Safe Passage

MARCH 2021

Trans Mountain oil tanker safety perspectives from global experts who live on British Columbia's South Coast

A Report by the Resource Works Society for the B.C. Environmental Assessment Office TMX Reconsideration.

Resource Works

Reviewed by the Pacific Chapter of:

The Chartered Institute of Logistics and Transport

Safe Passage: Trans Mountain oil tanker safety perspectives from global experts who live on British Columbia's South Coast

Table of Contents

Resource Works

JOBS FOR BC. INNOVATION FOR THE WORLD.

Safe Passage: Trans Mountain oil tanker safety perspectives from global experts who live on British Columbia's South Coast

Interviews conducted by Stewart Muir and Margareta Dovgal.

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Scene at the Coast Guard Base in James Bay area of Victoria.

About this project

Role of Resource Works

Resource Works is a not-for-profit group that communicates with British Columbians about the importance of the province's resource sectors to their personal well-being. It demonstrates how responsible development of British Columbia's resources creates jobs and incomes throughout the province, both directly and indirectly, while maintaining a clean and healthy environment. Since its founding in 2014, Resource Works has published numerous expert reports examining a range of issues, including tanker safety.

In 2018, Resource Works published the *Citizen's Guide to Tanker Safety and Spill Response on British Columbia's South Coast*. The report was reviewed by the Chartered Institute of Logistics and Transport (Pacific Chapter) and found to be "factual and credible." It remains the only independent, authoritative and comprehensive source of relevant information on its topic.

Resource Works convened the *Finding the Path to Shared Prosperity* event in January 2020, a day of speakers and dialogue about charting a path to prosperity and hope through partnerships following BC's historic passage of Bill 41. Resource Works is currently organizing a national-scale event on these themes, scheduled for May and June 2021.

About the authors

Margareta Dovgal (project editor)

Margareta is the Director of Research at Resource Works. She is a strategic communicator and natural resource policy advocate with a passion for technology, innovation and Indigenous economic development. In 2020, Margareta and the team at Resource Works convened an unprecedented and diverse coalition of industry, labour, and Indigenous groups to champion Canada's economic recovery from COVID-19. Since being formed, the Task Force for Real Jobs, Real Recovery has grown to 38 members, including all major Canadian industry associations in natural resources. While studying for her Master of Public Administration in Energy, Technology and Climate Policy at University College London, Margareta led an international post-graduate consulting project, delivering recommendations on financial regulation, consumer debt, and digital government to the Prime Minister's Office of the United Arab Emirates.

A lifelong Vancouverite, she holds a Bachelor of Arts in Asian Area Studies from the University of British Columbia. @margare7a

Stewart Muir (senior supervising editor)

Stewart Muir is Executive Director of Resource Works and edited 2018's *Citizen's Guide to Tanker Safety & Spill Response on British Columbia's South Coast*. He is a historian and award-winning journalist with a passion for the natural legacies of British Columbia. He was a deputy managing editor at The Vancouver Sun, and a divisional managing director with The Canadian Press. He was lead writer of *The Night the City Became a Stadium: Independent Review of the 2011 Vancouver Stanley Cup Playoffs Riot* that submitted 53 recommendations to government, all of which were accepted. A graduate of Simon Fraser University and the University of British Columbia, he was a director of The Nature Trust of British Columbia from 2006 until 2014. He studied economic botany and the long-term consequences of deforestation and climate change at Leiden University in The Netherlands.

Muir, whose great-grandfather was master of the Daunt Rock lightship outside of Cork harbour in Ireland, was a contributing author to *The Sea Among Us: Life and History of The Strait of Georgia*, an award-winning 2015 book from Harbour Publishing edited by Richard Beamish and Sandy McFarlane. @sjmuir

Statement: The Chartered Institute of Logistics and Transport

Originally founded in 1919 in the United Kingdom, the Chartered Institute of Logistics and Transport (CILT) today is recognized globally as the leading professional organization in the field of logistics and transportation, with over 30,000 members in more than 30 countries.

As the professional certification body, members are granted post-nominal letters which represent their level of education and experience in the fields of logistics and transport (MILT - Member; CILT - Chartered Member and FCILT - Chartered Fellow)

In the Pacific Chapter, CILTNA, our goal is to promote professional development for our members through a series of speaker events throughout the year. With the onset of the pandemic, our national board shifted focus and began a series of highly successful webinars (9 in 2020) with expert speakers in such areas as port digitalization, tanker safety and cannabis logistics. In addition to our North American audiences, we have broadened our reach to many countries around the world and have received very positive feedback from participants.

Pacific Chapter members represent all modes of transport, supply chain/logistics organizations, all levels of government, academics, legal engineering and accounting firms, as well as the broader business community.

Recently our Pacific Chapter was invited to review and comment on the draft document "Safe Passage: Trans Mountain oil tanker safety perspectives from global global experts who live on British Columbia's South Coast." I nominated four members of our Executive with particular expertise in marine matters to undertake this task.

Just a word about each reviewer:

- George Adams, Fellow Chartered Institute of Logistics and Transport (FCILT) is a retired senior shipping executive, a Master Mariner and former member of the Board of Vancouver Fraser Port Authority, who closely follows maritime issues;

- Gordon Payne, Fellow Chartered Institute Logistics and Transport (FCILT) is Chair of Harbour Links Container Services Inc. He has 55 years' experience in shipping, port and marine terminal management and transportation logistics;

- Paul Levelton is President, Levelton Infrastructure Advisory, and former Global Lead for Ports in KPMG's Infrastructure Advisory Practice, with extensive international experience in port/marine terminals;

- Tony Nardi is former Vice President, Logistics and Community, Neptune Bulk Terminals. Neptune is one of the largest multi-commodity bulk terminals in the Pacific Northwest. Over his career Tony has been involved in every aspect of terminal operations and was active in the BC Marine Terminal Operators Association and the Greater Vancouver Gateway Council.

This group has reviewed the draft document and has found it to be both factual and credible.

Marian Robson, FCILT

Chair, Pacific Chapter

Chartered Institute of Logistics and Transport North America

Crew of pilot vessel prepares
to collect a pilot from a cargo ship.

Introduction

This paper responds to the BC Minister of Environment and Climate Change's direction that there be a public-comment process relating to recommendations for new or amended conditions for the Trans Mountain Expansion Project (TMX), a twinning of an existing 1,150-kilometre pipeline between Strathcona County (near Edmonton), Alberta and Burnaby, BC. The completed expansion will triple the nominal capacity of oil carried by the pipeline, resulting in up to 34 Aframax tankers and three oil barges per month at the Westridge Marine Terminal.

For those who support an open discussion on responsibly developed infrastructure, especially where it concerns projects deemed to be in the national interest, it's critically important that all voices be heard and respected. In this case, it is particularly important to include people with expert knowledge about oil tanker safety and risk management coming from years of senior work in relevant fields.

Our approach in this paper has been to bring forward such expert but oft-unheard voices by interviewing qualified individuals who care passionately about coastal safety and have dedicated their working lives to protecting the public and the environment in marine industries. The eight individuals we interviewed for this report have uniquely well-informed perspectives on the safety of tanker shipping today in BC, and how that will evolve after the scheduled completion of TMX in December 2022.

Our interview subjects represent a broad range of backgrounds with a combined centuries of experience in a number of fields related to marine industries, both in local waters and around the world. They have worked at senior, strategic levels in public policy development, marine transportation and logistics, ports, marine engineering, naval architecture, marine survey, towboat operations, marine risk management, marine piloting and related academic fields.

Rather than presenting a summary of their comments, given the expertise of each individual we opted to provide transcripts of these interviews as the body of this report, edited only for length and style.

It is our hope that the reflective mode of this report will provide important context and information fostering better understanding of the important matters under review, in particular the general standard of conduct for shipping on both a global scale and in the local BC environment today. We hope this contributes to well-informed decision making by the EAO and Province, based on an informed confidence in the expertise and dedication of those charged with protecting our marine environment and shipping safety.

We also hope this report can contribute to reconciliation with First Nations. Members of the Salish Sea First Nations and residents of local municipalities are entitled to know that full consultation has taken place and that procedural rights are upheld. In this way, the benefits of TMX can be enjoyed, safe in the knowledge that environmental and safety concerns have been fully satisfied.

Executive summary

Resource Works, a Vancouver-based non-profit, has prepared the following report, bringing the expert knowledge of eight professionals in marine shipping, regulation, risk management and engineering to the BC Environmental Assessment Office's Reconsideration of the Trans Mountain Expansion Project (TMX). The office was seeking input on marine shipping specifically during a public comment period that closed March 1.

While extensive measures are in place to meet and, in many cases, exceed the legislative and industry-imposed requirements for Trans Mountain Expansion (TMX), it is natural that increased marine tanker traffic inevitably fosters the perception that marine risks are higher.

Enhanced maritime safety practices and expanded capacity to manage marine traffic related to TMX have been put in place over the past several years, however, that work has been done largely quietly and out of sight by dedicated experts. Part of our goal with this submission is to take readers behind the scenes and come to better understand, from informed perspectives, what that change looks like in the safe transport of oil and gas to export markets.

This report takes the form of transcribed interviews with eight individuals, many of whom have spent their entire careers working to ensure public and coastal safety in the marine environment, many of them in senior roles. We have edited only for length and style (eliminating redundancy, etc.), so what you will read comes directly from in-depth interviews with:

- Robert G. Allan - Marine engineer and naval architect
- Darryl Anderson - Transportation and logistics executive
- Captain Chris Badger - Shipping educator, former Chief Operating Officer, Port of Vancouver
- Captain John Dolmage - Master mariner, accredited marine surveyor, towboat expert
- Ronald J. Holton - Retired manager for risk management services at UBC
- Captain Kevin Obermeyer - CEO, Pacific Pilotage Authority
- Michael Schoen - Associate Professor of Teaching, UBC Chemical and Biological Engineering and Keevil Institute of Mining
- Captain David Smiley - Master mariner, marine surveyor and auditor, pilot, ship broker, author, project coordinator

In detailed interviews, the subjects were asked to reflect on their experiences with coastal safety, measures in place to protect the coast today and how measures are set to evolve as shipping traffic increases due to the TMX expansion. The interviews have been ordered thematically, with a focus on having each subsequent interview build on the perspectives outlined in the preceding one.

In his comments, leading marine engineer and naval architect Robert Allan summarized a theme common throughout the interviews.

> "I believe that in the vicinity of the port of Vancouver, through the Gulf Islands and out to Victoria, the measures that are proposed – both proposed and presently implemented – result in the very safest measures that can be taken while dealing with tanker traffic. The speed is controlled. The operations are controlled in terms of tide stage and time. You've got multiple layers of safeguards within the vessels themselves, and through the system of escorting that's being used. You've got trained eyes, everywhere in the system.
>
> I would say that every resident should have basically almost zero concern."

The comprehensive and effective nature of measures in place to protect BC's coastal waters were repeatedly referenced throughout the interviews, in many cases highlighting British Columbia and Canada's record of leadership in innovating safety and environmental protection. By way of example, Master Mariner Chris Badger observed that the BC Coast Pilots pioneered T2D (T Squared Deployed), now an internationally-accepted tug escort technique for oil tankers. This commitment to innovation and willingness to invest in research & development has been routinely noted by international observers of Canada's marine and maritime industries.

While marine accidents have clearly (and appropriately) shaped the development of stringent shipping rules and regulations around the world, regulatory expert Darryl Anderson noted that there has never been a significant spill related to oil and gas transport on BC's coast. That is no accident, but is due to the layers of protection in place aboard ships, on tow boats and tugs, with local pilots, and with government and non-governmental agencies.

"We're probably one of the few jurisdictions in the world that can claim a world-class standard and we haven't had a spill," Mr. Anderson stated.

BC EAO's pursuit of a rigorous understanding of all potential impacts from spills as well as the risk of a spill occurring is an important part of this protection. Risk is, after all, a measure of both the probability and potential impact of an event. The consideration of the potential effects associated with marine spills (Section 6.7) must be adequately contextualized with reference to prevention and mitigation measures in place.

Experts interviewed during our research have universally indicated that the risk, with all currently applied marine spill prevention and mitigation measures, is incredibly low. This is due to the extensive prevention safeguards, low ship congestion and effective traffic management measures in the Strait of Georgia and Vancouver Harbour. It is evident that a professional culture of responsibility and risk awareness is widespread in British Columbia's maritime industry, especially among those in the most critical roles.

In particular, the excellence of BC's Coast Pilots was highlighted by numerous participants, including Pacific Pilotage Authority CEO Kevin Obermeyer. Captain Obermeyer explained the exceptional standards applied to coast pilots' local knowledge, ship handling skills, continuous training and capacity to perform under high pressure.

The participants also provided us a global perspective, highlighting that Vancouver is actually a small port by global standards, and that even with the TMX expansion will have low traffic congestion and total ship movement. Low speed limits, strict distancing requirements and the use of several coordinated escort tugs further reduce the probability of an oil tanker spill in BC's coastal waters – measures which have proven effective in larger, more crowded ports around the world.

These measures also have other unintended benefits – Captain John Dolmage, an expert tug operator, described the conscientious approach taken by escort tug operators in abiding by low speed limits as a safety measure, also reducing wake and wash.

Ronald Holton, an enterprise risk management professional, reviewed both the BC EAO's draft report and Resource Work's original *Citizen's Guide to Tanker Safety*, completed in 2018. He commented on the "considerable care and attention paid, through a risk management" lens, to the cumulative effects on marine safety and the environment from the Trans Mountain Expansion Project.

Just as the BC EAO has done throughout its draft report, the interviewees frequently emphasized the importance of federal jurisdiction. Although a desire for improved public consultation and education was apparent, including outside of the regulatory process, those interviewed expressed satisfaction with the safety outcomes resulting from the current jurisdictional make-up of shipping governance in Canada. Several suggested improvements that could be made to bolster municipal and First Nations participation and consultation, while others highlighted incoming enhancements as technology and funding continue to evolve.

We hope readers of this report come away with a sense of confidence and pride in Canada's marine industries, more information, and insights into how we can make an already-strong system protecting BC's marine environment even better into the future.

DARRYL ANDERSON, 56

Resident of Victoria
Transportation and logistics expert

PHOTO BY ARNOLD LIM FOR RESOURCE WORKS

Interviews

Darryl Anderson

Darryl Anderson is a maritime transport and logistics executive with expertise in policy and regulatory analysis, and thirty-two years of project experience include global and domestics shipping and seaport opportunities in the container, dry/liquid bulk, project cargo/Ro-Ro, cruise/ferry, port services, workboat fisheries sectors.

Mr. Anderson's private sector leadership roles have included Managing Director, Wave Point Consulting Ltd, President & CEO of the Port Alberni Port Authority and Business Development Manager for the Greater Victoria Harbour Authority. His non-profit and public sector involvement includes serving as Executive Director, Mercy Ships Canada, Policy Manager, Rail, Intermodal & Marine for Alberta Transportation, Manager, Trade Policy and Business Intelligence for Alberta Energy Department and Chief Harbour Authority Implementation for Fisheries and Oceans Canada.

Can you please tell us about your professional background, area of expertise and how this relates to this topic?

I've been involved in public policy issues in the transportation maritime sector for going on 30 years. I've got a Master's degree from the Australian Maritime College, a Master's in Maritime Management, and a technical diploma from BCIT in shipping and marine operations. And I've been a government policy advisor at the federal level and [for the] provincial government in Alberta, both in transportation and in the energy sector.

Over the last 30 years, particularly the last 13 years on the consulting side, I've done, and my colleagues have done, a lot of regulatory analysis of what constitutes robust and effective regimes, particularly in the transport of hydrocarbons – not surprising as we know we're talking about the changes in the energy sector from having import terminals on the coast of British Columbia. A lot of this work has been published in some journals, like the *Australian Journal of Maritime & Ocean Affairs* and others.

But regardless of which direction [the hydrocarbon cargo] is heading [import or export], I ask: what does the regime allow us to do? What are the things that we know about effective regimes?

Dr. Bonnie Henry, the public health official in British Columbia during COVID, uses an expression, "layers of protection." A regime, in simple terms, is a layer of protection. Well, what are the stages of a thing that needs protecting? Obviously, the prevention of spills is a first step, and it's well-known that prevention is the most important step. We also have response. How do you respond "if and when"? Then there's mitigation. Finally, we have restoration and financing.

I think once you have a better understanding of the regime, the tools and the stages, you're allowed to have an informed opinion about real or perceived gaps.

Plus, are we applying the things that we already know? I feel that this is almost the same kind of conversation. So, what do we learn when we look at international regimes that are world-class or best-in-class – Washington State, Norway, UK, Australia? Those are examples of the benchmark and how we need cascading and complementary layers of protection.

The one thing that we have all learned over the last 30 years is that things have changed dramatically since the days of the *Exxon Valdez* [tanker-spill disaster]. That is a world that doesn't exist anymore, and [we've learned that] prevention is better than response. But when response is required, it needs to be quick, practiced, measured and effective. And that's where the rubber hits the road, and then clearly a well-informed regulatory system is crucial for enforcement.

From your perspective, what are the structural components of risk management within the regulatory systems that you work with? How is risk perceived and how is it understood?

Let's summarize, really quickly, the risk management tools because [some] of these risk management tools are unique to this sector, but some are not. Some are specific to oil tanker traffic.

Both regulation and industry best practices have driven performance and innovation over the last 25 years. So, what I alluded to, at the highest level, was those regulatory regimes, and that is the first level of risk management. That's really ocean and shipping governance. At that level, we're talking about the International Maritime Organization (IMO). They develop conventions, which are brought into Canada, and we know them under the *Canada Shipping Act* and other things. In this case, we're now talking about another common risk management tool – a project-specific risk assessment.

These things don't operate in isolation. There is another thing that's really important to understand in shipping, related to ocean and shipping governance – but it's unique in regulatory law. It is something called Port State Control (PSC). People may say, "Oh, well, that ship is a foreign-flagged vessel, therefore we can't trust that foreign flag to uphold the international rules or standards like we in Canada would. Therefore, because we can't trust and verify, it's suspicious or we don't want that activity."

Well, the maritime conventions have recognized Port State Control. In this case, a federal inspector in Canada can inspect the ship as if they were the inspector for that foreign flag vessel. And if they're found deficient, they can actually take corrective action or detain the vessel.

As I jokingly say to many people, when we look on the beach and beyond the horizon the ship disappears, we often think that it goes into this land of 'the rules must stop.' And that's simply not the case. The reality is – again I'll go back to Dr. Bonnie Henry's expression – layers of protection.

When a ship enters Canadian waters, we have a vessel traffic management scheme. In Canada and British Columbia, we have coastline compulsory pilotage.

Many parts of the world have harbour-specific pilotage, which is where a marine master navigator goes onboard the ship. Pilotage is the oldest form of marine environmental protection – or the expression I like to use is marine environmental navigation. The whole purpose of having an independent party come in and assist the captain and crew on local navigation for all vessels, including tankers, is the protection of the environment.

The compulsory zones and the standards and tug requirements – all of those are driven from a very specific risk assessment that the pilotage authority does and then [works] to implement with all vessels. Then finally, we get to port and terminal procedures. That would be an example of best practices – there is some regulation, [however].

For instance, the Westridge Marine Terminal we're talking about: they have their own tanker vetting standard. The marine terminal operator will only accept the ship under certain conditions, and then they have another party that verifies that the information they're given, the quality and characteristics of the ship, are consistent with what was declared to them prior to the loading of the cargo and then supervises independently the loading of the cargo. That's an example of industry best practices. It's not regulated but represents world-class standards in caring for both the terminal operation and the ships.

Obviously, a lot of people spend a lot of time asking about our oil spill response capability. That's another example of a risk tool. And then finally on the financing side, we [have] the Ship-source Oil Pollution Fund.

Each of those tools that I've highly summarized are related to those three or four characteristics that I've talked about: prevention, response, mitigation and restoration. And when you start breaking it down into those simple things, then you can benchmark Canada's characteristics with other leading jurisdictions.

Since the federal government introduced the Oceans Protection Plan (OPP), it is fair to say that Canada actually has a world-class system. And what's remarkable about it, ironically, is that other jurisdictions have had incidents or spills to move them along this path, but thanks to the very healthy public debate we've had about the type of risk with tanker traffic we've been able to move ourselves into a world-class system without a spill on BC's coasts. And we're probably one of the few jurisdictions in the world that can claim a world-class standard and we haven't had a spill.

So, in the context of processes that increasingly are designed to provide public confidence in the regulator, what is the role of conversations about climate energy transition within the work that you do?

Good policy has to recognize the context that we're talking in. This comes from my background being a policy advisor at the federal and provincial levels.

If you think the good policy will come through only one process, and you make that one process try to do everything, you [must] ask yourself, “Is it going to achieve excellence at anything?”. And I'd liken it to marketing: if you try to be all things to all people, simultaneously, chances are you're going to appeal to no one.

I have real sympathy for regulators. We talk about good policy being cascading and complimentary, and about policy on shipping from the International Maritime Organization (conventions that are brought into countries such as Canada). [But] when you don't recognize the multiple layers of protection, the interrelationships of existing regimes, and then you expect a regulator at the end of the process to pretend that all of these other cascading layers of protection in the governance regime don't really exist – but on a project specific review, we want you to perform a better outcome than all the people that have participated in the policy decisions before that, and override the judgment of the people that actually have years of experience – don’t be surprised to find very convoluted regulations that seem to not make a lot of sense.

I understand the pressure; the regulator has to do the regulator’s job, but really, it's our political leaders asking the questions. If I'm concerned about a certain stage of it, why aren't they investing in those public resources and doing ocean policy better? The federal Oceans Protection Plan (OPP) is working a lot with First Nations on risk assessment and local knowledge. That's the way to do that. The governance framework for ocean shipping applauds those kinds of initiatives.

Every international regime we’ve studied [at Wave Point] on international best practices had a role for public involvement, but only Canada seemed to think that the regulatory process for approval was the only channel at which we were going to have that dialogue take place. Then it becomes immensely political and partisan, and we have a hard time understanding one another. It's not a really great place to understand more deeply – and some of these issues are technical in nature. We go to the regulatory process with a win or loss attitude. It's not an interest-based negotiation, it's a zero-sum game for all the parties, and yet we expect better policy to result.

There's nothing wrong with public involvement. We need it. You can't do policy in a vacuum. And that's why I refer to cascading and complimentary layers, not competing layers. Note the difference in best practices with other jurisdictions. In Canada, we have a hard time coming up with cascading [layers] and mostly we're talking about competing layers. Except, really, it's not a layer, it's the regulatory process.

I don't think that anyone who has studied policy for a living, or takes it seriously, believes that's the most desirable and most effective regime, and certainly, all the layers of protection that I talked about in the maritime sector weren't developed that way. We have to ask ourselves, are we the only ones playing the game in a weird fashion, or what truly could we learn, with a little bit of humility, from others?

We've briefly touched on local participation, including municipalities and First Nations. What's your impression generally of Canada's approach? How can it be more effective?

Local involvement is key. The question you have to ask yourself time and time again is which phase – prevention, response, mitigation or restoration – is local involvement most effective. I'll give an example.

Norway has national contingency plans for oil spill response. But guess what? The national plan requires municipalities to do stuff, and the private sector plans also require it. Our municipalities often want to insert themselves into stuff that's beyond their jurisdiction and avoid doing the stuff that's their jurisdiction. Many municipalities think that we shouldn't have anchorages or other things, or they should use certain types of fuel. If they believe those things, the solution isn't to address those locally, but to press the federal government or the right level, to say we think this is important, you need to take a leadership role.

But here's the thing that they do in Norway with a very robust municipal government: the Norwegian government helps fund *municipal* response to oil spills. I have no question about whether municipal governments and First Nations or others need to be involved. It's the misapplication of their time and effort to the wrong part of the process and ignoring their own responsibility [that is the issue]. And I think First Nations have actually done a better job than municipal governments of identifying their key responsibilities, their key interests, and saying, "Listen to us."

Once again, the federal government was a little bit slow in listening to those interests, but I'm going to hand it to the First Nations, they were saying, "Here's our interest. We have a clear interest in prevention. What is the federal government doing to make sure that we're preventing?".

I can't say I heard any clarity from any municipal government in coastal British Columbia, but they all want the federal government to do 'something.' Can you imagine driving rules, if every municipality decided that they were going to determine the make, model, safety standards for vehicles, the driving restrictions, the driver's license and the air emissions for the vehicle?

That doesn't mean municipal governments can't be concerned about the larger policy agenda. All I'm alluding to is, when you only focus on what the other party is doing and ignore what you should be doing, don't be surprised if you arrive at a less effective outcome.

Despite the need for continuous improvement in our regulatory system, would you say that we still manage to deliver results and outcomes that do what they're broadly intended to do?

Don’t confuse a process of continuous improvement with a weakness. There isn't an Olympic athlete that isn't on a continuous improvement process. They just perform at such a high level.

I think it's important to understand the base and the calibre we're at. We can say that, yes, Canada is *already* amongst the best in class.

CAPTAIN KEVIN OBERMEYER, 63

Resident of Vancouver
CEO, Pacific Pilotage Authority

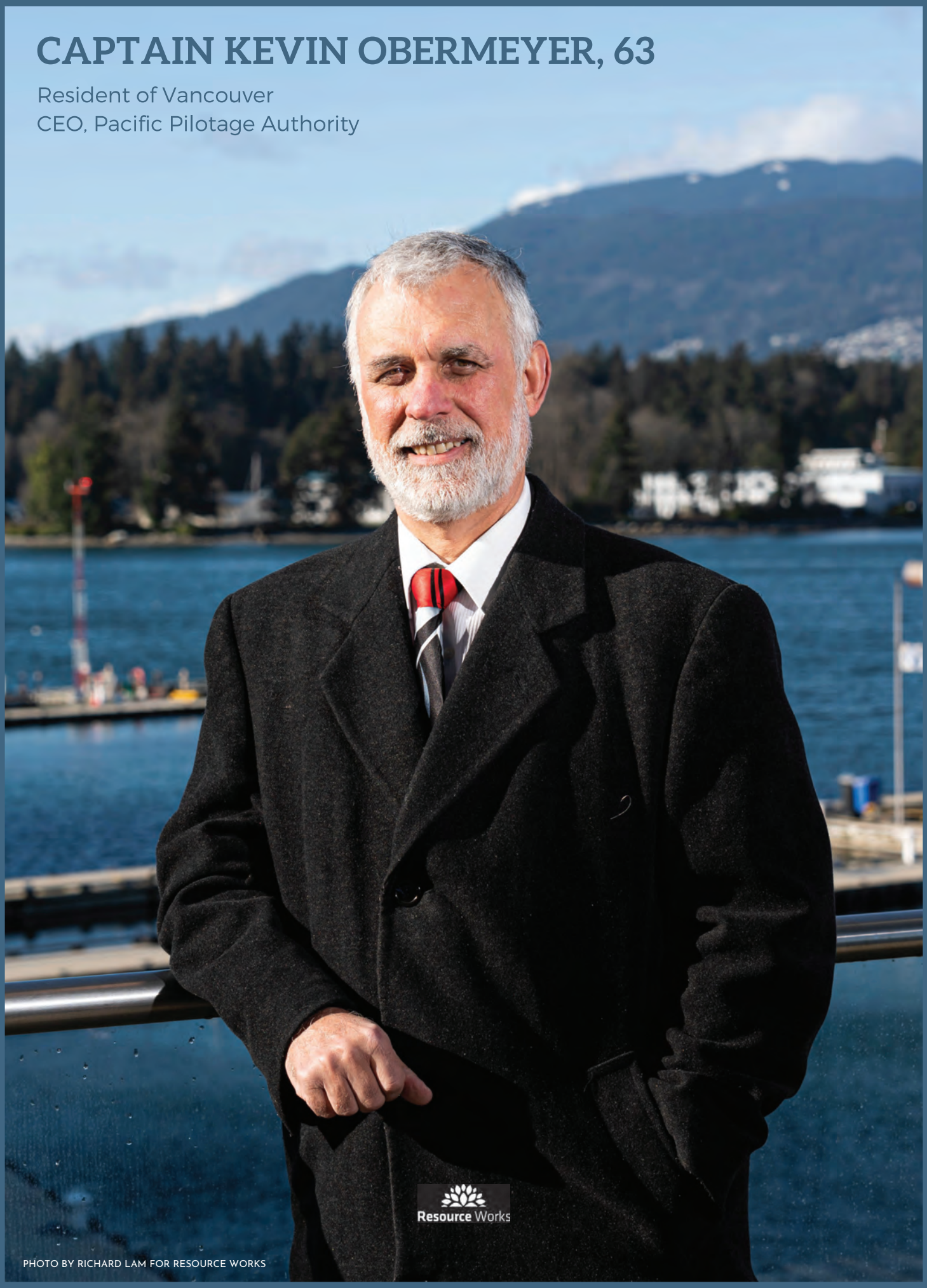


PHOTO BY RICHARD LAM FOR RESOURCE WORKS

Captain Kevin Obermeyer

Kevin Obermeyer is a Master Mariner who hails from South Africa and has been intimately associated with the sea since early childhood. He served in the South African Navy and Merchant Navy and has held positions in various ports including Prince Rupert and Nanaimo, British Columbia.

Capt. Obermeyer joined the Pacific Pilotage Authority in 1999 as Director of Marine Operations and was appointed Chief Executive Officer in 2006. His many years of deep sea shipping experience and marine management have given him a vast amount of practical experience in the marine and administrative fields, especially where vessel safety and operations are concerned.

Would you mind recapping what the Pacific Pilotage Authority does specifically and what the role of a Coast Pilot is?

What we do is provide marine pilots for all vessels over 350 gross tonnes. And we do that in all of the compulsory pilotage areas.

We provide the captain and bridge team with the experienced pilots who have an in-depth local knowledge. Under the *Pilotage Act*, the legislation that we operate under, we are a federal Crown Corporation. They are responsible to the Master for the safe movement of that vessel, called having the conduct of the vessel. What that means is that the pilot will give helm, which is like your steering wheel, course directions, using the engines to restrict speed in certain areas. As an example, we have to slow down through the ECHO [Enhancing Cetacean Habitat and Observation] Program, through Haro Strait, Boundary Pass – the pilots are well-versed in that. They are also experts in risk assessment and mitigation. So, if there is an issue, they know who to contact and they are aware of all the regulations and requirements. As soon as there's something up, they would contact MCTS [Marine Communications and Traffic Services].

They are the one person on that ship who knows, in-depth, the Canadian rules and regulations. They are also a resource to the bridge team. They are expert ship handlers and they do the docking.

Recruitment is from the local industry. The majority are captains. We do take chief officers from time to time, but then there's a much longer process. In order to become a pilot, you need a huge amount of sea time. The minimum is 700 12-hour days, and to get that as the captain you have pretty much been at sea for about 10 years – so they know this coast. Once they've got all of that time, we ensure that they do a familiarization program, so they will ride along with pilots for two years just to see whether they actually do like what pilots do. Not everybody wants to climb up a ladder at three o'clock in the morning on a rough winter's night – sometimes that scares them rigid and they never come back to us again.

The people that we have can handle stress very well, they know the coast and, of course, they passed I would say probably the most difficult exam in the marine world.

Their knowledge is such that we can give them five blank charts with an outline of somewhere on this coast, and they will fill it in so that you can see exactly what lights they have, what dangers are on the coast. And that's all from the head – it's not an open-book exam.
If they get 70% in those two written papers, they then have to sit through a three-hour oral exam, with a minimum of 70%. I used to be on the exam committee, I haven't been for a while, but there are five examiners, three of them are licensed pilots. One is an ex-Transport Canada examiner, and then it's one of my Master Mariners in the office – so that's the Pacific Pilotage Authority.

[In the oral exam], we can ask them to go anywhere to anywhere on the coast. And they have 20 minutes, in which to tell us what course they're steering, what they're steering on, what dangers are along the route. We will stop them and [ask], "Where are you, what is around you?" and we expect them to tell us.

It is by far the most difficult exam. If you ever want to see it in action, we welcome observers – one person per exam because the person is already totally stressed out. So, more than one really puts them over the edge. If they then pass this exam, they are put on a waiting list. And once we need another pilot, they will start the apprentice training program for a maximum of 24 months. During that time, they will do ride-alongs with pilots and over time will be given more and more responsibility. They also do a five-day ship model course in Warsash [Maritime School], in the UK, and a five-day full mission bridge simulation.

That's the process of how you get to become a pilot, it's very difficult. But we are always looking for people and encouraging them to study.

It sounds like there's a lot of rigour involved in that. But is there an area where errors typically do happen, when there's unprecedented conditions or something like that?

The errors often occur during the docking situation. But I want to differentiate between a tanker and a bulk carrier because there is a very big difference in how things are handled.

When you have these loaded [oil] tankers, you have two pilots on the bridge. You have one pilot, looking at his PPU [Portable Pilot Unit], all the time. If there is any error on the ship, such as a rudder failure, the PPU is accurate to within one tenth of a degree. The pilot that's watching the PPU standing next to the helmsman will say to the helmsman, "We're off track." Instantly, your two tugs on the stern and one on the bow will work to get that ship straightened out and through Second Narrows. All the way through the harbour from Westridge, all the way through to English Bay, you have these tugs with the vessel.

Why is it, in your view, that we are so risk averse as Canadians?

I think it's a lot to do with where we live. To me, there's a heightened sense of environmental awareness, in BC, Washington State, Oregon and California. The [safety] changes that I saw happening [recently] on the west coast are not emulated on the east coast. They don't put two pilots onboard, even if it is tight and they've never had an accident either. But there is much more of a heightened awareness on the west coast. I think companies, organizations and governments react to it.

There's a tremendous amount of interest, of course, from the public. Like you said, there's a cultural component, and politicians are quite concerned and care about protecting the coasts and the waters here. Are you confident that all the necessary protections that we currently need are in place?

I will tell you that I am asked quite a bit, "What do you lose sleep over?". I do not lose sleep over the tankers. Don't get me wrong, there is always room for improvement. It's never going to stop improving. And the more you study it, the more you think, "Well, maybe we can do this or maybe we can do that." But nothing comes to mind right now. I don't think we have a gap right now. I think with the escort tugs, the double piloting and all the other restrictions, like minimizing your speed to keep it under 10 knots – all these things are helping in the safe movement of crude oil products.

I lose sleep over a lot of other things. The pandemic has kept me awake some nights, worried about the effect on our population of pilots. We have a very small group, 117 pilots. I can't afford to have any of the pilots get infected.

But the tanker is not what keeps me awake at night. Let me explain. You have six levels of safety because you have a well-built ship, [and it is] double-hulled. You have very good equipment. You have a well-trained crew. You have two pilots in all of the critical areas. And you have a tug. And even if one of the pilots falls ill on the ship, you've got a backup standing right there who can instantly carry on as normal.

All these levels of safety give me a good night's sleep, where that's concerned.

Do you see a role for municipalities, whether currently or potentially in the future, in these conversations?

I think that's an interesting discussion point. The problem that we have is that we go through many different jurisdictions, both First Nations and municipalities, up and down the coast. I think if anything, if you had a Marine Advisory Committee for certain areas with First Nations at the municipalities, and then with Transport Canada as the lead (because this is a federal jurisdiction), you would be able to include people in the discussions looking at safety. And I know Transport Canada is doing that because there are so many OPP initiatives, and one of them is [the] Cumulative Effects [of Marine Shipping (CEMS) initiative].

In the report that you sent me [the BC EAO TMX Reconsideration Draft], there is a lot of talk about cumulative effects and the impact of the project vessels.

As a mariner, I have to put it into perspective. Because what it means to us, as pilotage, is [that] I have to look after – right now we're doing 52 ships a year. I'm going to have to move that up to 363, 365 – so one ship a day.[1] That's not a huge increase. We've gone from 14,000 jobs [i.e., ship movements] on the coast all the way down to 10,000 at one stage. Now we're back up to 12,000.

A lot of the communities say, "Well, you know, that's helped the environment." I don't disagree, but Canada is a trading nation and the western gateway is through Prince Rupert and Vancouver. We don't have any other options.

If everything went through the United States, you will have thousands of additional trucks, running backwards and forwards between Seattle and Vancouver. I'm not sure that the impact of pollution will be less than one ship in our area for maybe eight hours. And it's not in each area for a full eight hours. It will pass through each municipality within 30 minutes.

We're looking at this with a fine-toothed comb – as we should. I don't think we shouldn't. But nobody comes to me and says, "Oh my goodness, Kevin, you've gone from 10,000 to 12,500. What about the air quality?" It's just trade; it's international trade and the need to move Canadian products overseas and Canadian purchases across the country. We spend a lot of time agonizing over these 300 ships.

[1] Quoted numbers are subject to variability. TMX itself has assumed maximum throughput in its regulatory filings – up to 408 Aframax tankers annually (34/month).

CAPTAIN CHRIS BADGER, 64

Resident of Nanaimo
Shipping educator, former Chief Operating Officer, Port of Vancouver

PHOTO BY ARNOLD LIM FOR RESOURCE WORKS

Captain Chris Badger

Chris Badger is a Master Mariner with over 40 years in the marine industry and a proven record of achievement in Canadian port operations. Since retiring from the Vancouver Fraser Port Authority as Chief Operating Officer, he has facilitated and led a number of marine related projects including a review of marine pilotage in BC, and an assessment on the use of escort tugs in Haro Strait and Boundary Pass for tankers under 40,000 SDWT.

Since 2017, he has been an adjunct instructor at the Western Maritime Institute where he now teaches simulated electronic navigation utilizing full mission bridge simulators. Chris holds a certificate of competency as a Master Mariner foreign going, a Bachelor's of General Studies from Simon Fraser University and a Diploma in Executive Management Development, also from SFU. He is also a certified National Association of Career Colleges (NACC) instructor.

We know that the Trans Mountain Expansion is going to increase the capacity of Westridge Marine Terminal from five to up to 34 Aframax tankers per month. In general terms, can you please explain what impact a change of this nature means for overall shipping safety in Vancouver's Harbour and all the way out to the open sea?

Vancouver sees about 3,000 to 3,500 deep sea vessels a year. So, with the TMX, we're probably looking at about a 10% to 12% increase in traffic for the port. So, if we would put that in perspective, say LA Long Beach has around 3,500 to 4,500 ships a year. Houston, Texas has around 8,000 ships a year. Rotterdam, 29,000 to 30,000 ships a year. And the port of Singapore sees around 130,000 ships a year. It makes the port of Vancouver a fairly large port in North America, but quite small compared to large global ports. Personally, I don't really see [how] an increase of shipping from say 3,200 to 3,600 would have any material impact on safety.

In terms of the shipping conditions we have, relatively speaking, how do they relate to ports that do have a lot of traffic or comparable traffic?

From a geographical perspective, obviously, most of our waterways are almost like fjords. So, we have generally deep water with a whole bunch of shoulders here and rocks popping up now and again. From a navigational perspective, it's not simple, but it's not hard. You don't have the shallow banks that you can't see; most of the rocky outcrops are very visible. We have a very good nav aid system and coastal mapping system in BC.

Every deep sea vessel coming into Vancouver and into the coast has to have a locally trained pilot onboard and our marine safety inspectors are also top notch. We're definitely comparable with any port in the world with regards to safety. Because we do not have a large number of ships; we're not a congested area either. If one was to take, for example, the Strait of Singapore, or the Strait of Dover, or going through from Turkey into the Black Sea, you've got some significant congestion and traffic. We don't have that issue on this coast.

Can you provide some insight into the levels of oversight of the different agencies involved in shipping safety in this region, and whether the Oceans Protection Plan (the OPP) has changed this? Has it been a success in your view?

This is probably the question I had the most difficulty getting an answer to. Certainly, parts of the OPP are definitely overdue – better relationships with the coastal First Nations in regards to improving marine situational awareness. I think the knowledge that First Nations have has been very undervalued for many years. As part of this process, I think [getting that knowledge is] absolutely essential.

More money for staffing for Coast Guard and Transport Canada, that's great. They certainly could do with those extra people. I think one of the challenges they may have though is actually finding people who are qualified and that's a whole different ball game. Hydrographic survey work – the standard part of the OPP is to improve our mapping or charting system on the coast. That's really good. And additional radar stations – absolutely, it's very useful.

With regard to whether the OPP has been a success or not, I think that's a really difficult one to answer. If you look at Transport Canada's site, they talk about the pilots and the fact that every ship has a pilot onboard, and that they have a success rate of 99.97% in safely guiding vessels. So, the question, I guess, is whether the OPP will improve it from 99.97% to 100%. And I don't think that's likely.

So, from a safety perspective, will the OPP improve safety? Probably, but not substantially because the safety record is so high, already.

Do the measures that we have in place efficiently mitigate the risks and harms that could come if there is an accident?

Yes. One of the things I teach at the college is the error chain. There's no two ways about it: whenever you have an error, somewhere in that chain, you will find human error. Clearly that is, and always will be, one of the major causes of incidents, whether it's ships or anything else in the world.

The tugs, extra pilots, double-hulling of vessels, etc. – these all will have a substantial impact on the potential for any accident and what happens if an accident happens. I really think the risk of a major spill from an oil tanker is pretty low, if not next to none.

One of the questions you had though, in the list you sent me, was a concern about levels of government or the municipalities, in particular, being concerned about insufficient oversight being in place. I don't see the level of oversight as being insufficient. What I do think could be improved would be the actual coordination of that oversight.

Let me give you an example. The US Coast Guard, they're basically responsible for all seagoing services: search and rescue, enforcement, aids to navigation, environmental protection, security and even coastal military protection.

We tend to take a more layered approach in Canada, where we have our Coast Guard involved, we have Transport Canada involved, we have port authorities involved, we have the DND [Department of National Defence] involved. So, when we're looking at the coverage of all those things I talked about earlier, they're covered mainly by those four agencies or organizations.

This multilayered approach does require extremely good communications and, to a certain extent, it may also reduce reaction time during time sensitive events such as a marine incident. I don't think that BTS is as effective as it possibly could be. BTS, or MCTS as we call it in Canada, is more of a communication service. They provide updates on vessel movements [and] they provide notice of hazards and other events or weather information. The US BTS, on the other hand, provides all of those plus it has a more active role in monitoring and navigation advice. In fact, the US Coast Guard manages vessel traffic, particularly in confined waters. Whereas that's not a role that's carried out by MCTS.

Answering this in a nutshell, I think there's sufficient oversight. However, I think, a less layered approach, particularly in regard to response to emergencies and in the management of vessel traffic would probably make it even better.

Do you mind elaborating a little bit on your understanding of the OPP and the Indigenous consultation piece? You said earlier that there's a lot to learn from situational knowledge and really understanding the surrounding environment. Can you expand on that?

Yes. Again, I'm not an expert on the OPP but [here's] what I have seen and what I have heard discussed. In fact, I was involved with a lady by the name of Michelle Corfield, who was trying to develop a training program for coastal First Nations communities. What she was getting at made eminent sense to me.

Backing up a little bit, look at what they've done in the Arctic with the Arctic Rangers, where First Nations people in the Arctic are trained to protect the Arctic. She was looking at the same kind of concept, I believe, for the rest of the coast. So you would get First Nations members who spend their whole lives on the water, provide them with some training with regards to environmental inspection, etc. provide them with some training in response and some marine training – putting together a program that basically [has] communities out there with trained people, particularly in those areas where the Coast Guard can't get to quickly. They can respond quickly and effectively to any incident because as I'm sure you've heard from other people it is really the first hour of an incident that makes or breaks whether [the response is] effective or not.

In addition to pilots and other navigational safety measures, the advent of the Trans Mountain expansion has ushered in a new era of response strategies.

Resource Works

One environmental concern raised in the BC EAO's draft report is the discharge of bilge water. Can you please expand on what this means and how it pertains to tanker ships, especially those that are arriving at Westridge Marine Terminal?

I think it's complete nonsense.

As I mentioned, I was Harbour Master in Nanaimo, in Vancouver for a number of years, and I don't remember any incidents involving the discharge of bilge water. As you know, deep sea vessels are extremely regulated by IMO [International Maritime Organization] regulations regarding discharging anything.

In fact, in the port of Vancouver, when I was Harbour Master – and in Nanaimo – just to add another level of security, we used to go onboard the vessels and seal the bilge valve. Basically, the ships loved it. Of course, if they then got accused of something in the water around them, they could point to the valve with a seal on it and say, "Well, clearly it wasn't us."

So, bilgewater – it doesn't make any sense to me at all. Now, in the 90s, there was a real concern about the discharge of ballast water, not because it was necessarily dirty, but because of the introduction of non-indigenous species into local waterways. Obviously, the zebra mussel is probably the most well-known occurrence of that and in the Great Lakes. Vancouver was, in fact, the first port in North America to require mid-ocean ballast water exchange. And that really kind of eradicated that problem since then. Canada has an active regulation, as does the IMO, with regards to that.

Ballast water at one point was a real concern. It was a proven concern, but I just don't know where this fear or this concern about bilge water is coming from.

Another concern that they're evaluating is whether "vessel anchorages can denude the seabed within the circumference of chain swing with resulting loss of biodiversity and increased turbidity." In your view, are deep sea vessel anchorages in the southern Strait of Georgia selected and managed with such considerations in mind?

This was the best question, by the way.

I think that is one area that probably requires some more study. For instance, a bit of background, I'm a boater. I'm really pleased that a lot of the marine parks in BC now have mooring buoys so that you can moor a motorboat instead of going to anchor. Because, quite frankly, in my experience in the boating community, most people are pretty bad at anchoring. They really do anchor everywhere. But also, it's not unusual to see a whole bunch of them dragging their anchors when the wind gets up.

Regarding deep sea vessels, the anchorages are very well-marked on the chart and they're designated, so there's no question of a ship anchoring in one place one time and another place another time. They have to go to a designated anchorage, and obviously, the pilots are onboard and they make sure that they do get anchored in that anchorage as well.

Having said that, I actually think a bit of study on improvements could be made on the way that anchorages are chosen, so they're not just chosen for a ship safety perspective, but also with the marine ecosystem in mind at the same time.

Can you walk me through a little bit on the incentive structures in place for a safety-oriented approach to maritime shipping? How has this changed over time? For example, we spoke with another Master Mariner who was at sea in the '60s and '70s and had some real Wild West stories. But from every conversation we've had, it is also clear that the approach today is fundamentally different, especially following the *Exxon Valdez* disaster.

Anybody that went to sea in the '70s, and doesn't have some horror stories to talk about... Well, they were either asleep or weren't at sea, because it was a very, very different world back in the '70s. I think in the '80s, we started to wake up to the fact of what the impact was on the marine environment. And it's the same with IMO and the work that it is doing now.

The fact is that shipping companies themselves recognize that it's not necessarily in their best interest to do things the wrong way. It's going to cost them. Plus, education. I think a lot of those, as you put it, Wild West stories are really old stories.

And how about approaches to safety at the terminal itself?

One of the things that they do extremely well is they set the standard for the vessels that are allowed to come in. Trans Mountain sets standards for the vessels that are actually allowed to take their cargo. You can't just sort of say, "Okay, this is the ship coming in, we'll fill it up." It has got to be one of the ships that has been approved.

They have a third-party Supernumerary, Superintendent, who actually looks after the loading operations. So, it isn't the terminal, it isn't the ship. It's a third party, and therefore that person doesn't have the same potential pressures that may have happened to captains or even terminal operators in the past.

We already talked about human error. Human error usually comes when people are rushed or stressed. And if you remove that part of it, the captain really can't say "I want you to go faster," because it's not in his purview to do so.

Are there any additional noteworthy distinctions with respect to the port of Vancouver? Are there things that we need to be aware of that really differ from other conditions elsewhere?

Well, from my own perspective, when people talk about Vancouver being an oil port, I laugh. Vancouver is not an oil port. We're a bulk port, a container port, with a certain amount of oil. The majority of the cargo that goes through the port of Vancouver is dry bulk cargo. And in fact, we're dwarfed by Canada's two major oil ports, Saint John (NB) and Come By Chance (NL). They're doing 23, 24 million tonnes of oil a year.

If there's anything – and this is me blowing the trumpet for the west coast of Canada – if there's anything that sets Vancouver apart, it is a willingness to look at research and development in regards to improving safety. I'll give you one particular example.

We talked about tankers a lot [and] we talked about tethered tugs. The T2D concept, which is two tugs on the back end of the vessel, is a fairly new concept – a great concept. It was BC Coast Pilots in Vancouver that did the first fully instrumental trial using T2D on the vessel *Hellespont Tatina*. What did that show? It showed that tugs, when employed, resulted in a very minimal off track distance for the ship. And when used properly, you could bring a ship through a narrow channel like Second Narrows with the rudder hard-over, and you would stay on track. So that was the kind of R&D that Vancouver embraces and tries to utilize to make things safer.

So answering what's different in Vancouver, it's our ability to innovate.

And was this particular example adopted elsewhere?

Absolutely. It's now probably the main way of escorting tankers through narrow channels worldwide, using tractor tugs [in a T2D deployment].

So, you'd agree that Vancouver is a global innovator in tanker safety?

You bet, even though it's not an oil port.

ROBERT G. ALLAN, 73

Resident of Vancouver
Marine engineer and naval architect

PHOTO BY RICHARD LAM FOR RESOURCE WORKS

Robert G. Allan

Robert Allan is a third-generation Vancouver naval architect, designing commercial workboats of all types for 50 years. A 1971 graduate of the University of Glasgow, and as President of Robert Allan Ltd since 1981, he is internationally recognized as an authority on the subject of escort tug and specialized workboat design and has received major peer awards for this work.

He was co-Chair of the International "SafeTug" J.I.P., (2005-2010) and Chair of the Bollard Pull J.I.P., (2016-2018), and is Adjunct Professor in UBC's Naval Architecture & Marine Engineering program. Mr. Allan is currently Executive Chairman at Robert Allan Ltd., and President of the Association of BC Marine Industries.

Can you summarize for us the role that tugs play generally speaking in the operation of shipping on the south coast?

Our boats in the coastal waters of British Columbia are actually fairly unique on the world stage because we have a whole fleet of tugs that tow barges up and down the coast. They're pretty much the only means of shipping on the coast. There are no small ships moving between coastal ports. All of that work is done by tugs and barges up and down the coast and up and down the Fraser River.

But these are not the kind of tugboats that we're talking about when we start dealing with ship docking and most particularly when we're dealing with tanker escorting and tanker control. That's a whole new generation of tugboat that's emerged globally in the last two decades or so and has continued to be very much refined through a lot of analysis and model testing, to the point where now they're extremely reliable. These are generally large, powerful tugs purpose-designed for acting as an emergency brake and emergency steering system for tankers when they're working near coastal waters. We have a fleet of very powerful ship handling tugs in and around the port of Vancouver. And [under the Oceans Protection Plan], we're expecting to see that enhanced by larger escorts working further out in the Strait of Juan de Fuca.

The role of tugs is to lend assistance, to support ships when they're in port and to respond if they get into trouble, have a mechanical failure or steering system failure. So, tugs are the workhorse of the waterways. They're everywhere around the world. And they're workhorses doing what's needed.

Specific to tankers carrying products from the Trans Mountain terminal in Burnaby, how do tugs fit in? How many are used, and why does it vary along the journey?

At the present time, within the port of Vancouver, there are very strict regulations about tanker movements. They can only take place at certain states of tide, and they're very controlled in the speed at which the ships can move. The speed limit is effectively around five knots, and that's the speed at which most large ships have difficulty steering themselves.

The present regulations call for at least three powerful ship handling tugs to support the tankers, from the terminal through Second Narrows, right through the harbour, through First Narrows and out to the limits of English Bay. In all of that, the tugs are tethered to the ship. Once they get out to the Strait, the tugs accompany the ship, all the way out to the entrance of Boundary Pass. Then they connect up and do what we call a tethered escort through the Boundary Pass and Haro Strait down to Race Rocks.

Those tugs are in the order of 32 metres long. They're about 5,000 to 6,000 horsepower. They can generate about 80 tonnes of bollard force. And they work in direct mode, which is what escort tugs do uniquely compared to other tugs. They can generate almost 150 tonnes of line force.

They're working through the trickiest parts of the voyage, through the Gulf Islands, acting as an immediately available emergency steering and braking device. The plan is that once those tugs get to Race Rocks, they will turn over the support of the tankers to a larger group of escort tugs, which will be in the order of 40 to 45 metres in length and about 10,000 horsepower. And those boats will escort the tankers all the way out to Buoy J – basically the entrance to [the Strait of] Juan de Fuca – and that's by far the most weather-exposed and sea-exposed portion of the journey. It was a notorious area of the coast in the days of sailing ships, but we're long past those days. But it's still exposed to storms and whatnot, so these big escort tugs are able to perform their duties in the very worst conditions that can be expected in that area.

The BC EAO has postulated a scenario involving a 16,500 cubic metre spill from a tanker at a reef located on the western side of the top end of Haro Strait. The thinking would appear to be that that's where they believe a potential risk exists that's higher than other places. I've also seen through the comment period and through the NEB approval process the Haro Strait being identified as a tight spot that should be looked at more closely. Can you comment on the reality of this passage?

It is, relatively speaking, the narrowest point of the voyage – it is a constrained waterway, and at that reef, there's a bit of a dogleg in the turn. But I think what's really important to understand is that long before you get to that point, the escort tug will be connected to the stern of the ship and running on maybe 100 metres of tow line. When you're in a situation like that everybody's in a state of heightened awareness and they're really paying attention. They're not on automatic pilot going through a place like this. The tug skipper is out there, he's anticipating what the tanker is going to do and watching its course. The pilot onboard is watching the course – the ship's master is watching the course.

Everybody's paying attention when you're in a situation like that. And it's not a high-traffic area. Yes, Vancouver is a relatively busy port, but on a world scale we're really pretty quiet and the approach waters are not really busy compared to many big ports.

It’s conceivable that at a turn like that, you might have a mechanical failure, but that's exactly the situation for which these escort tugs are in place, and they will respond in a matter of seconds, not in hours or even minutes. They will see if the ship is not responsive and go into action immediately. These tugs are capable of turning the ship in a full circle in a matter of minutes, so they can take very tight control over what's going on and either retard a turn or enhance the rate of turn to do what's necessary.

From a practical point of view, what does it mean that there are layers of safety involved here?

If you think of the entire operation as a system, the components of that system are, first of all, the land-based connections and dealing with the ship and whatnot. But I won't speak to those.

But let's consider the tanker itself. Every tanker afloat today, and certainly every one that will be used in the TMX system, has a completely double hull. What that means is that you need a tremendous amount of energy in a collision to penetrate through to the cargo carrying inner hull. We've done some analysis on that that shows, for instance, if we said a 100,000 tonne tanker, you would need to collide with another 100,000 tonne tanker at least at about five knots in order to penetrate through to that inner hull. That's a right-angle collision.

You've got this, let's call it a crumple zone like an automobile fender these days, which is designed to crumple rather than just bounce off. A lot of the energy of impact would be absorbed by the crushing of the outer hull, and the hull is further subdivided into compartments. Even if you did penetrate, there's a limited volume of oil that might be lost.

That's on the tanker side, and then we have a speed limit within the harbour. That, in itself, keeps the energy of any impacts down to manageable limits and would really prevent any penetration of the inner hull.

The Port Authority has a whole series of strict controls about managing other traffic and managing the state of the tide and the times when tanker movements take place. So, effectively they make sure that the tanker’s route through the port is clear of other traffic, until they're right through. You've got pilots onboard, and you've got the ship's crew onboard. And you've got this group of marine masters in the escort tugs with their professional mariner eyes on the situation.

Those are the layers that you have: you've got at least a pilot and the ship's master and three tugboat masters all paying attention to what's going on at any time and understanding their role in the safe transit of a tanker through the port. So, I think the very safest place where these tankers will be operating is in the port of Vancouver – that’s a highly controlled maneuver.

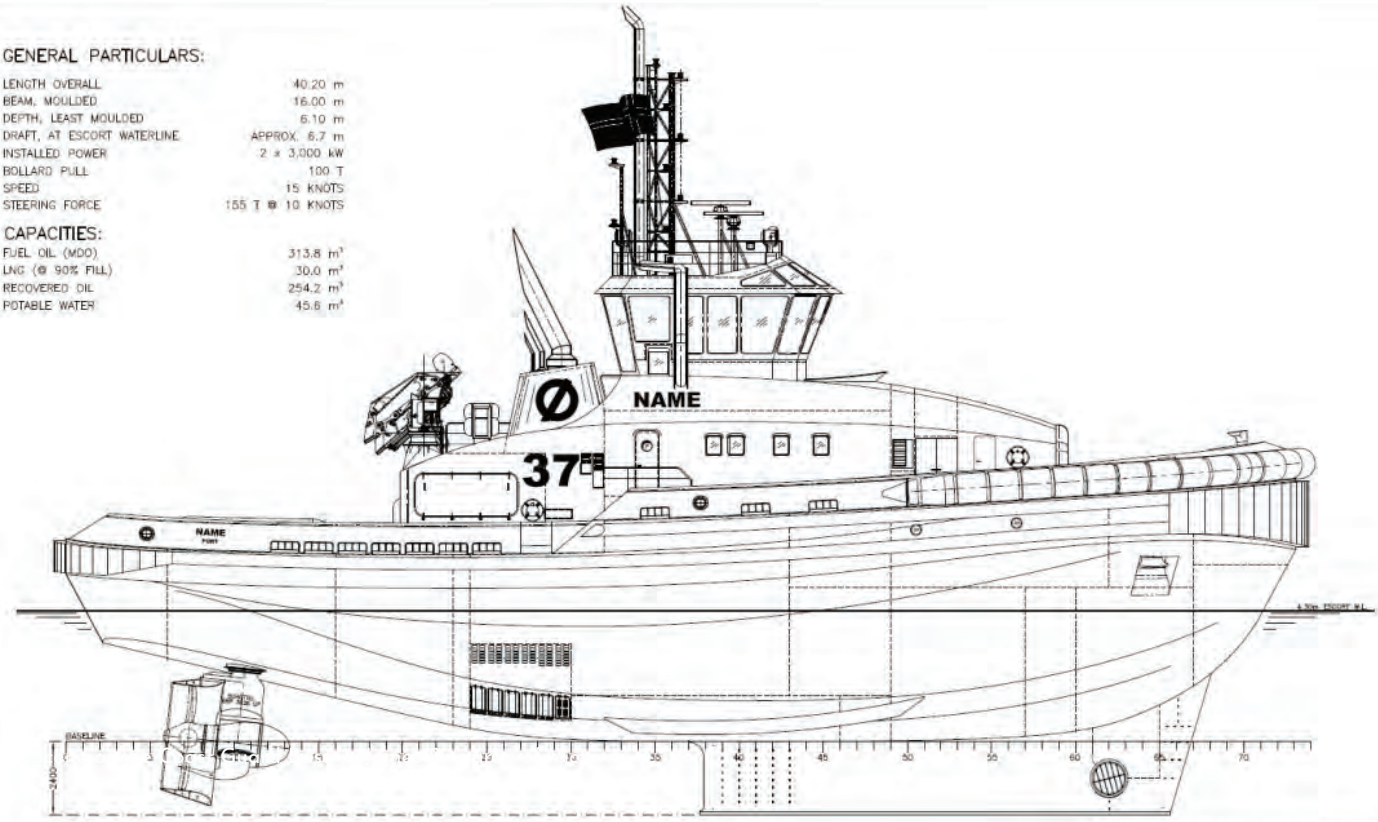
The type of tug above was created by Vancouver's Robert Allan (design below). The versatile craft is popular internationally and will become familiar to those watching ship movements from Burnaby's Westridge Marine Terminal.

GENERAL PARTICULARS:

LENGTH OVERALL	40.20 m
BEAM, MOULDED	16.00 m
DEPTH, LEAST MOULDED	6.10 m
DRAFT, AT ESCORT WATERLINE	APPROX. 6.7 m
INSTALLED POWER	2 x 3,000 kW
BOLLARD PULL	100 T
SPEED	15 KNOTS
STEERING FORCE	155 T @ 10 KNOTS

CAPACITIES:

FUEL OIL (MDO)	313.8 m³
LNG (@ 90% FILL)	30.0 m³
RECOVERED OIL	254.2 m³
POTABLE WATER	45.6 m³



OUTBOARD PROFILE

CONTRACT DESIGN
ADJUST TO SUIT FINAL LOFTING AND CERTIFIED VENDOR INFORMATION BEFORE CONSTRUCTION.

SCALE – METRES

ROBERT ALLAN LTD
NAVAL ARCHITECTS AND MARINE ENGINEERS

TITLE: GENERAL ARRANGEMENT			
SCALE: 1:125.01	DATE: JAN 27/15	PLOT SIZE: ANSI B	SHEET: 2
PROJECT No.: 214–054	DRAWING No.: 30000		REV.

Let's look at a scenario where we've got two-metre waves, we've got adverse wind conditions and you're in a situation where you've got a failure coming around that point. What then?

Two metre sea when you're out in a 30 foot sailboat in the Strait of Georgia might seem like pretty harrowing conditions but on a global scale and on a trans ocean scale, compared to what these ships are designed to take, that's pretty moderate stuff. There's not a lot of windage involved in these ships when they're laden like that. The tugs are designed to deal with those conditions, not a calm water state. All the forces that are needed have been calculated based on, at the very least, something like the 97th percentile of anticipated wind and wave conditions.

I have no concern about the capability of these tugs to do the job in the worst sort of weather conditions, but also I do know that Trans Mountain has set an operational threshold, depending upon the weather forecast for the operating area, because you can't design to 100%. It becomes a bit unrealistic if you have to achieve that. If the wind and wave conditions exceed 'x,' then we just delay for 12 hours or 24 hours. And that's an additional safeguard in the whole system – they're just not going to go out there when the conditions are forecast to be really poor.

As a naval architect, can you tell us about the design and physical characteristics of tugs, including how they've changed over your lengthy career? And how has noise management been part of that, whether for the crew on the boat or the noise it's created in the surrounding area, such as with reference to the Southern Resident Killer Whale (SRKW)?

I've been designing tugboats for basically 50 years now, and it's been quite remarkable to see how they have changed in that time period but most particularly how they've changed in about the last 20 years. The biggest change happened really in the post-*Exxon Valdez* era, when the United States of America implemented what they call the *Oil Pollution Act of 1990,* commonly called OPA 90. In Europe, at about the same time, there were similar regulations that were implemented, all calling upon tankers in near coastal waters to be escorted.

But the problem was technically nobody in the industry really understood what that escorting amounted to and it took quite a bit of time for people to really understand that you couldn't safely do that intended job with the designs that were in existence at the time. Those types were designed for the conventional kind of harbour ship handling, or coastal towing. A lot of research and development work, largely done right here in Vancouver by our firm, went into developing very unique hull forms, with large keels underwater and very powerful drive and steering systems that would enable these tugs to safely do these emergency steering and braking maneuvers that were required. It's actually been professionally an incredibly exciting time, and we've been at the forefront of this technology worldwide, I would say, for the last 20 years.

Every vessel has a threshold of safety too, so we've been paying a lot of attention to making sure that the crews that operate these boats understand those safety thresholds. And they're doing their job. They're being called upon all around the world regularly. Anytime there's an incident, these tugs are available, so they're doing exactly what was intended of them, and they're doing it well.

On the noise question: any time that you put energy into water through a device like a propeller, it's going to generate noise and tugs are no different than any other vessel that's out there – they're part of the whole equation of ship-generated noise. Back in the 1970s, there were complaints about noise onboard tugs, from the perspective of the crews, because in the 1960s, there was a whole generational change from old, lower-powered wooden tugs to higher-powered steel tugs. The noise environment onboard was quite a bit different than what the crews had become used to. Our company and many others spent a lot of time developing noise abatement solutions onboard, and those are really well-understood and well-refined today. Even in a relatively small and high-powered tug, the noise onboard is well-controlled.

We're applying the same technologies, to some extent, in trying to understand how to reduce [noise in the surrounding environment]. We'll never be able to eliminate it, but we can certainly mitigate and reduce the amount of noise that's generated from the propellers.

There's work going on worldwide in designing propellers to reduce that. But it’s just one part of the whole shipping equation. Every vessel out there that's using a propeller, or any propulsion device, is making noise, so we need to pay as much attention to that from an engineering perspective as we can. And then, other than that, the controls will be in operations.

Just to give people a sense of the relative power, is there a way to relate a tug to an ordinary person's experience? What about compared to a fast recreational boat. How does it compare?

The orders of magnitude are so much different. The escort tugs that we're talking about have got 20 times that horsepower. But they also are using propellers that are designed to generate high thrust at relatively low speed, compared to just high speed. It’s probably 40 times, or 50 times, the pulling power of the most powerful kind of racing boat.

The analogy that I like to use is that putting an escort tug behind a tanker is a lot like putting the most powerful tow truck you can find right behind every sort of tanker truck that's driving around the streets, delivering to your gas station. That big tow truck is right there in case anything goes wrong.

In your opinion, can residents of municipalities that are passed by loaded tankers rest easy knowing the tankers are being managed safely?

I believe that in the vicinity of the port of Vancouver, through the Gulf Islands and out to Victoria, the measures that are proposed – both proposed and presently implemented – result in the very safest measures that can be taken while dealing with tanker traffic. The speed is controlled. The operations are controlled in terms of tide stage and time. You've got multiple layers of safeguards within the vessels themselves, and through the system of escorting that's being used. You've got trained eyes, everywhere in the system.

I would say that every resident should have basically almost zero concern. One can never completely eliminate risk, unless you eliminate that shipborne trade – and then you've eliminated our economy and most of our modern world.

The safeguards that are in place are extremely effective and take account of all of the technological limits of the tankers and the tugboats themselves. I believe that the risk of an incident anywhere in the confined waters of British Columbia, with the system as designed, is extremely, extremely low.

CAPTAIN DAVID SMILEY, 79

Resident of Victoria
Master mariner, ship pilot, author

PHOTO BY ARNOLD LIM FOR RESOURCE WORKS

Captain David Smiley

David Smiley is a Master Mariner with early seagoing time spent on reefers, bulk-carriers and tankers. He later became a marine pilot, load master and safety officer of very large crude oil tankers and tanker terminals in the Middle East. His maritime career later took him to Kuwait, Singapore, India and the UAE.

Today he lives in Victoria, British Columbia where he is a maritime consultant advising on projects including ferries, cruise ship terminals, defense and aerospace.

Tell us about your career in tanker ships.

My own experience of tankers starts as a second officer onboard those ships, and that was at a time in the mid-1960s when things at sea were somewhat different to the way they are today: there were more people onboard the ships, the ships didn't have the same technology to support them that you see today, and it was nice to be a part of because the crew size was big enough that there was a social life onboard as well as the working life.

One of the most prominent points in maritime emergencies that we can think of was the *Exxon Valdez* spill. In your view, how did that specifically change your profession? What sorts of impact did it have on understanding of safety and risk management?

I wouldn’t say there was a monumental shift or change, because the *Exxon Valdez* was as a result of human frailty and other tankers before and since then have also suffered from the human frailty. Most accidents, it's not necessarily the fault of the ship, it’s the people onboard the ship. And the *Exxon Valdez*, the Master was lambasted. The ship design was critiqued. The maintenance that was supposed to be carried out was critiqued, and it went on, and on, and on, forever. The *Exxon Valdez* also didn't have the electronic charts that they have today. They didn't have the benefit of a traffic separation scheme, which would have some oversight from people in another area.

I wouldn't say it's a direct result of the *Valdez*, but a few years later, we come into the modern era of having electronic charts. And again, it may have been to the *Exxon Valdez* as an advantage, because one of the things that she did was she went out of the shipping lane, with the approval of the US Coast Guard because there was ice. I don't know if that was something that led to the disaster, but she wasn't in the normal shipping lane.

Can you define what a traffic separation scheme is?

It’s a little bit like the yellow line in the middle of the road, usually a mile wide with a mile-wide buffer in the middle. If you think of your main road as being a traffic separation, you keep to the right. In the middle of the road would be your yellow line, but now it's a mile wide and you don't go into that. And beyond that, in simple terms, you're not supposed to cut across the traffic scheme at an angle, except at a right angle.

How would you characterize the significance of oil and gas in the broader movement of goods around the world?

The greater public has no real appreciation of where things come from. And something like 90% of the world's trade is carried by water. When you consider the number of ships at sea, we get bigger ships. We don't have a huge increase in the number of ships, but for economic reasons, we get bigger and bigger.

The clothes you are wearing are made in some cases from substances such as oil – so many things are made from hydrocarbons. But if you look at trade in general, nothing is made here [in Canada] at all, but it's imported. And how does it get here? Well, it floats over. You can't avoid it. It's in your face, but it's not widely regarded, there isn't a great deal of respect for the people who are carrying this workload.

Is your impression that the increase in shipping that's going to be caused by this expansion project is going to be a substantive shift? Is it going to make it much busier relative to, let's say, the places you have visited and spent time in throughout your career?

If I can compare to anywhere else, it's really not going to make a difference. We keep talking about one extra tanker a day coming out of Vancouver, so maybe one in, one out, two movements. That's nothing in the overall scheme of things where your ports are handling 50 or 60 movements a day including big tankers.

Take the likes of the port of Rotterdam. I forget what their total is, I was looking at it only a couple of days ago and I think it was 70-odd ship movements a day. In other tanker ports, places in the Gulf, it's really small beer. It really is.

If you look at a port like Singapore – I can't remember the number of movements they have in a day – any time at all, if you look at a picture of Singapore, there's about 100 ships at anchor. We're talking about very large numbers and volumes. If you look at tanker terminals, such as the one in Burnaby, places that I can think of that would have similar traffic volumes would be Kwinana in Australia, south of Perth, Botany Bay on the east coast of Australia – very similar to what we have in Burnaby.

If you look at the issues, and I think we mentioned this on the list that you gave me, of traffic in the congested waters – we're citing the Haro Strait here as an example, where it's already been decreed that there would be escort tugs that would be tethered to the ship going through the Haro Strait. That's fine, that's straightforward. There's a reasonable body of water. It would need a fairly major catastrophe for anything to affect what goes through there. The extra couple of ships, it's nothing. It's nothing. They keep coming back to this – I don't get that – but it's nothing.

From the point of view of municipalities and First Nations located on the coast, can you think of any ways that they can inform and educate their residents or their members about the status of tanker safety, whether that's at today's levels or what you think is ahead of the future in terms of how safety practices will improve over time?

The man on the street here [in BC] feels very strongly about protecting the environment. There needs to be probably more public consultation, [like an] open house where people who have some knowledge can answer questions without having any political or other bias. Because if I was in a room with a group of strangers and they said to me, “Well, you see, this is going to happen and that's going to happen,” and if it's obviously wrong, then they need to hear from people who have some experience, who don't have an axe to grind, to tell them the way it is and make some comparisons.

In an op-ed that I wrote for the Times Colonist a few years ago, I quoted the number of ships and that that was through a number of strategic waterways. The first one to me, which is kind of obvious, is the Dover Strait between England and France, where there are 400 ships a day, moving up and down and around those waters. It hardly bears thinking about it. How many times have you got a ship hitting another ship? It's really big news. And if you look at it from a tanker perspective, the Strait of Hormuz between Iran and the Allman Peninsula is about a mere 20 miles or so in distance going around the corner there. And it's about 20 something miles wide.

But if you look at other areas, like the Dardanelles, that’s very narrow, a mile to a mile and a half, something like that, wide. It's nothing. And they have something like 35 ship movements a day. And if you look at the Strait of Hormuz, they have twice that number of movements. And although only about 15 of them, maybe, are large tankers, any of the others are large container ships with similar dimensions that travel faster. A collision between those two would be quite a catastrophe. And yet, that hasn't occurred. And then if you look at the Singapore Strait, I think it's up there, similar to Dover, and a very, very narrow waterway to get through. And the whole of the Malacca Strait, which is like 600 miles long, is a pretty narrow body of water with narrow shallow benches.

There are other areas of the world that are much more impacted by traffic on them than we are ever going to be here because we can't reach those volumes. It's not as if Vancouver was halfway along a Strait and that you could get out the other end and appear in, say, Montreal. It's a dead end. It's traffic to one dead end. That's all. You still have more risk of having some kind of an incident from any other ship, other than a tanker. All of the cruise ships that are coming in and out, they carry a lot of oil. They all have potential, but it doesn't happen because we're well-policed, well-controlled.

Traffic separation schemes that we've talked about before are very, very good. There's that and the advent of the AIS [the Automatic Identification System, which tracks ship traffic]. Those are some significant improvements on the way that the business is conducted today.

If I go down this afternoon to Willows Beach [in Victoria] and look out to sea, I'll probably see a couple of very large bulk carriers going past, also carrying fuel oil, also creating risk, however low. You'll see a couple of them in the space of an hour. That's nothing.

CAPTAIN JOHN DOLMAGE, 67

Resident of North Vancouver
Master mariner, accredited marine surveyor, towboat expert

PHOTO BY RICHARD LAM FOR RESOURCE WORKS

Captain John Dolmage

Captain John Dolmage is a Master Mariner with decades of experience on towboats in BC waters and from Puget Sound to Alaska. He's also an accredited marine surveyor and has been accepted by courts as an expert witness in marine matters and barge operations. He's taken part in everything marine from water-taxi, towing and salvage operations to designing anchoring systems for BC salmon farms and providing services to deep-water shipping.

Tow-boating is in his blood. He was raised in Vancouver in a tow boating family. His father was a pioneer in the industry, starting his own towing company out of Vancouver in 1925 and building it to be the largest towboat company on the coast.

Can you tell us about your background and the parameters of your current job?

Well, I've been operating tugs for almost 50 years now – 48 years. And then I've got a Master certificate, so I operate tractor tugs for Standard Towing at Port McNeill, where there are ships coming in for gravel. And then I also have been operating tugs in Vancouver Harbour, towing oil barges to supply bunkers to ships in the harbour, as well as towing log barges up to the Queen Charlottes, in Prince Rupert and around the coast.

So that's recently, and early on I started with log towing, [which was] was primarily what I did all over the coast and. And then, I spent 22 years in the aquaculture industry, servicing the aquaculture industry with a tug and barge and crane barge and doing construction and network and assembly disassembly of sites, that kind of thing. And also advising them – I did a lot of design and layout for the farms and anchoring systems for all of those years.

In the last 10 years has been mostly ship docking, and then general barge work in the harbour.

We use tractor trucks, which are quite different than a conventional tug in that they've got two drives that turn 360 degrees. You can do any maneuver you like with those types – they're extremely maneuverable, plus very powerful. Tugs have increased in power hugely over my lifetime.

The operators are well-trained and they're very versatile vessels to work with. And you'll see more and more of the tractor trucks coming into general towing as time goes on. It's becoming more and more common that people are building these tractor trucks to do what used to be conventional tug towing. They're been very successful because of that maneuverability.

A big part of towing is tides and understanding tides. Because you're so restricted in your speed, you want to use that tide every way you can, and avoid it in some cases. You really learn your tides very well. Maintenance is a huge part of it for me: rebuilding boats, rebuilding barges, a lot of time around shipyards, machinery, working in machine shops. It's been a lifetime of boats every which way.

Do you mind walking us through a little bit of what that process looks like when you are involved in an oil barge coming in and out of the harbour: what's your role, what are the roles of the other people who are involved in that process and how do you work together as a team to ensure the safe movement of goods through our waters here?

Well, you use your own vessel traffic system now. And they notify you when there's opposing traffic or traffic that's going to be in your vicinity. And then we generally will always contact that opposing traffic if there's any chance that there's going to be interactions, or a close passing situation. You always talk on the radio with the other master or pilot and make arrangements for passing, which side you'll pass on. Or one will say, “We'll hold off and wait for you to get by, go through and then we'll come in.”

Second Narrows now has a half mile distance clearance between vessels, so you'd have to stay at least a half a mile from the other vessel as he goes through the Narrows. And, yeah, you're aware of their speeds and their intentions, all the time. Radio contact is the number one thing in the harbour.

Can you describe the orchestration between those helms? Who's in charge and what are the considerations for braking and crash avoidance?

The pilot is in charge. He has control of those tugs and the tugs don't talk amongst themselves at all. It's you. There are protocols, so you listen for the pilot, and the tugs generally are identified by ‘port bow,’ ‘starboard bow,’ ‘aft tug.’ You don’t talk about the name of the tug. Sometimes they'll do numbers just to keep it brief and the pilot orders the tug to do whatever he wants, [and] the tug replies the exact same order, so that you know that you've received the proper order.

Sometimes, another tug might say if they've noticed that there was a mistake made or somebody didn't answer quite right. Somebody will sometimes step in and say, “Well, no, that's not right.”

Everybody's listening very intently all the time even, it doesn't matter which type of ship you're handling – it's all the same. There's no chatter when you're doing that process; it's strictly replying to the pilot’s orders and answering him clearly.

What are some of the considerations around managing wake?

Of course the ships are going slow. They don't throw any wake – there's zero, really zero, wake from a ship moving through the harbour. And the tugs mostly don't throw wake. Most of the fellows are very good. The tug moves through the water at an easy speed, up to about seven to eight knots. And if you push it from there, if you want to go faster, all you're doing is you start to dig a hole – that’s what we call it. The boat doesn't really go very much faster forward but it just starts to, because it's got so much power, it starts to dig a hole and that hole creates a wake.

It's pretty rare in the harbor for tugboat masters to run with a wake because they're always aware of it. And there's nothing worse when you've got a tug and barge up close behind you for a tug to go by throwing wake – it's really hard on your gear.

Most of the guys respect that and are aware their wake can cause problems so they are pretty conscientious.

I would say overall the pleasure boats make far more wash through the Narrows than most of the commercial traffic.

So, if someone's concerned about wake as a problem they should be looking at pleasure craft?

Well, I would say more so. Also, the commercial traffic is generally out mid-Strait and the wake dissipates. By the time it gets to the shore, it's dissipated considerably and really isn't much concern. Again, the pleasure boats tend to go all over the place. You've got them running up closer to the shore in some areas and that kind of thing. But for the most part in Vancouver harbour there's – well, other than the SeaBus – not really any wash to be concerned with from the commercial traffic.

And there never has been. Years ago, before the SeaBus, I have to say that no one threw wash except for the CPR boat.

What ensures that everyone involved in this process is aware of the safety considerations and the risk?

The first thing that comes to mind is pride in your job. All the fellows that operate the tugs and the pilots that are on the ships are very proud of what they do and they like to do it well. That never changes. Ship docking Masters on the ship were always considered the elite. The best guys went into the ship docking. Now there's generations of fellows that have been in ship docking so it's changed a little bit but it's still a very demanding job and I think most of the fellows are really looked up to. They're regarded as very professional.

And, of course, pilots have graduated from their Master's on tugs, big trawlers or ferries, that kind of thing. [Then], they've attained their pilot's certificate. So again, it's people always doing the best they can.

There's continual training, especially for the pilots. Even the tugs, there's new scenarios coming in, and the fellows have to train and be aware of that situation or changes that are made. And they go out and they practice them, and they're very skilled at what they do.

Are there things that British Columbians or Canadians need to be worried about when it comes to the increase in tanker traffic that's going to come as a result of the Trans Mountain Expansion Project, or are you confident that the measures that are in place are sufficient to protect our coasts and to ensure good outcomes even as the traffic increases?

I don't have any reservations. There's far less traffic now than what there used to be. When I was a kid in the ’60s and ’70s, the harbour was crawling with tugs, barges and log tows – there were sawmills all up Burrard Inlet and on the North Shore.

The ships were smaller but there were a lot of ships coming and going all the time, and coastal traders and that kind of thing which we don't have anymore. The volume of traffic has decreased a huge amount on the coast.

That's eliminated a lot of the potential risks today because there's so much less traffic. It's much easier to control. Everybody has radios, everybody's got radar and all the new AIS, so it's very easy to keep track of other vessels. Of course, vessel Traffic Services also help to coordinate, where everybody is, what the traffic is, the situation in all the different areas.

With the training and the power of the tugs that are involved I don't see any risk. Well, I should say, it's always a risk, but the potential of an accident is extremely low, I think. I'm really confident in that. I would hate to see anything happen in the way like an oil spill – I just don't want to see that kind of thing. I enjoy our environment, and [don't like to see] anything that does harm to it. Most people have got that in their head all the time as well.

There's a lot of people who want to know that the work your industry does on the coasts is not harming marine mammals, particularly large ones. Can you tell us about your own experience here?

I've had lots of encounters with whales over the years, and when you're towing they'll come in alongside the boat and kind of check you out. They don't seem to mind at all and I've had humpback whales come right up close to the boat, breaching right within 20 feet of me.

All this talk about the propeller noise – it's the boats with bigger engines. The propellers turn much slower and the noise doesn't seem to bother them. We've been pushing on a ship full force, full speed and the killer whales come in by the boat, alongside us, and check out what we're doing and then off they go again. So, they've got three miles of water behind us to avoid us if that noise was bothering them but again, they're curious. They come over and check it out and off they go again. The tugs stay on their course and whales, if they want to avoid you, they avoid you. You don't really know what a whale is wanting to do, so you just stay your course.

I've never seen an issue with the ships and tugs and slow speed engines. It's the high-speed engines that the whales don't like. Jets are the worst [as] they've got a real scream when you're underwater. Unfortunately, whale-watch boats are putting jets in their boats, so I think that's detrimental.

RONALD J. HOLTON, 74

Resident of Vancouver
Risk management expert

PHOTO BY RICHARD LAM FOR RESOURCE WORKS

Ronald J. Holton

Ron Holton was born in Saskatchewan and received a BA Honours degree in Economics from the University of Saskatchewan and an MBA degree in Transportation from the University of British Columbia (UBC). He worked for British Columbia Railway following graduation from UBC, then spent much of his career with Canadian Forest Products Ltd. (Canfor).

He joined the Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games (VANOC) in March 2006 as Vice President, Risk Management & Assurance Services. He has supported risk management work for the Sochi and Rio de Janeiro Olympic and Paralympic Games. In January 2011, Ron was appointed Chief Risk Officer for UBC, where he led the Risk Management Services Department, retiring from UBC in February 2020.

Our first question is about the nature of risk itself and what professionals in risk management typically do. Can you explain in layperson terms what your profession specifically entails?

The profession of risk management, or enterprise risk management as it's more generally described, really is very straightforward and quite intuitively obvious. It entails looking at what the objectives of an organization or a project are and then identifying what could get in the way of achieving those objectives. Risks are, by definition, something that could happen to interfere with the achievement of the objectives of an organization or a particular project, in this case the Trans Mountain Expansion Project. The intention in a comprehensive risk management framework is to go into the project with eyes wide open. Just looking at what could go wrong and identifying all types of risks and all parts of the project or the organization.

So, then the process of identifying becomes looking at what could go wrong, what could interfere with the successful outcome, identifying the risks, and then assessing the risks looking at the probability of occurrence of each risk and the severity of impact. Then you move on into looking at ‘are there existing controls in place?’. And identifying those and assessing whether they appear to be adequate. If they're not adequate, or if there aren't existing controls then additional treatment, controls or mitigations are required, and those need to be identified. There needs to be an identification of who was responsible for implementing them. In some cases, it's not reasonable to completely eliminate the possibility of the risk occurring, or manifesting. In those cases, then, there needs to be attention paid to response capabilities and contingency plans in place. Response, recovery and financial capability (to provide response and recovery) then become a key part of the overall risk management process.

Tell us a little bit more about your work at the Vancouver Organizing Committee for the 2010 Olympic and Paralympic Winter Games (VANOC). What are examples of specific scenarios you evaluated and planned around in terms of mitigation plans, who's accountable, things like that?

We had a very, very comprehensive framework in place. It began in 2006, when I joined VANOC. It began with the construction projects, and as you would know there were multiple projects for venue construction that VANOC was handling directly. And then there were others that VANOC was not responsible for the construction project, but we were contributing funding. And what we did was go through that risk identification and assessment process, which resulted in the creation of risk registers for each of the nine construction projects that VANOC was managing directly, and then half a dozen that were being managed by partner organizations – UBC in one case, City of Richmond in another case. We created risk registers for those as well. Looking at the risks that VANOC could control and risks that other partners could control. Then as VANOC began to operationalize – and there were 73 departments or functional areas in Olympic terminology that began to set up: transportation, sport, various others in various marketing initiatives – we created risk registers for each of those as well identifying all the operating risks that they would encounter.

As we moved closer to Games time and the construction projects were completed and the venues became the competition venues and the key non-competition venues became available for training and exercises, we worked with venue management teams to create risk registers for each competition and non-competition venue. An example for a competition venue that I think is particularly noteworthy is Cypress Mountain.

Early on it was identified that there was a lack of snow risk. Given the lower elevation of Cypress. And so, the risk was identified, “insufficient snow, resulting in a disruption of planned events at Cypress” – that was basically the risk statement, so we started looking at existing controls, if you will, and the weather history for February. The period for the Games indicated that most years there was adequate snow at Cypress. However, not always, so it was recognized that we couldn't necessarily count on it and we identified additional measures that needed to be taken. One of those was installation of snowmaking equipment at Cypress which hadn't existed there before. That was done by installing snowmaking equipment to cover the four fields of play.

But it was recognized that you can only make snow if it's cold enough. If it's too mild, the snowmaking equipment is not going to be effective. And it was recognized again looking at weather history that there could be unusual warm periods in February. So another mitigation plan was developed to contract with helicopter companies to haul snow from high elevations. As part of all of that there was a contingency budget that was created, if these things needed to be implemented.

It was cold in December, and it was cold in much of January as well and so a lot of snow was made and stockpiled and covered with tarpaulins. But then we ran into extremely warm weather in February and torrential rain, which tended to just melt the snow that was there. The end result was that we had to do all of those things. But as a result of having all of those prepared mitigation plans in place, all of the events at Cypress on the four fields of play, ran as scheduled on time, with adequate snow.

That is probably one of the best examples of risks that had been identified early on and a great deal of planning, thought and financial preparation had gone in.

You've outlined some of the core criteria within that risk management process that enabled you to appropriately respond when the risk actually manifested at VANOC. Now turning to Trans Mountain, what has your impression been, as a risk professional, of TMX's enterprise risk management strategy?

What I can contribute is just to speak about the process of risk management, and whether or not there is evidence that that process has been followed, and the elements of that process of a good risk management framework. I can't talk about if this is going to be adequate to deal with all the risks involved. I don't know, but I can tell it looks like a very thorough and comprehensive process has been followed.

[Based on the materials that Resource Works shared], I found it very, very reassuring overall, and a good illustration of a risk management process identifying the risks. The adequacy of the existing controls was commented upon – it was noted that the existing Trans Mountain pipeline has been operating since 1953 without a drop of oil being spilled by a tanker visiting its terminal. It talked about additional mitigations like extended pilotage, additional tugs, retrofits of Lions Gate and Second Narrows bridges, additional mitigations at Westridge Marine Terminal and the enhancement of response capabilities. The Greater Vancouver integrated response plan for marine pollution incidents is the response plan for marine oil spills in the Greater Vancouver area. So, it was relying on that as being a significant and comprehensive current control.

Then there is the role of the Western Canada Marine Response Corporation, which has been given additional funding because of the project to enhance their capability to the tune of $150 million to cover costs of investments in enhancing spill response capacity: new personnel, new vessels, new equipment caches, new permanent operations bases.

So looking at that and what had been put out in that [Resource Works] Citizen's Guide, I thought this really lays out quite adequately a risk management approach to this whole project and identifies the players that are involved, the existing regulatory frameworks that are involved, but acknowledges and indicates that the probability of a significant occurrence is extremely low and the severity of impact is likely not to be terribly great, even in a worst case situation. But it doesn't pretend that it couldn't happen, which is why all the response capability and the enhancements of the response capability that are identified are important.

So, if I look at all of that from a risk management professional overview standpoint, I'd say there's been considerable care and attention paid, looking at this whole project with a thorough risk management lens, if you will.

Looking at the EAO [draft] review, which I've read, a good part of it, not all of it, unfortunately from my standpoint, which surprised me actually a little bit given that the EAO is a provincial body, they haven't laid it out in an apparent risk management approach. They are, of course, basing all of this on the National Energy Board reconsideration in 2019 of the review that they'd done in 2016, and whether they felt there was anything that needed to change. It's there, but you have to dig for it to find [clear articulations] of risks, existing controls and if anything has changed in the NEB reviews from 2016 to 2019. In many cases, they have nothing or they found that there was no need to change or issue any additional recommendations.

In the EAO draft review, the point is made frequently that tanker shipment and marine safety is not the responsibility of Trans Mountain. Their responsibility is the pipeline and their tanks, and the responsibility for marine shipping rests with various agencies. So, back to your question, there has been an identification of existing controls that are in place and in some cases, additional measures or additional mitigations that need to be taken. That should provide an adequate level of comfort.

So, for a member of the general public, who lives in Vancouver and doesn't want to see an oil spill anywhere in the coastal waters, what can you tell them about the process that is typically followed and whether they ought to have confidence in that process?

My feeling, to the extent I've looked at it, and to the extent risks have been identified and analyzed, controls identified, additional mitigations proposed where felt necessary and response capabilities identified, analyzed and enhanced, I feel that I feel quite confident that the risk management approach that has been employed throughout is adequate.

Now, in risk management, one always needs to be wary of the so-called asymmetrical risk, or a Black Swan, where the probability of occurrence may be very, very low. But every once in a while, something happens unexpectedly and maybe the severity of impact was thought to be very low but a particular set of circumstances unexpectedly occur and you get an incident that is much worse than had been foreseen.

Always in in risk management if you can't be completely confident that you have eliminated the possibility of the risk occurring, then you need to have contingency plans in place, response and recovery plans in place, and that's why it's so reassuring in reading these documents to see the response capability that exists now, and the enhancements to that response capability that are being contemplated. That's really adding that on to the enhancements to the safety procedures. But then having that backstop of the enhanced response capability is absolutely critical because things can go unexpectedly wrong.

A few of the experts we've spoken to have identified human risk and the risk of human error. What's your read on that based on the information you've reviewed on this project? How well does it address it and what sorts of things would need to be addressed for this project to have a good handle on the human side of the risk?

Well, a couple of things spring to mind just from having read it. Training is mentioned in various capacities including regular training exercises. And that's the human side of it, making sure people are adequately trained and adequately familiar with what their roles should be. The enhanced pilotage presence is a human factor as well. It also relates to other things like double-hulled construction and other enhancements of tanker shipping safety. But I think that there are good indications that the human side of it has been considered.

MICHAEL SCHOEN, 67

Resident of Surrey
Associate Professor of Teaching, UBC Chemical and Biological Engineering and Keevil Institute of Mining

PHOTO BY RICHARD LAM FOR RESOURCE WORKS

Michael Schoen

Mike Schoen has a joint appointment as an Associate Professor of Teaching at UBC Chemical and Biological Engineering and the Keevil Institute of Mining. He has an M.A. in Energy and Mineral Resources from the department of Petroleum Engineering at the University of Texas at Austin and an honors undergraduate and graduate degree in English. He also has over 20 years of corporate experience in the oil and gas industry. His teaching focus is the 2nd year, core engineering communication course that is required of all engineering undergraduates.

As he tells students, he has a passion for oil and gas, which is why he is situated in chemical engineering and mining.

As an educator, how do you prepare the oil and gas engineers of tomorrow to be empathetic about public concerns?

We have to tell people that were part of the solution, we're cleaning up our processes. We have reduced emissions from oil sands. The irony is that what we told people for years, has come back to bite us, because it's true: 80% of your emissions are coming at the tailpipe. So even though we've reduced our GHG emissions in the exploration, production and refining processes, it really hasn't had that much of an impact because 80% of the emissions are coming when you put it in the car and burn it. But QUEST [the carbon capture sequestration facility in Alberta] – our sequestration of CO2 is phenomenal.

We have [Alberta's North West Redwater Sturgeon Refinery] on-stream now. That will produce the greenest petroleum products from the highest carbon intensive petroleum products, because we're capturing all of the emissions at-source, and we are pipelining them to a depleted reservoir, 600 kilometres away. That's the Alberta Carbon Trunk Line (ACTL), and we're using that in enhanced oil recovery (EOR), to take what's basically stripper well production to 400 barrels a day. We expect when Redwater is sent to Phase Three, we'll be getting 40,000 barrels per day out of that depleted field. So, we are reducing our energy consumption in refining and processing, we're utilizing coagent. We're doing so many things on the technical end. And what we have accomplished here, what our Canadian engineers have accomplished, is completely phenomenal. They need to be respected for what they have done technologically, but people don't really understand what they've done.

I tell my students that inexpensive energy has improved the standard of living for everyone … there's a good 50 year run left in oil. And the people that [the industry needs] will be the smartest people in the world because they have to have the technological chops to do things.

What's the reality that people need to know when they're thinking about the bigger picture on energy transition?

Okay, first of all, peak oil doesn't mean that all of a sudden we fall off the cliff and there's no more oil consumption. When we hit peak oil, world oil production can still be increasing incrementally, but the incremental increase will be less than the population increase. So, per capita consumption is dropping. And then the question is what the rate of decline is going to be. So peak oil will kind of phase itself in over, I'm guessing here, a 20-year period. Our forecasters – McKinsey, IHS Markit – one of them thinks that peak oil is already here and the other one thinks that it's going to be in 20 years. I think it's more like 20 years. I could be wrong, let's split the difference.

For sure it's not yet, it's not now. There will be a rebound after this COVID thing is finally over, and then things will slow down. How long will that rebound be? Hard to say. But we're not at peak oil yet. And frankly, I welcome the transition. I welcome seeing natural gas increase its share of the energy mix, that'll be good for Canada too. We have a ton of natural gas. I welcome hydrogen. I welcome more ethanol in our gasoline. That will be great for British Columbia, because we'll be able to utilize our wood waste.

Climate change is the most important problem we are facing in this world, I believe that. My course, this term, is focused on climate change. We are in a global climate change emergency, we have to do everything that we can. But that doesn't mean shutting down pipelines, because there is a place for Canada's oil and gas in the world. And that place is dictated by energy security. Any smart country in the world would like to have a piece of us, as part of their energy basket.

How would you tie these two together: climate action and energy security?

There are several arguments: One, it has to be multilateral. Two, part of the climate change issue is addressing the inequities of North-South relationships, industrialized and lesser developed countries. Three, let's take a look and I'm going to take you back into the refining world.

[Henry] Kissinger, created the International Energy Agency (IEA) in response to the first oil shock [in 1974], when oil price went from $3 or $4 a barrel to $12 a barrel overnight, and OAPEC evolved into its own separate embargoing institution. So, Kissinger helped to implement what they called at the time, a consumer cartel. And that was the IAEA and it came with sharing agreements. So, okay, Saudi [Arabia] punishes America, well, Britain, France, Spain, will piece off 10% of their oil and help out America because they're being somehow embargoed. That was the way it was supposed to work – that everybody would share in the risk and would be prepared. Even just through energy conservation, you can hive off that 5% or 10% and give it to your buddy in need.

That was the origin of the IEA and it had some success. And then of course, America cultivated the non-OPEC countries. And then you have the rise of Mexico, Russia, Canada and others, and that diluted the power of the cartel to set price – the definition of a cartel.

So, let's take a look at refining because the big question that we get as Canadians is "Why don't we just build more refineries? They're cheating us on the gas, [and] they get that bitumen bubble discount." Because we don't have anyone to sell it to. People don't want to buy refined products, or if they do, they want to limit their purchase of it.

Nigeria ships its oil to India, gets it refined there and imports refined product from India. The largest oil refineries in the world are in India: Reliance [Petroleum] has two oil refineries that have the capability to process 1.1 million barrels per day. That's huge. And I think one of them they're planning to talk about expanding it to 1.6 million barrels per day, which [Russian-owned] Rosneft has offered to partner with Reliance [on].

What's happening in China? [Saudi-owned] Aramco is partnering with China on joint ventures in oil refineries, 50/50 partnerships. The Russian natural gas pipeline to China is a tremendous deal for China, except for [whether China can] count on Russia to not turn off the tap.

The bottom line is, Canada is perhaps a regulatory nightmare to negotiate and things take a lot of time, but once you have things in place, you're not going to get your source of fuel interrupted. But what a lot of countries who import from America don't like is that they can't actually own the resource that is going to be refined, transported and shipped to their country. They can either own the oil in the ground. or they can have a piece of infrastructure that's processing it, but they are not allowed to be vertically integrated – at least with LNG. And I'm pretty sure that they have enough barriers in place to do the same with shale oil as well.

Any final thoughts?

Cotton was the defining commodity of the 19th century because we had the American Civil War arguably over cotton and Britain, supporting the South for cotton. And what was the commodity of the 18th century? Sugar. Oil is the defining commodity of the 20th century. I suspect water will be the defining commodity of the 21st century.

A coast pilot descends from a cargo ship off Victoria.

Resource Works

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Acknowledgments

We acknowledge the participation of the expert interviewees who volunteered their time for this project. Taken together, these interviews provide a much-needed perspective on the status of maritime safety as it exists in 2021. Through this work, we hope to assist not only the TMX Reconsideration process that this paper has been created for. We also see the utility of expert information to benefit citizens who want to arrive independently at conclusions about important public safety matters.

We acknowledge the efforts by First Nations leadership in numerous communities to ensure that the authentic concerns of their members have been addressed. The emergence of an Indigenous coastal guardian movement on the west coast is a welcome turn of events. As for the Trans Mountain Expansion Project itself, the fact that in March 2021, 63 First Nations supported the infrastructure initiative is surely a rare and remarkable thing. Long-term sustainable opportunities from economic development projects, experienced through partnerships, provide an example for how Indigenous aspirations can be met.