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NEWS (SPRING 2026)

Canadian Naval Technical History Association

Lessons Learned: A Naval Engineer's Gulf War Experience

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Thirty-five years ago, on April 7, 1991 following a 227-day deployment to the Persian Gulf in support of Operation FRICTION, the destroyers HMCS *Athabaskan* (DDH 282), HMCS *Terra Nova* (IRE 259), and the supply ship HMCS *Protecteur* (AOR 509) returned safely to home port in Halifax, NS. For those of us aboard the ships, along with families and friends awaiting us dockside, it was an emotional homecoming.

Seven-and-a-half months earlier, when our task group sailed to join other coalition forces in the Gulf, all we knew for certain was that it would be a deployment fraught with uncertainty. HMC Dockyard did an outstanding job of refitting the ships with major new armaments and equipment in two weeks (*MEJ* 26), but there were other things we did to prepare ourselves in anticipation of potentially hostile operations overseas.

As the Marine Systems Engineering Officer aboard *Athabaskan*, the task group's command flagship, it fell to my department to ensure we maintained our ability to float, move and fight. I had joined '*Athabee*' in 1989, directly after serving two years as Engineering Officer in HMCS *Nipigon* (DDH 266), and, there is no question that the back-to-back Head of Department (HOD) postings gave me a running start in preparing my engineering team and ship for deployment to a hot zone. In 1990, the stakes were high.

And then the real work began.

Critical Weight Reduction

The emergency refit work of installing a new reverse osmosis distillation (ROD) plant, the Phalanx close-in-weapon-system (CIWS), and mounting two Bofors guns on the boat deck all added weight to the ship. To offset this and keep the ship properly trimmed, we reviewed all of our stores items to ensure we were carrying only what we needed for the deployment. In all, we offloaded 125 tons in eight days.

Photo courtesy Government of Canada

HMCS *Athabaskan* homeward bound from the Persian Gulf in April 1991.

The weight savings increased the ship's range by allowing us to fuel up to 95 percent capacity or better, enough for another full day of sailing between refuellings. This was especially important when operating in a combat zone where our restricted ability to manoeuvre and increased radar profile during replenishment-at-sea (RAS) operations made us vulnerable. Toward the end of a RAS, we would give the tanker a strict five-minute warning that we timed by stopwatch so that they could maintain the maximum pumping rate up to the last possible moment.

Managing the Power and Heat Load

The ambient air and sea temperatures in the Gulf were around 40°C and 33°C, respectively, which limited the ship's power generation capability to the extent that our Solar gas turbines, rated at 750 kW, could only produce 450-500 kW before shutting down on high-temperature alarms[1]. After reviewing our power load-shedding protocol, we decided to include the after air-conditioning (A/C) plant to the list of equipment to be shut down as required to maintain the ship's power generation capability. Load-shedding became an everyday occurrence for us.

Before sailing, we had taken steps to reduce our power consumption and heat load by taking such initiatives as:

- cutting passageway lighting in half by removing every other fluorescent tube from the fixtures;
- painting the upper deck areas white (with the exception of the flight deck) to lower temperatures on deck and inside the ship;

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1. Solar Turbines, a subsidiary of Caterpillar, vice Solar Ship the hybrid aircraft manufacturer.

Replenishment-at-sea (RAS) operations were stressful due to our restricted ability to manoeuvre and the increased radar profile.

- disconnecting the main machinery room (MMR) and auxiliary machinery room (AMR) cooling coils from the A/C system, and reconfiguring the A/C coils to saltwater coils to help cool the spaces;
- rigging high velocity (HV) firefighting nozzles onto the mast to reduce the ship's heat signature without having to use the pre-wet system; and
- using the ship's helicopter to make forward looking infrared (FLIR) camera passes over the ship to identify the heat load on the exterior of the ship.

During action stations in the Gulf, we also shut down systems such as the ROD plants and auxiliary boiler to reduce the number of non-essential alarms we had to react to.

Damage Control – Thinking outside the box!

Before deploying to the Gulf, I reviewed whatever I could find that might give me insight on managing damage control (DC) in a combat area. The incident reports from the 1987 missile attack against the *USS Stark* (FFG-31) made it abundantly clear that maintaining firefighting equipment levels would be critical. *Stark* ran out of chemox canisters twice, which forced the firefighting teams to back off until additional canisters could be supplied, allowing the fires to spread.

While in Halifax, I was able to scrounge an additional 1,200 chemox canisters from naval stores and other ships, and also loaded up on extra fire hoses. We equipped every hose-saddle in the ship with two of the standard 50-foot lengths that they normally held, and installed smoke curtains on every door along the two main decks.

Since it wasn't known if Iraq had chemical weapons, we took extra care to verify the integrity of the ship's gas-tight citadel[2]. We got creative, and had rolls of plastic wrap on standby in the forward and after section bases to cover the heads throughout the ship during condition Zulu Alpha; otherwise, the build-up of air pressure would force the water in the heads overboard, thereby reducing the pressure in the citadel. To test the system, we closed down to condition ZA, then had people smoke cheap cigars around the perimeter to see if we could detect any air leaks.

We did our best to ensure that both the forward and after section base teams were balanced not only in numbers of personnel, but in terms of occupations, talent and leadership. We made sure everyone knew what to do for the different damage control conditions so as to reduce the time it took to close the ship down. We also assigned a PO2 engineer to Section Base 3 to provide the Air Detachment further insight into ship systems to minimize radio communications during emergency stations. A Section Base 4 was added to the bridge to cut down the damage control response time for the bridge, ops room, and upper deck areas.

During our transit to the Gulf, we conducted daily engineering drills and DC exercises. Having the senior hull technician from Sea Training staff on board with us as far as Gibraltar was a huge help in ensuring we were ready for any and all damage control situations.

Aftermath

Fortunately, we encountered no direct attacks, and survived navigating the mine fields without mishap. On the trip home, I made note of some of the specifics mentioned in this article, along with what I considered to be the major takeaways from our engineering experience in the Persian Gulf:

1. **Think/act operationally and creatively.** A warship can be sent into harm's way at any moment. While Sea Training conducts workups to validate a ship's ability to operate efficiently under any circumstances, it is up to ship's staff to ensure personnel and systems are working at the highest level. Anticipate situations. Conducting regular engineering and damage control drills will keep your team focused, boost confidence, and better prepare members who are looking to progress their watchkeeping certification qualifications.
2. **Know your department.** Make the best use of people's strengths and work on individual weaknesses. Encourage more experienced team members to teach their skills to others in the department and help progress certification qualifications.
3. **Know your machinery and systems.** Ensure all planned maintenance is up to date prior to a major deployment. Have each piece of equipment assigned to a primary crew member for conducting maintenance or emergency repairs and assign a backup. More frequent hot-section inspections of the propulsion gas turbines helped extend their running time. There is no substitute for vibration analysis when troubleshooting or conducting maintenance.
4. **Learn all you can from other people's experience.** In addition to what we had been taught at Damage Control School, the lessons we took away from studying incidents in other ships greatly informed how we went about preparing our own ship for operations in a combat zone.

Overall, *Athabaskan*'s engineering department did an outstanding job of getting our ship ready to go overseas and doing whatever it took to keep our machinery and hull systems operating at peak efficiency throughout the deployment. We did what we could to maximize our ship's effectiveness within the coalition task group, and our chances for a safe return.

Joe Murphy served as the MSE head of department in three ships, the last being HMCS Iroquois, and ashore as Commandant of the Naval Engineering School in Halifax. He retired in 2005.

2. Part of Chemical, Biological, Radiological, and Nuclear (CBRN) defence.