

# RAIndrops

Robert Allan Ltd. Information & News Issue 8

## *Then & Now Stern to Bow*

New Generation of Ownership

Introducing Generation 5

Designs

From our Early Beginings to Today!

Education

Starting Young!

**FIFER**  
VANCOUVER BC



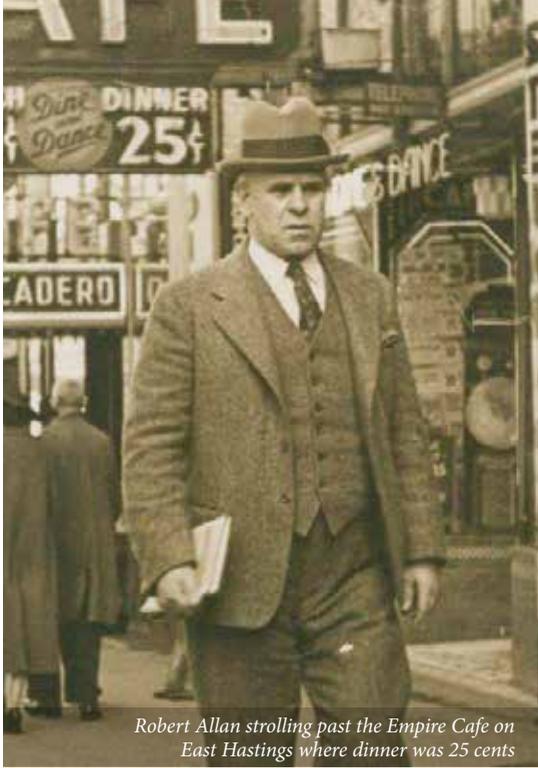
**ROBERT ALLAN LTD.**  
NAVAL ARCHITECTS AND MARINE ENGINEERS

# Five Generations

Robert Allan Ltd. was established in Vancouver, Canada in 1930 by Mr. Robert Allan (right), who had emigrated from Scotland in 1919. The company's founder is remembered for notable enduring yacht designs such as *Meander* and *Fifer* as well as for a myriad of west coast fishing boat and ferry designs.

In 1945, Robert F. Allan (opposite page, top left) joined his father in the practice and eventually the company was incorporated as 'Robert Allan Ltd.' in 1962. The Company continued to grow, achieving international recognition for the unique and innovative specialized designs produced, especially for coastal tug and barge fleets, extreme shallow draft vessels for Canada's northland, and for the pioneering icebreaking supply vessels for the Beaufort Sea. Often overlooked in the business history, Nancy (Mrs. R.F.) Allan also worked as Secretary-Treasurer of the company for more than 20 years in the period 1960-1980, maintaining the accounts and records.

The third generation of the Allan family; Mr. Robert G. (Rob) Allan (opposite page, top right) joined the firm in 1973. His leadership, commencing in 1981, took the company into a new era of computer-based design technology. He also revolutionized the ship docking tug industry with new innovative designs for the



Robert Allan strolling past the Empire Cafe on East Hastings where dinner was 25 cents



Robert F. (Bob) and Nancy Allan at Bowyer Island (ca. 1962)



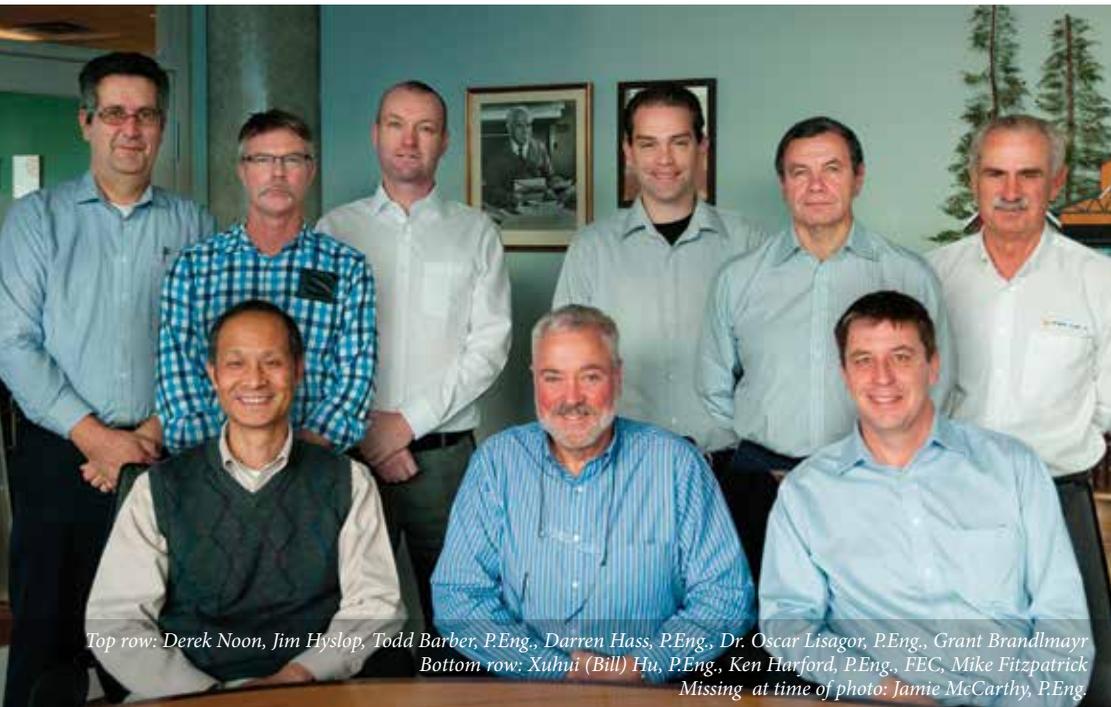
Rob G. Allan adventuring on BC's north coast

Port of Vancouver, which soon attracted world-wide attention.

In 2008, the transfer of company ownership to a group of ten senior employees took place, creating 'Generation 4' (seen below) of the company! A critical part of the transfer of family ownership to the employees was the objective of establishing an on-going process of ownership growth and participation amongst

committed employees. Now in 2013, the creation of 'Generation 5' (below) of owners at Robert Allan Ltd. is an important milestone in fulfilling that objective.

Mr. Rob Allan remains active as the Executive Chairman of the Board of Directors, and Mr. Ken Harford remains as President of the Company. 🚢



Top row: Derek Noon, Jim Hyslop, Todd Barber, P.Eng., Darren Hass, P.Eng., Dr. Oscar Lisagor, P.Eng., Grant Brandlmayr  
Bottom row: Xuhui (Bill) Hu, P.Eng., Ken Harford, P.Eng., FEC, Mike Fitzpatrick  
Missing at time of photo: Jamie McCarthy, P.Eng.



Top row: Allan Turner, P.Eng., Andra Papuc, EIT, Mike Phillips, P.Eng., Bilyana Ivanova, P.Eng., Robin Stapleton, P.Eng., Mavis Ye, P.Eng., Vince den Hertog, P.Eng., Dave Christopher, I Eng, MIMarEST, MNI,  
Bottom row: Lawren Best, EIT, Bart Stockdill, P.Eng., Philippe Whyte, Erik Johnston, P.Eng.

# Designs

## Fireboats

by Derek Noon

Manager, Marine Engineering

Robert Allan Ltd.'s start in dedicated fireboat design began with two 23 m (75'-5") long vessels for the Canadian Navy, the 1978 built *CFAV Firebrand* and *CFAV Firebird*. These vessels have a relatively modest pumping capacity of 1150 m<sup>3</sup>/hr (5,000 gpm) delivered via 3 manually controlled monitors. They were however very unique in being one of the first applications of Z-drive technology in Canada. Both vessels are still currently in service at Canadian Navy bases in Esquimalt and Halifax.

In the 1990's, a number of fireboats were designed for Hong Kong, China and Vancouver but the real growth in this sector occurred after the turn of the century with major US ports such as Los Angeles, Philadelphia, Portland (Maine), Baltimore, Chicago, and New York replacing their aged vessels, aided by incentives from the US government's Homeland Security program. Over the years, the vessels have increased significantly in pumping capacity and become considerably more complex with multiple mission roles.

Recent deliveries include CBRN (Chemical, Biological, Radiological, Nuclear) protected fireboats *Three Forty Three* and *Firefighter II* for New York (42 m) and *Guan Xiao Er Hao* for Dongguan, China (46 m). *Guan Xiao Er Hao* has a pumping capacity of 10,800 m<sup>3</sup>/hr or 47,000 gpm (nearly 10 times the *CFAV Firebrand*) delivered through 7 remotely controlled monitors. Full details of these and many more fireboat designs can be found on our web site.

And it doesn't end there; currently under construction at Foss Shipyard in Seattle are two identical 108' (32.9 m) fireboats for the Port of Long Beach, California, with Voith-Schneider propulsion and a total pumping capacity of 9,300 m<sup>3</sup>/hr each. 🚢



The Canadian Navy's ASD harbour fireboat *CFAV Firebird*



FDNY's RAnger 4200 Class *Three Forty Three*



RAnger 4600 Class *Guan Xiao Er Hao* for Dongguan, China



Rendering of one of the Port of Long Beach's new designs

## Ice-Class Vessels

by Hans F. Muhlert, P.Eng.  
Consulting Naval Architect

Robert Allan Ltd. got its start with icebreaker design in 1974, working with Canmar Marine (Dome Petroleum) to develop a series of four shallow draft, Arctic Class 2 (nominally 2 feet of ice) offshore supply vessels. Certified for world-wide operation, and designed specifically for service in the Beaufort Sea, these vessels were the first ever built to the then new Canadian Arctic Pollution Prevention Regulations. The special shallow draft design with a tunnel stern allowed them to enter Tuktoyaktuk harbour. The working deck aft featured a large stern roller and a very large double drum towing/anchor handling winch from Burrard Iron Works. These vessels had a high Canadian content, at a time when the local industry had many notable manufacturers locally in the Vancouver area. The entire project had an extremely “fast track” program for both the design and construction in order to be on station in the Arctic at the prescribed time. To facilitate this all the steel was ordered in advance of the design of the vessels and was

allocated to the yards through our office. The project was headed by Robert F. Allan and the project manager was Hans Muhlert. Originally the vessels were named *Canmar Supplier*, *Canmar Supplier II*, *Canmar Supplier III*, and *Canmar Supplier IV*. All vessels are still in service, and according to their AIS information, are now named *VOS Atlantico* (Greek registry) and *Atlantic Tern*, *Alex Gordon* and *Jim Kilabuk* respectively, the latter three all still in Canadian registry.

Using this Canmar design as a basis, in 2004 Robert Allan Ltd. designed a series of 4 x 60 m (196'-10") vessels built at Keppel Singmarine for operation in the Caspian Sea under contract to Lukoil. The new designs were more complicated with additional systems and had an additional constraint – a low air draft to pass under bridges on the Volga River.

Following the success of the 60 m design, we are currently completing a pair of 80 m designs (262'-6") with an increased ice rating of ARC4 and ARC5 in accordance with the Russian Maritime Registry of Shipping, also for operation in the Caspian Sea. 🚢



Recent Caspian Sea supply vessel delivery VZMORYE



Canmar Supplier



3D model of new Caspian Sea supply vessel design

## Shallow Draft River Tug/Barge Systems

by Hans F. Muhlert, P.Eng.  
Consulting Naval Architect

Shallow draft tugs, sometimes called towboats (by virtue of the fact that they replaced the horses that previously pulled the barges), work in the river systems of the world and have been around for hundreds of years, starting with paddle wheel/steam propulsion. Robert Allan Ltd. has designed shallow draft tugs and workboats since the earliest days of the company. In the 1960's and 1970's Robert Allan Ltd. did significant work on vessels operating on the Mackenzie River system in the Canadian Arctic where typical Mississippi or European style river towboats would have too much draft for this type service. A high level of sophistication was reached in the late 1960's and early 1970's with a number of very powerful 45-metre, 4,500-hp, quadruple screw tugs with operating drafts in the range of 1.1 metre. The **Vic Ingraham** (below), designed in 1969, was the most sophisticated and best performing of this group. It had a very complex tunnel stern shape and special shallow draft nozzles. It was followed by a fleet of four tugs in 1972, of about the same size and power, but with a simplified hull form to make them more economical to build. Notable was the case of nozzled propellers on two of these and open props on the other two, offering a unique opportunity to

compare performance. These tugs still are the primary workhorses on the Mackenzie River. The river is about 1,800 kilometres long and has many sections with swift currents, shoal water, shifting sand bars, and rapids requiring the barge flotillas to be broken up and shuttled through one by one or in small groups. Some of these tugs also do coastal runs in the Arctic Ocean, a completely different environment – presenting unique challenges to the naval architect!

In subsequent years the design work at Robert Allan Ltd. turned to other types of vessels in other parts of the world but the shallow draft fascination and expertise never disappeared. Recently there has been a revival of activity, but not in the Canadian Arctic. South America has an extensive navigable river system and with the improving economics of that region there is a demand for more efficient shallow draft tug/barge systems. Robert Allan Ltd. is now very active in this region. This includes the design of diesel mechanical and diesel electric versions of large shallow draft tugs for pushing 40,000 DWT convoys on 2,500 km routes. Smaller towboats have also been designed for escort and convoy assembly service. The barges are



Stacks of barges being delivered to the Client



RApide 4617-TS Class pushboat HB Hydra for Brazil

being built under Robert Allan Ltd.'s supervision in China and shipped in lots of 32, stacked on board a semi-submersible transport ship.

## Barges

by Hans F. Muhlert, P.Eng.  
Consulting Naval Architect

Model testing has always been an important part of this work – primarily to verify the complicated tunnel forms and very highly loaded propellers. There simply is not room for the normal size of propellers one would fit if the draft (and prop diameter) were not restricted. The propellers still have to accept the high engine power, requiring special propeller and tunnel designs. In addition to model testing, Robert Allan Ltd. now performs numerical modelling using Computational Fluid Dynamics (CFD). This tool was not available in the 1960's and 1970's, but advances in computer technology and affordable pricing now make CFD a feasible and practical adjunct to a model testing program. Theories and design options can be tested quickly and economically, although model testing is still a valuable and important tool.

Another fundamental change with these new river tugs is the advent of azimuthing propeller systems, or Z-drives, making new standards for manoeuvrability and convoy stopping possible. However, they also present new design challenges with weight distribution and tunnel designs. The sophisticated tunnels of the **Vic Ingraham** are not suitable and a new shape is required, but the lessons learned and design principles from those earlier tug designs still apply.

Tug/barge operations in shallow, swift flowing rivers require a special breed of river towboats and barges that Robert Allan Ltd. understands thoroughly and has the experience and expertise to design. 🚢

Robert Allan Ltd. has a long and successful history of barge design which dates back to the earliest years of the company. Since tugs and barges are the sole means of general and bulk transportation on the coast of British Columbia, the company has had to meet the challenges of designing a multitude of barges to handle all manner of cargoes with various means of loading and unloading. In the 1960's the company was amongst the first in the world to develop barge designs for long distance towing, including some of the first ocean towed, multi-barge "drop and swap" type cargo systems. Robert Allan Ltd. also developed the original self-loading, self-dumping log barges, some of which are over 120 metres long. In the course of this work the company conducted extensive model testing, so we have at our disposal the results of many tests to identify the best bow and stern shapes and best skeg designs for directional stability with minimum resistance augment. Recent projects include a 120 metre ocean going deck cargo barge, a fleet of 150 river style hopper barges for iron ore, and a fleet of four Lloyd's classed double hull petroleum and deck cargo barges for the Canadian Arctic service, all designed, built, and delivered to Tuktoyaktuk in an incredible 11 months. 🚢



RApide 4715-QS Class Vic Ingraham



Self-dumping log barge Island Forester

# Education

For more than 20 years Robert Allan Ltd. has maintained a permanent student work-term / intern position within our office. This position is offered on a rotating basis to one or more students of Naval Architecture or Mechanical Engineering. The company also administers the Robert F. Allan Memorial Scholarship, created by an endowment from the late Robert F. Allan, and awarded annually to a deserving Canadian student of Naval Architecture.

This year's recipient of that scholarship is Mr. Ian Saari (below), a fourth year student at UBC, who spent a work term with this office in 2013.

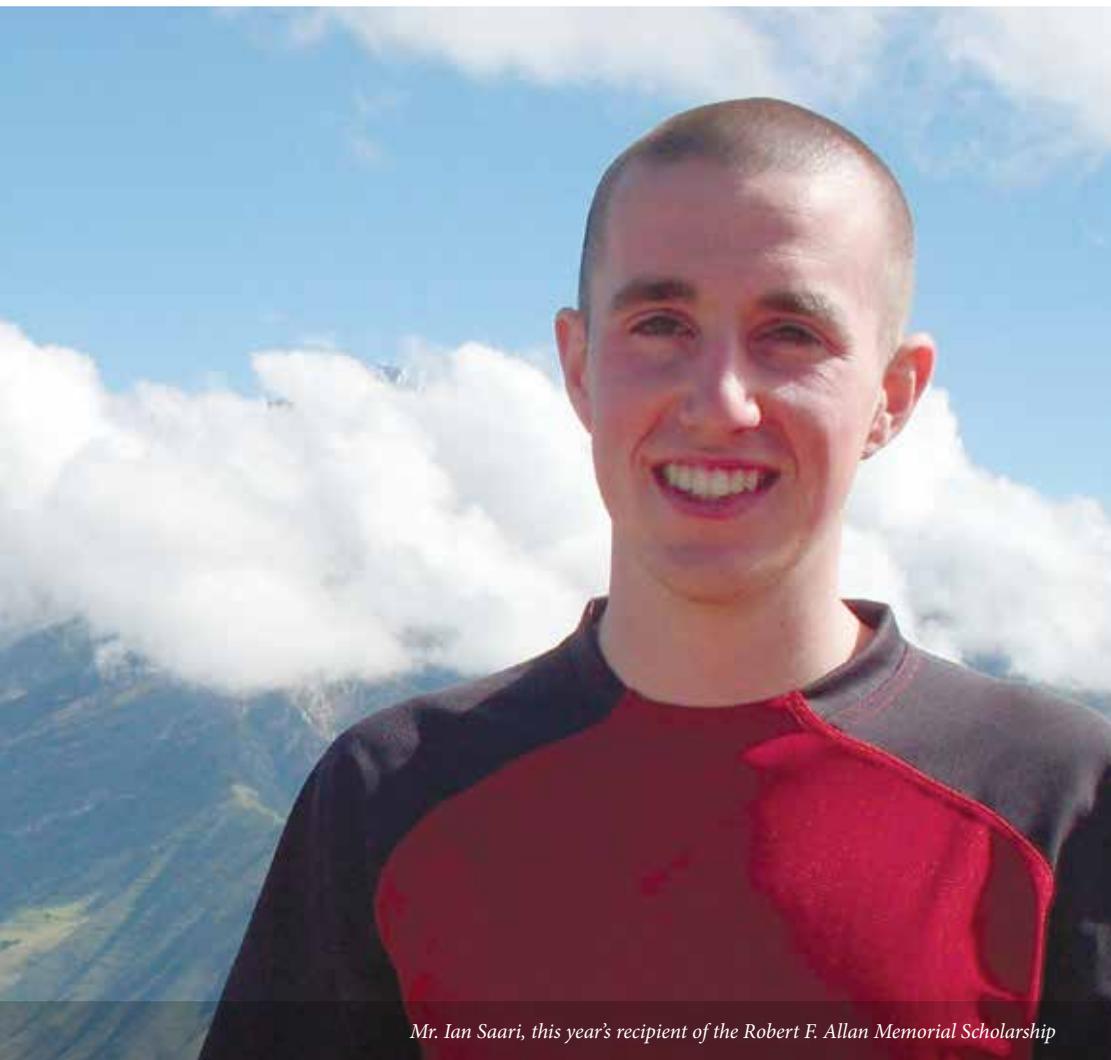
Robert Allan Ltd.'s academic involvement isn't just limited to post-secondary education; we encourage children of all ages to learn about the world of tugboats! Robert Allan Ltd. has



*Kid-built tugs in operation at the fabric dock*



*Shipyard in full production mode*



*Mr. Ian Saari, this year's recipient of the Robert F. Allan Memorial Scholarship*

been the primary sponsor of the “Tugs for Tykes” School program at the Vancouver Maritime Museum since 2007. The museum runs approximately 15-25 of these programs per year and it introduces students to the role of tugboats and familiarizes them with terminology used in the Maritime industry. They also have taught preschool to grade 12 students about the history, science, and technology of the maritime world.

In addition, Mike Phillips, a naval architect with Robert Allan Ltd. was invited to speak to Grade 1 and 2 students at River Valley School in Calgary, AB, Canada, which is coincidentally within minutes of where Mike attended middle and high schools. The students had already been working on self-propelled models made of popsicle sticks and elastic bands and had already begun learning about the concepts of buoyancy and stability as they relate to designing models with optimal cargo capacity (Kudos to their teacher!). Mike travelled to Calgary and gave a short presentation on the

many different types of vessels and how they are designed, before joining the class and helping them design and build their high-load carrying models (made of foam, plastic bottles, elastics, popsicle sticks, and of course lots of glue!). Mike reports that: “Overall the presentation was very well received. Tugs and especially fire-boats were by far the favourites, and the kids’ curiosity, imaginations, and creativity were running wild as they built their models! In the following weeks, the students followed up with lots of great questions which were a great deal of fun to answer. I’m already looking forward to potentially meeting next year’s classes!”



*Mike Phillips and the grade 2 class*

# RAindrops

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Front Cover: Stern view of the notable ocean-going motor yacht **M.Y. Fifer** built in 1939. "As trim yet as powerful a pleasure craft as ever slipped down the ways from a coast build yard." Vancouver News Herald, November 13, 1939

Back Cover: Bow view of the **RAmparts 3000** Class **Harry Evans**

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