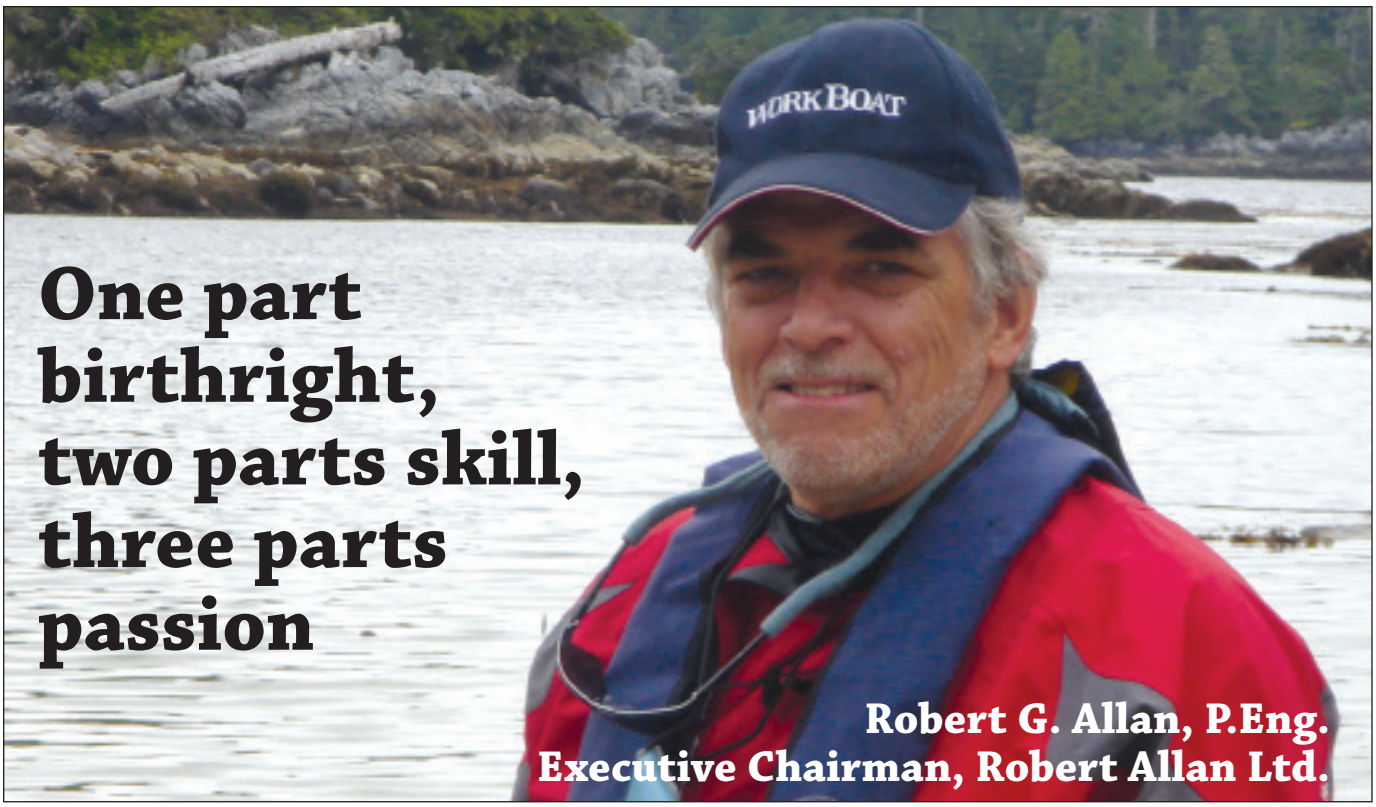


One part birthright, two parts skill, three parts passion

Robert G. Allan, P.Eng.
Executive Chairman, Robert Allan Ltd.

There are few names in B.C.'s marine industry that are more well-known or well-respected than that of Allan. The legacy that can be seen in all but a handful of workboats on the B.C. Coast demonstrates a consistent 82-year reputation of ingenuity, innovation and expertise. While being born into a family of expert naval architects might intimidate some, Robert G. Allan can't believe his luck. As we find out through our interview though, being born into a legacy is only a part of what makes a talented naval architect. Skill and passion are so evident when Rob discusses the many aspects of design and marine engineering, that it becomes clear that it is the local marine industry who should consider themselves lucky.

BCSN: *Could you provide an overview of shipbuilding activities and how they have driven trends in naval architecture?*

RA: In historical terms, centres of excellence for shipbuilding have all waxed and waned — and continue to do so — all generally in pursuit of lower labour costs. Britain was the leading shipbuilder for many generations but by the early 1970s that started to fade. The technical expertise was there, both in terms of design and construction, but the labour costs were simply getting too high. After the Second World War, the Japanese, then the Koreans started building up their expertise, especially in the big ship market. Small vessels are more difficult to transport large distances and don't trade internationally so they tend to get built closer to where they're used. Increasingly, that's changing though.

> Steel boats can be patched and repaired but only up to a point and I think that point is getting very close now.

For Canada, we had a very viable industry here in Vancouver, largely to support local industry — forestry, fishing and mining. Following the boom of the Second World War, there was a complete revival of the coastal towing industry throughout the 1960s and into the 1970s that was spurred on by the Ship Construction Assistance Regulations (renamed to the Ship Construction Subsidy Regulations in 1966, the Shipbuilding Temporary Assistance Program in 1970 and finally the Shipbuilding Industry Assistance Program that lasted until 1986). The subsidy allowed for the B.C. coastal towing industry to completely rebuild itself from the old wooden tugs and barges to new modern steel vessels — it created a whole new, much more efficient industry for the transportation of goods up and down this coast. But what was new and innovative in the 1960s is now pretty old. Steel boats can be patched and repaired but only up to a point and I think that point is getting very close now. The cost of maintenance continues to escalate to where far more is spent on repairs and you get more unpredictable downtime.

That subsidy started off at about 40 per cent but declined over time until it was completely finished by the mid-1980s. I can't speak to what the government's motivation was in terms of implementing it but we certainly saw the beneficial effects and it created an absolute centre of excellence here, especially when it came to Arctic technology

which was booming throughout the entire 1970s. I started working with my father in the early 1970s and it was an exciting time — there was the Mackenzie Valley Pipeline proposal and the beginnings of the Beaufort Sea development. We were designing and building vessels in six and seven months with all of the suppliers located here — a tremendous amount of employment was created.

By the 1980s, with the international oil crisis, everyone pulled out of the Arctic and you had a decade of stalemate. We were hanging on by our fingernails for some of those years. We survived but many didn't. All of the local shipyards basically closed shop in the 1980s. The federal government did very little — for example, their last major program for Canadian Coast Guard vessels was in the mid-1980s and then nothing until this recent National Shipbuilding Procurement Strategy (NSPS). That's had a big impact — if we don't see a continuum of work, there is no incentive for people to join the industry and no potential for improving efficiencies of process. You can't invest in facilities and training when you're focused on basic survival.

It's been unfortunate to see the industry disappear and I hope the NSPS will be sustained long enough so that we see a revival. The country needs a shipbuilding industry. In addition to government fleet needs, there are the general commerce vessels — ferries, tugs and barge operations, fishing vessels — and if you don't build at home, your dollars are just pouring out the door.

BCSN: *How does Asia's shipbuilding capability factor into this?*

RA: I've never thought of the big Asian shipyards as competition for what we can do locally but in the last 10 or 15 years, most owners here in B.C. have been getting even the simplest barges built in China because of the price. Even when you factor in transportation and the 25 per cent import duty, they're still cheaper — and that's really sad. It's irritating to hear people say that Canadian shipyards aren't competitive when we had the facilities and the skill sets but didn't have that constant and continued support from both our national government and provincial agencies like BC Ferries and Marine Atlantic.

If you have a continuum of well-planned work, there is more than enough to keep three or four good-sized shipyards in Canada going continuously.

If you have a continuum of well-planned work, there is more than enough to keep three or four good-sized shipyards in Canada going continuously. If you look at the needs of BC Ferries, Marine Atlantic, the Canadian Coast Guard, Fisheries and Oceans Canada and the Department of National Defence, and then all of the general commerce vessels, there is a lot of work available. The stumbling block is our high-wage environment.

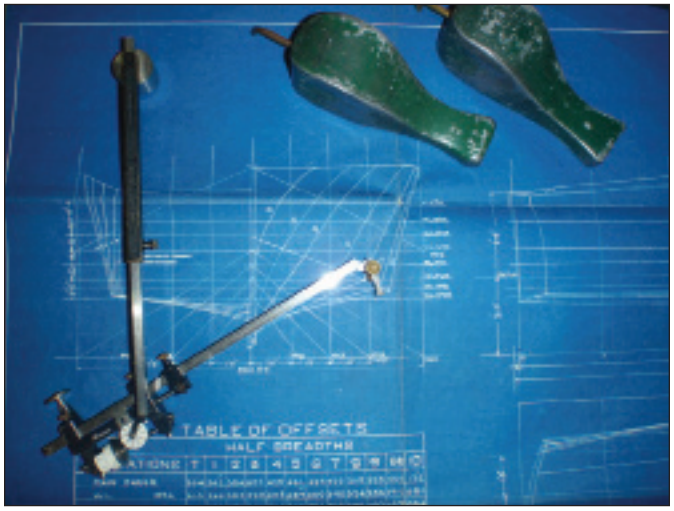
I'm very pleased to see that the government has made the statement of intent to provide that continued support through the NSPS. It's still subject to all the vagaries of politics but we have the opportunity now to rebuild the industry. I hope it's not too late because we have lost a tremendous amount of talent at the management and journeyman level and the whole industry is getting old — the median age of people in the shipyards today is in the mid-50s. It's the responsibility of those of us in that 55 to 65-year age group to make sure that our skills and knowledge are passed on to the next generation. If that gap is too big, we'll end up having to import all of the knowledge.

BCSN: *What about trends in the type of vessel being built today?*

RA: When you look at trends, you have to see where the demands are coming from. Our business here is providing custom design services and although we have many designs that are used for the basis of each project, it's very rare that we do exactly the same design. For example, one of our most popular tug designs is the RAmparts 3200 — we just signed an order for the 100th. There are at least 80 different designs within that 100 that are custom-tailored to an owner's requirements. In that context, we see trends — and in some ways we have established some of these trends. For example, we did a lot of unique designs in response to demands for tanker escort tugs — this created a trend if you like. This was in

Robert Allan (Sr.) and Robert F. "Bob" Allan circa 1956.

Rob and Dr. Robin Browne, circa 1982, in Japan on the deck of the newly delivered Icebreaker/AHTS Ikaluk*, one of two 79-metre, 15000 BHP Arctic Class 4 icebreakers built for Gulf Canada Resources Inc. Rob said: "The design of these vessels was a career milestone for me, and gave me a great appreciation for Japanese shipbuilding processes. There was no vessel in the world even close to the capability of these ships at the time. The design also began at the same time as my father was dying of cancer, so I was faced with simultaneously directing this major project and taking over the administration of the company. It was a very challenging time! Robin and I continue to work together on Arctic projects along with a team of several others who were involved in that era."*



Tools of the trade that Rob's grandfather used.

response to the Oil Pollution Act in the early 1990s and oil tanker escort tug design has been evolving ever since.

In the last five to 10 years, one of the major trends has been in the demand for LNG terminal tugs which are an offshoot of that tanker escort tug design. Five or six years ago, everything was about LNG. We were in a very fortunate position because a lot of the work that we'd done in developing our escort-capable hulls provided superior sea-keeping capabilities and that allowed us to offer escort and offshore-capable designs to the LNG industry. The heat's gone off that lately — there's still a lot going on in the Middle East and while it's still active here and there, it's nowhere near the boom we saw between 2005 and 2008.

Since then, the trend has all been toward greener machines, much of which is being driven by emissions regulations. A lot of work has been going on for the past three or four years on the whole business of greater fuel efficiencies and less emissions through hybrid technologies. A good example is Foss' *Carolyn Dorothy*, the first hybrid tug in the world. It was our design and while we weren't deeply involved in the hybridization aspects, we still had to make it all fit and float in an existing design (Foss built 12 or 14 vessels of that design, two of which are hybrids). The hybrid package adds to the cost and I believe the Ports of Los Angeles and Long Beach as well as the State of California contributed quite a bit. The vessel has proven its merit — it was a test bed for new technology and it has led to refinement in the system and better understanding of how hybrid technologies work — but at a cost.

To determine return on investment, we created some software here internally and, without exception for any project we've looked at, there is no return in anything close to approaching the normal life cycle of the vessel. So you have to base the decision to go with any sort of hybrid technology on altruistic merit rather than on financial merit. What concerns me is that there won't be a level playing field — for example, if you have a number of ports close together and one puts in a requirement that operators must have zero emissions, making it greener but more expensive, the shipper, when choosing which port to go to, will take his business to the cheapest. Unless all ports agree and cover the entire coast, shippers will just go elsewhere. We're heading to the right end-result but getting there will be costly.

The focus on the environment influences every vessel type. We're working on a number of different projects with that focus at the moment. The *Carolyn Dorothy* is a perfect example of how hybrid technology should work — a typical harbour tug will spend 95 per cent of its time idling, waiting to apply 95 per cent of its power for five per cent of the time. If you can spend all of that idle time on batteries or a small generator set to provide the simple idling power requirements, and then fire up the big engines just when you need them, you'll save fuel and running time on the big engines and thus your maintenance costs come way down. That's

where we've identified the major cost savings — in machinery maintenance. The cost of the batteries is high but coming down. The more they're used, the better they will become but cost is a stumbling block right now. We've been looking at options that are non-battery hybrids — particularly, driving the boat using a small generator for idling and manoeuvring operations. There are simple ways to do that that are cost effective.

BCSN: *What have been the major benchmarks in technological advancements for naval architecture?*

RA: We were the first consultant firm in the marine field in Canada to invest seriously in computer-aided design (CAD) technology — that was in about 1983. We were probably a couple of years premature because the software wasn't really available at that time for ship design but we used an architectural software that was well-defined and it allowed us to learn how to work in the CAD environment. This was at a time when the economy was tight but we actually got work because of the new technology. By the early 1990s, CAD technology really took off to the point now where we now have a whole room dedicated to servers.

The basic CAD drawing capabilities have moved from simple 2D-drafting into a full 3D-modelling environment. We still work largely in 2D but doing more and more in 3D all the time. Once you've got the basic drawing issues resolved, there are some very powerful tools today that can do detailed structural stress analysis through finite element modelling and hull performance prediction by computational fluid dynamics (CFD) — basically a virtual towing tank. You can put a proposed hull form into water, see the flow patterns, the pressure on the hull, the waves that are generated. We're doing a project in South America and one of the important things there is how quickly can you stop a flotilla of barges in a river with a tug — we can simulate reversing the propeller flow to see where the energy goes and where the wake goes and then actually model the braking of the flotilla. That's something you couldn't even dream of doing 20 years ago.

The technology that's available today is absolutely amazing but it hasn't completely replaced the human brain and a pencil and paper...

BCSN: I*s there too much reliance on technology for design today?*

RA: At the end of the day, naval architecture is a creative engineering process. The technology that's available today is absolutely amazing but it hasn't completely replaced the human brain and a pencil and paper, especially at the concept stage. If I'm doing a new design concept, it's a pencil and paper project — the computer is not an effective sketching tool.

I have a slight fear that with a lot of this exotic software, instead of just doing a simple calculation, someone will do a 3D model and a finite element analysis when all that was needed was a simple beam theory calculation. That "first order thinking" is in danger of being lost through total reliance on the machine. This new generation of young engineers that we've been hiring are incredibly smart — but it's that ability to reason that is one of the key things we look for in new candidates.

BCSN: *Compare the process of vessel design between your grandfather, your father and you.*

RA: All three of us spent most of our lives hunched over a drawing board. The major difference is the amount of time spent on each drawing. My grandfather would do a drawing in light pencil and then go over it in ink. I have archives that go back to the 1930s that include drawings done in ink on linen and they're absolute works of art. They're done with a nib pen and every plank has the wood grain marked on it. I'd love to have the time to do that now. In my father's day and my earlier years, we could no longer afford the time to do the ink work, and the paper technology had improved so we were working on vellum. You could do quite nice drawings with pencil on paper but it never matched the ink quality. And today, everything is produced by the computer...much more accurate but lacking that personal touch!

When I look back at some of the projects my father did in the 1960s — he did dozens of big tugs and complex barges — they'd each be represented by 15 or 20 drawings and a specification

"Two very important people in the growth and success of Robert Allan Ltd. internationally: Mr Johannes Ostensjo of Norway (left) who was the first major European tug owner to invite us to design a new tug for them, and Mr. Ali Gurun (centre) of Sanmar Shipyard in Turkey, who was my very first contact in that country and who has gone on to build more than 85 of our tugs in the past 14 years. The occasion above: the first tug built by Sanmar for Ostensjo…a terrific team!"

document that might have been one to two centimetres thick. That was enough to get a firm price contract with the shipyard. That's changed — now you have to write specifications that are eight centimetres thick with dozens and dozens of drawings and details. This influences the process of shipbuilding today.

Not so long ago, we would have handshake agreements with our clients for new designs. I remember getting one purchase order from Claire Johnson at Cates Towing and all it had on it were the words "for one tug design". It illustrates the level of trust and respect people had for one another. Now, we submit a thick proposal that defines every detail and associated costs and there is a great deal of legalese. Today, the product that my father and grandfather produced would be called a preliminary design even though there was more than enough to define many fine vessels.

Another change I've seen is that back then, one person designed the whole boat. There is no way one person could do all of this today. We are much more segregated in our skills and teamwork is key with everyone playing to their strengths. Wherein the senior naval architect would have done a lot of the drawings himself — those people are now supervising and directing the entire project. That generational change is something that's ongoing and we're mentoring not only on technical side but the business side as well.

Today, the product that my father and grandfather produced would be called a preliminary design even though there was more than enough to define many fine vessels.

We're also finding that classification societies are asking for a great deal more analysis of critical elements. Everything in the world these days is driven by potential liability so anyone in the chain of design or construction of the vessel tends to have a risk manager. We've lost a lot of the trust that used to exist amongst all of the players. I can remember some projects where we just had this wonderful rapport between the client and the shipyards and everyone was on the same team.

When I started in this industry, it was all family-owned companies and there was this incredible network of successful component suppliers — Wagner, Kobelt, Paramount Pumps. The Cates family, the McLaren's at Allied — it was a bit of a Scot's mafia — but they were all family businesses and you worked family to family. That's largely gone now.

Rob & Enneke — "my wife of 41 years, who has been an incredible support to me and put up with far too many late dinners over the years! Enneke's father is Fred Spoke, former manager of the Port of Vancouver (currently 91 years old and doing very well!). I married her before he was hired!"

BCSN: *How have new methods of propulsion and onboard technology changed the process of design?*

RA: It's not a problem for us to incorporate modern technology into design. They're just pieces of hardware that have volume and mass and have to find a home. So that's pretty straight forward. The bigger question is: does the owner want it and are his crew trained to deal with it? More often, the challenge is to avoid adopting the latest technology if it doesn't suit the application. KISS (keep it short and simple) is still a good principle. For example, we're designing two major fireboats for the Port of Long Beach — we do a lot of fireboats and they're really interesting vessels, very complex with a lot of equipment. They have very few operating hours but when they're needed, they have to be there so ongoing maintenance is critical as is reliability of every system. We're working with people who don't want to have to worry whether the machine is going to work properly when they need it so simplicity, ease of maintenance and repair, clear access — those elementary aspects are far more important than having the latest touch screen computer. They want a big red button to push that starts the pump. There is a lot of technology on the vessel but when it comes to the real fundamentals of the propulsion and the fire pumping system, we keep it as simple as possible.

In general though, even the basic diesel engine is now computer-controlled. Maintenance of a lot of this equipment is now reliant on some outsourced supplier rather than the ship's engineer — for example, the engine maintenance might be done by the guy from Caterpillar that drives down on Friday mornings. That might be okay

for a harbour tug but if you're travelling the coast and the computer has a glitch, what do you do? There are a lot of advantages and disadvantages with modern technologies but I do feel it's important not to get caught up with all the gadgets.

There are a lot of advantages and disadvantages with modern technologies but I do feel it's important not to get caught up with all the gadgets.

BCSN: *I understand RAL does quite a bit of research and development.*

RA: Yes, people generally didn't think of tugboats as a subject worthy of much research but we started doing quite a lot 10 or 15 years ago and it has paid huge dividends for us. We get a lot of business because of what we've learned. I have to give credit to the federal government for their R&D tax credit scheme. It's a very good program and allows us to write-off costs that would otherwise be too expensive.

Today, we do a lot of R&D with finite element analysis software and computational fluid dynamics (CFD) analysis. Previously, we were largely focused on model testing — especially in relation to escort tug design — and we did some innovative work using the model basin out at UBC which has since been closed. Our model testing is now done in Europe at three times the cost but we're able to do quite a lot of research-type work with the CFD capability we have in-house — comparative evaluations of different hull forms or appendages and so forth.

BCSN: *Could you provide some insight into how government regulations impact on design, especially noting those that are focused on the environment?*

RA: If we weren't faced with the emissions regulations, I don't think people would be worrying as much about issues like alternative technologies. I fear the industry overall is focussed entirely on solving problems with technology rather than by a more fundamental design

approach. There are a lot of regulations that force us into designing vessels that are less efficient than they could be. For example, all of the regulations that come into effect for vessels above 24 metres in length — you go from being a small craft to an ocean-going vessel at 24 metres. Why 24 metres? I haven't a clue but it means that there is a significant economic incentive to stay below that length. And while the focus is on the length, there's nothing to dictate what happens to the beam or draught so we end up with these short, fat boats that are very fuel inefficient. If we were really concerned about fuel efficiencies, we'd have longer and thinner vessels. Who cares whether a harbour tug is 24 or 27 metres long if it means saving a huge amount of fuel?

The fishing vessel regulations are also full of requirements as are the licencing regulations that tie vessels to specific lengths. You end up with fish boats that are short and fat and two decks high and completely unsafe. It's not just in Canada though. If you look through a magazine from the U.K., you'll see something that looks like two shoeboxes put together — that can't be safe but you know it has been designed that way because of the regulations.

Gross tonnage regulations are another example. Buried somewhere in the history of shipping there is a regulation about how much wine a ship could carry and that was the basis of taxation in Phoenicia. It's not so bad in Canada but the U.S. still has this archaic regulation of gross tonnage measurement where you have to put a whole bunch of completely redundant, inefficient steel into a vessel in order to minimize the internal measured volume because the operating crew's licences are tied to gross tonnage.

I would prefer to see a regulation that doesn't tie the requirement for these treatments just to horsepower but rather to horsepower and operating hours.

We've come to accept the fact that there are a lot of questionable regulations but now, given the requirements for energy efficiency at all levels, we should be tackling this at the root with good design. We should be designing the most efficient hull form that we can for the application, not for the regulation. I look back at the designs my grandfather did in the 1930s and 1940s for fish boats and motor launches — these lovely long boats with beautiful lines — and those things went along at 10 to 12 knots with a couple of hundred horsepower. Now, we're building these bathtubs that throw up huge wakes and burn more fuel than needed.

BCSN: *What specific challenges do you see coming in with some of the latest regulations, for example Tier III engines?*

RA: Tier III regulations that come into effect in 2016 will present

About Robert G. Allan, P.Eng, FSNAME, FRINA

Robert G. Allan is the Executive Chairman of the Board of Robert Allan Ltd., the oldest established Naval Architecture consultancy business in Canada, which in 2010 celebrated 80 years of continuous operation in Vancouver. He is the third generation of his family to own and manage this business. Born and raised in Vancouver, he received an honours degree in Naval Architecture from the University of Glasgow in 1971. After working for two years in the U.K., he returned to Canada to join the family business. Since assuming ownership of Robert Allan Ltd. in 1981, he has led the business into a position of wide-spread international recognition in the design of specialized workboats of all types. He is a Registered Professional Engineer in the Province of British Columbia, a Fellow of the Society of Naval Architects and Marine Engineers, (SNAME) and a Fellow of the Royal Institution of Naval Architects (RINA), London.

He has published numerous papers and articles on the subject of tugboat design and performance, as well as on several other topics. In 2006, he authored two major contributions to the latest edition of the SNAME Textbook, *Ship Design and Construction*: one chapter on "Small Commercial Workboats", and one on "Tugs and Towboats". In 2005, Robert Allan was awarded the Royal Institution of Naval Architects Small Craft Group Medal in London "...for his contribution to the field of workboat design, and in particular for his innovative work in the development of tugboats for all types of operation"; and the Society of Naval Architects and Marine Engineers David W. Taylor Medal "for notable achievement in naval architecture and/or marine engineering", the only Canadian ever to be so honoured.

Rob is married to Enneke, has three sons — Neil, Scott and Murray — and recently welcomed his first grandson, Nico, to the family. "I have three amazingly talented sons and all are doing exceptionally well in their chosen fields," said Allan. When asked if any had considered continuing on with the family business, Allan noted that: "If any of them had shown any interest I would have certainly encouraged it but I didn't want them to feel pressured because I never was. I'm incredibly proud of them and happy that they're doing what they love to do rather than what I want them to do…I think it helped that we didn't start off by naming any of them Robert as well."

significant challenges to the workboat industry. The extra emissions-reducing equipment is large and heavy and has to go above the engines, interfering with sightlines. It also has negative impacts on space, stability and safe working areas. I would prefer to see a regulation that doesn't tie the requirement for these treatments just to horsepower but rather to horsepower and operating hours. Harbour tugs generally have low operating hours — but the best example is a fireboat with typically 500 operating hours per year or less, mostly used for training exercises — and the regulations for exhaust after-treatment gets in the way of that vessel doing its real job. Emissions are tied to operating hours as much as they are to power. At the end of the day, there's very little impact on emissions-reduction if a vessel is only operating 500 hours per year. I'm not saying I don't agree with the objectives but we shouldn't lose sight of what the vessels have to do in the process of achieving that environmental standard. Let's not have unsafe and ridiculously expensive, un-maintainable vessels just to comply with a regulation.

BCSN: *Let's discuss education and training. Can you provide some insight into Canada's capabilities and a comparison to international institutions? I understand you did your schooling in Scotland. Why there?*

RA: When I went to university there was no training in naval architecture in Canada. My choices were the U.S. or the U.K. — Glasgow was my grandfather's alma mater and it was less expensive so I chose to go there. Today in Canada, Memorial University in Newfoundland is an excellent facility with a good co-op program. We've hired quite a few graduates from there. UBC has had an on again/off again option in naval architecture through their mechanical engineer department and we have hired several of those graduates as well. While they are initially more skilled in mechanical engineering than in naval architecture, we're able to supplement their training quite easily.

I'm optimistic that as part of the NSPS we're going to see a strengthening of that program. As part of their value proposition, Seaspan must demonstrate a commitment to support the marine shipbuilding industry and they have plans to support the Engineering Program at UBC to enhance the Naval Architecture Program.

In general, the institutes are doing a good job — my one proviso to that is I don't think they're doing enough on the "design" side of things. They teach the fundamentals of the science and they teach the necessary software and the students do go through a design project

About Robert Allan Ltd.

Robert Allan Ltd. is an independent, privately owned firm of Consulting Naval Architects established in Vancouver. The business was founded in 1930 when Robert Allan commenced private practice as a Consulting Naval Architect after managing a local shipyard. He was responsible for numerous enduring designs produced for the growing British Columbia fishing fleet and for coastal ferry services among others. The firm's reputation was also enhanced by the design of such notable ocean-going motor yachts as *Meander* and *Fifer*.

In 1945, after working as a project manager at Burrard Drydock through the Second World War, Robert F. Allan joined his father in the practice. The growing business was instrumental in the development of specialized tugs and barges for the burgeoning forestry and mining industries along the B.C. Coast. "The first draftsman they hired would have been in the early 1950s. For many years, just about the whole industry was trained in my grandfather's basement — Derek Cove, Bill Cleaver, Gordon Passmore, Ken Davies, Tom Ward, Peter Woodward and many others," notes Rob.

Incorporated as Robert Allan Ltd. in 1962, the company continued to grow and achieved international recognition for the high standards and performance of many unique and specialized designs. In 1973, Robert G. Allan joined the family tradition, and in 1981, succeeded his father as President, leading the company into a new generation of computer-based design technology, with a variety of distinctive designs for modern high-performance ship-assist and escort tugs, icebreakers, government service vessels, and high speed craft. The company has continued to grow and has established itself as an international leader in commercial small craft design. A staff of highly qualified Professional Engineers, Naval Architects, Marine Engineers, Technologists and Designers handle a wide variety of projects for clients around the world.

In 2008, reflecting the continued growth of the business, the company was restructured to a culture of employee ownership with a core group of senior employees becoming shareholders in the firm. Robert G. Allan moved into the new role of Executive Chairman of the Board and is still actively involved in the day-to-day operations, providing an advisory role to the new owners and a mentoring role to new employees.

Assuming the position of President is Ken Harford, P. Eng., who has been a key figure in the company since 1988, most recently as Vice President, Marine Engineering. Hans Muhlert, P.Eng., who has been responsible for many Robert Allan Ltd. designs and technical innovations since starting with Robert Allan Ltd. in 1972, has become the Director of Naval Architecture.

For information on Robert Allan Ltd., please visit: www.ral.ca.

process. The fact that it's a co-op program is really good as well and graduates come to us with great skills and lots of enthusiasm but if there could be a few short lessons on some of the fundamentals of design — how to lay out a state room, for example — it would really enhance their training.

In terms of comparing Canadian institutes to international ones — we come across students from the U.S. a fair bit through the Society of Naval Architects and Marine Engineers and we watch student design competitions. Overall, Canadian students do well — ultimately, it really depends on the skills of the professor and their focus. We currently have some good teachers in the institutions.

We've hired quite a number of students that came to work for us through UBC and Memorial's co-op programs. They bring all of these new skills and energy and allow us to capitalize on new technologies such as CFD. The combination of new skills combined with the experience here in the office is really paying off.

BCSN: *Are you anticipating any challenges with the forecasted bulge of baby boomer retirements?*

RA: There is a group of us here who are in the 65-year-old range and our energies are spent on passing along our collective knowledge to this new generation. There will be a bit of a gap once we all decide we're going to take things a little easier but I think the processes we have in place will make this manageable.

[Ed.note: For questions on future growth of the company, Rob invited Ken Harford, President of Robert Allan Ltd., to join the discussion.]

BCSN: *Could you describe the structure that is in place at RAL to deal with continuity and future growth?*

Ken Harford: Rob started the process of transferring ownership from his family in 2008 to what we're now calling the fourth generation of Robert Allan Ltd. There are 10 shareholders right now and we've started the process of setting up a mechanism where key employees can acquire ownership over time. The intention is to keep the company completely employee-owned in perpetuity.

The reason we've succeeded is because of the people who have been working here who have been every bit as committed as I have been...

As for future growth, we've been able to build on the relationships that Rob generated and we've been successful in leveraging those — for example, we're now doing river pusher work in South America, icebreakers in Russia, FSO's in Asia — and using the skill sets, history and business contacts to expand the scope of business.

All of us within the new ownership group feel very honoured that Rob has trusted us with his family enterprise and we definitely share his objective of keeping the company as a Vancouver-based and owned company.

BCSN: *Do you have any advice for someone considering a career in naval architecture?*

RA: Love it. It's not all that different from any other profession — it's all-consuming and the demands are significant so you need to love what you're doing. I would also suggest that you invest the time to understand the operation of the vessel types you'll be designing and there's no other way to do that except get involved with the industry and study and read whatever you can. When someone is applying for a job, I always ask what attracted them to the naval architecture field. Some will say that their father was a fisherman and they've spent their childhood on a boat and have been fascinated by things like water flow, etc., and then others will say they just thought it looked interesting and couldn't think of anything else they wanted to do. If you don't have any motivation, it's not likely you'll see a full career in this business.

BCSN: *Anything to add?*

RA: I feel incredibly privileged to have been born into this business and to have had the success that we've had — it seems like black magic almost. The reason we've succeeded is because of the people who have been working here who have been every bit as committed as I have been — they've been hugely influential in our success. I get the credit because I have the name but it really is a shared success. **BCSN**

"The business of tug design has taken me all around the world and I have met many terrific people…and others, including ships of the desert."