CCG website: <http://www.ccg-gcc.gc.ca/e0003909>]"

A similar "shipping exclusion zone" strategy could be employed for all shipping, which presently only has to be 12 miles offshore to be considered outside Canadian waters. The farther offshore a ship is, the more response time a rescue vessel will need. This is by far the simplest method by which to improve coastal safety and is not a new idea, having been recommended by both David Brander-Smith (*Final Report of the Public Review Panel on Tanker Safety and Marine Spills Response Capability*, Transport Canada, 1990) and David Anderson (*Report to the Premier on Oil Transportation and Oil Spills*, November 1989) concerning oil-spill preparedness on the B.C. coast. Typical large ships will drift




Propulsion Control, Telegraph, and Machinery Alarm & Monitoring

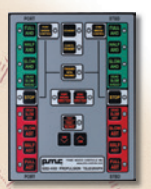
AZIMUTH TELEGRAPH




DCH




PUSHBUTTON TELEGRAPH




MPC-FP




IMACS




PCH



MCH



SCH



A World Leader in Propulsion Controls
PRIME MOVER CONTROLS INC.
 3600 GILMORE WAY, BURNABY B.C. CANADA V5G 4R8
 TEL 604 433 4644 FAX 604 433 5570 www.pmc-controls.com

RESCUE TUGS

at about three to four nautical miles per hour in the more severe wind and tidal conditions on this coast. If a response time of say no more than 24 hours is required to any location on the outer coast, then traffic must be kept effectively 100 miles offshore. (Note: The present TEZ varies from more than 100 miles wide in the north to about 40 miles wide at the entrance to Juan de Fuca Strait.) Then one must consider where any response vessels should be based. At a probable average response speed of no more than 12 knots in severe weather, a rescue tug can cover only 288 nm in a day — say 250 miles to allow for mobilization time and uncertainties. That 1,000 miles (by 100 miles wide!) of outer coastline could then be covered by four relatively fast and capable ocean rescue tugs — one each at Victoria and Prince Rupert at the far (and busier) ends of the coast; one at Bamfield; and one somewhere near the north end of Vancouver Island. These would have to be large, powerful and very seaworthy tugs to cope with the North Pacific winter conditions and to be able to tow the largest ships anticipated in these waters,

...the days of having salvage/rescue tugs stationed around the world's busiest shipping lanes hoping to rescue a disabled ship (and get paid well for doing so) are largely gone.

no less than 45–50 metres in length with a towing capability of not less than 120 tonnes, corresponding to an installed power of about 10,000 horsepower. (Note: The *Barbara Foss* which towed the *Simushir* has less than 65 tonnes of towing capability.)

The many thousands of kilometres of “inner coast” must be considered as much safer, as they are largely protected from the ocean forces. There are many inshore areas exposed to severe winds but there are also many places of refuge and more local traffic, especially a range of barge-towing smaller tugs which could be called upon for support, even if only marginally adequate. The inside passages are also not widely used by large ships other than cruise ships and ferries (although those are certainly not immune to accidents, but result from bad judgement and not bad weather!)

Large tugs of the type described above are not uncommon, but the days of having salvage/rescue tugs stationed around the world's busiest shipping lanes hoping to rescue a disabled ship (and get paid well for doing so) are largely gone. Modern ships are safer and more reliable than their forbears. Communications and tracking devices are far more accurate. Protocols for monitoring and controlling vessel traffic in near-coastal situations are very well-established.

So it IS practical to consider a rescue tug system on the B.C. coast but only in conjunction with a system of traffic control and limiting offshore distances to ensure appropriate and sensible times for response. But who pays, and what do the crews do to combat the boredom of being “on call” 99.99 per cent of the time? Tugs that do nothing but wait for an emergency are not viable. Coastal

WORLD CLASS SHIPYARDS - Right in your backyard



604.988.7444

Visit us at Booth #906

www.seaspan.com



604.988.6361

RESCUE TUGS



Photo source: Robert Allan Ltd.

Figure 2 — RASalvor Class Rescue Tugs 60 metres LOA, 10,000 kW Power, 150 Tonnes Bollard Pull.

safety is a federal responsibility administered by the Canadian Coast Guard. Their ships are typically configured for multi-tasking, with the primary role of maintaining aids to navigation, and, secondarily supporting Search and Rescue and Fisheries Patrol operations. Most of their ships are primarily buoy tenders and have very modest towing capabilities but nothing suitable for towing large ships at sea. The CCGS *Gordon Reid* (designed by this company) is a primary SAR vessel with towing gear designed to tow disabled fishing vessels and yachts (their most typical rescue target) so under the circumstances, she did remarkably well to tow the *Simushir* as she did in such difficult sea conditions. The most practical solution would be to reconfigure the west coast Coast Guard fleet to comprise primarily rescue towing vessels which are equipped with suitable gear for the other nav-aids and SAR missions. Such vessels exist even with CCG's own fleet as the *Type 1050 Class Nav-Aids* tenders (Figure 1) which were designed by our firm in the mid-1980s. These are based on a typical offshore supply/towing vessel (OSV) platform, equipped with a large buoy-handling crane. These are relatively shallow draft ships intended primarily for the Great Lakes, but the basic concept is well-proven. These vessels already have substantial towing systems but not really sufficient for open ocean tows.

A newer generation ocean-going tug, such as the *RASalvor Class* tugs recently developed by this firm (Figure 2), could easily be equipped with heavy duty, deep-sea towing gear without compromising

any other CCG duties. Such vessels would cost about \$25–\$30 million each on the international market, and about 50 per cent more if built in Canada. So a fleet investment of at least \$100 million is required, with attendant annual operating costs.

The rescue towing concept as described addresses the risks from current levels of general shipping on the West Coast and would certainly provide an increased level of security for any foreseeable growth in west coast shipping, regardless of whatever deep-sea vessel type one considers. All of the various oil transportation and LNG tanker projects proposed for the B.C. coast to date have been or are presently examining in depth the specific tugboat capabilities required to safely escort and berth the tankers involved in each specific project. Until such time as some of these projects materialize, it is difficult to say what synergies might exist amongst those projects to share tug resources. However, Enbridge in particular has certainly identified the most

capable class of escort/rescue tug available in the world today as the type of tugs required for, and which would be dedicated to the Northern Gateway Pipeline project. These tugs however would have, as a primary responsibility, ensuring the safe passage of tankers using the Enbridge facilities and only after any such tankers were safely anchored out of harm's way could these tugs potentially respond to a general ship-in-distress emergency on the outer coast. A non-private, Coast Guard tug capability seems the only logical answer for broad-based coverage.

In conclusion, it is certainly feasible to consider a system of large rescue tugs to aid in the protection of the B.C. coastline, but the economics of that operation are not trivial and the probability of an incident is very low. The existing CCG fleet mix has been demonstrated as capable in moderate conditions with a small ship but is not sufficient to deal with a large ship towing emergency in more severe conditions.

Therefore, such a rescue tug capability should most sensibly be considered as an integral and primary part of an overall revised Coast Guard plan for all their required vessel operations on the B.C. coast.

Robert Allan is the Executive Chairman of Robert Allan Ltd., the most senior and most experienced Naval Architecture consultancy business in Canada, begun by his grandfather in Vancouver in 1930, and currently in its 84th year of continuous operation. He has published numerous papers and articles on the subject of tug design and performance as well as on several other topics and has authored two major chapters in the Society of Naval Architects and Marine Engineers' textbook, "Ship Design and Construction" — one on "Small Commercial Workboats" and the other on "Tugs and Towboats". For more information, please visit: www.ral.ca.

DaveRoels™
PHOTOGRAPHY

**World Class Photography for the
Professional Community Since 1973**

www.daveroels.com
604.733.9222 / dave@daveroels.com

