By Steve Wilhelm

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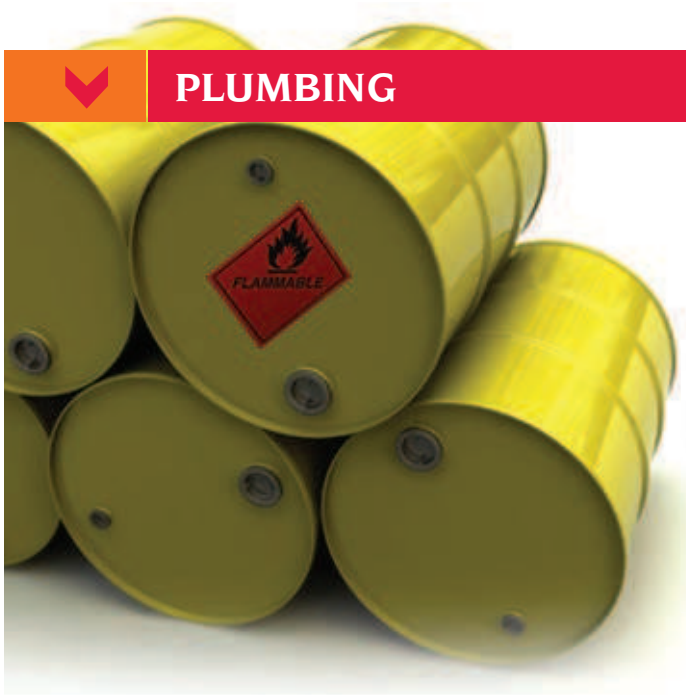


PIPING FOR NATIONAL AND ENVIRONMENTAL SECURITY

Protecting the waters

The inland waters surrounding Vancouver Island, B.C. – called the Salish Sea – have for eons been a thriving habitat for several subspecies of salmon. Since the early 1990s, there's been a slow but steady decline in the number of fish in that sea. A definite, glaring factor for the problem hasn't been identified, but Fisheries and Oceans Canada (DFO) isn't leaving water pollution to chance.

Canadian Forces Base (CFB) Esquimalt and its Fleet Maintenance Facility (FMF) are located on a peninsula in the Salish Sea. About three years ago, ground broke for a new 30,000 sq. ft. electroplating shop, which specializes in gold, silver, chrome, zinc, and iridium-coating of naval vessel parts and components. An adjacent waste water treatment plant handles the facility's corrosive byproduct.

"There's no shortage of aggressive and potentially environmentally-devastating chemicals used in the electroplating process," said Dave Small, superintendant at Lockerbie and Hole, the mechanical contractor on the job. "Cyanide, chromium, and a mix of nasty acids and alkalis are all an unavoidable necessity."

Because the shop needs to be at water's edge to serve the FMF dry docks, the chemicals are an even bigger potential threat to marine wildlife. The solution installed was a polypropylene double containment piping system. That's a highly specialized solution, but the not quite traditional installation went one step further, using an electric resistance fusion method of pipe connection, due to the tight space the pipes were to be installed into.

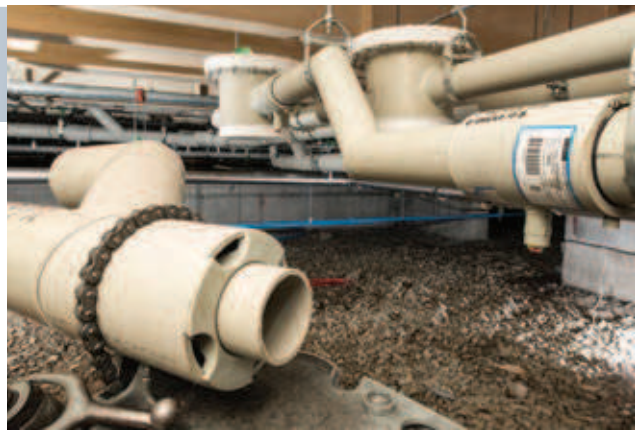
The shop's proximity to the water requires that it be elevated, like a boardwalk. Steel pilings, sunk to bedrock, hold the building four feet off the ground, except for a single access corridor where six-foot clearance

ADDRESSING THE HEAT LOAD

Lockerbie and Hole was trusted with the heating system at the new electroplating facility, as well as the chemical plumbing.

Ten natural gas-fired rooftop units are spread out across the flat roof of the electroplating shop. The units provide a combined 10 million BTUH of heating capacity for the space.

Certain steps in the stripping and coating processes create heat, so the facility is equipped with massive exhaust fans and air scrubbers that reduce the need for cooling equipment.



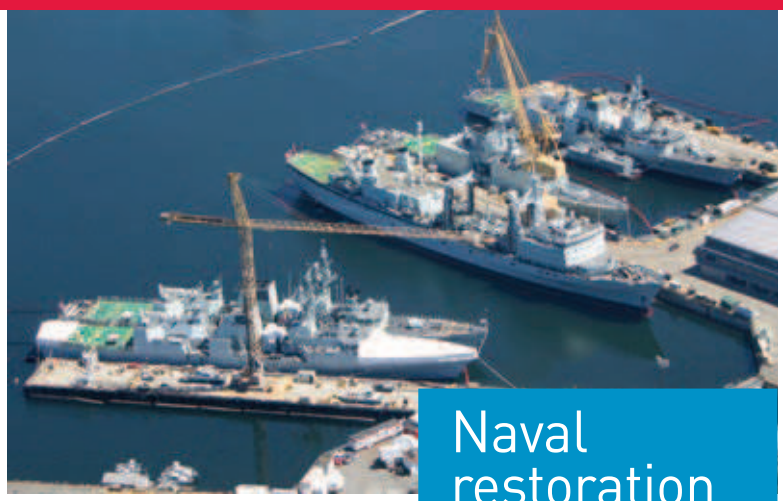


Photo: Ian Duke

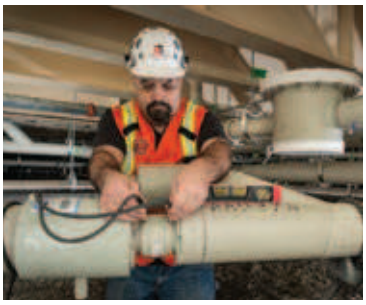
Naval restoration

Canadian military vessels that need work are often sent to CFB Esquimalt for a facelift. Once at the dock near the electroplating shop, the ships are partially dismantled. The parts requiring service are first steam cleaned, then chemically stripped of their old coatings before being freshly electroplated, cured and put back into service.

makes utility access more convenient.

"At high tide, we'll get about four or five inches of water under the building," said Craig Mercier, superintendant for Stewart Olsen, the building's general contractor. "During a king tide, it can be a lot deeper."

While Lockerbie and Hole turned the building over to the military in mid-February, service didn't begin immediately. "There's a good deal of commissioning to go through, and a learning curve for employees familiarizing themselves with the new equipment," said Small. "But they'll have the convenience of being able to service equipment on-base, and peace of mind knowing that vulnerable ocean waters are safe from contamination."



Uncompromising SECURITY

"The big question was, 'How can we be 100 per cent sure we won't have a leak?'" said Peter Way, representative at Hy-Line Sales.

"Double-containment – or acid waste – piping presented the only answer, but our company had never installed any before," said Dave Small.

His company assessed a pair of piping options, and while both were equally effective at isolating the chemicals, his firm opted for what he felt was the less labour intensive offering, since the installation site was challenging, to say the least.

The pipe was installed on the epoxy-coated underside of a half-inch thick steel deck, which serves as the building's slab. Over 500 studs were welded for pipe hangers. Working conditions in the crawlspace were rough, with varying height. Some of the time, workers were on their hands and knees, crawling around on abrasive rock surfaces in the crawlspace, reports Smith.

Chris Ziu, product manager with Watts Water Technologies, explained that the polypropylene pipe can be joined by the traditional socket fusion method, but Lockerbie and Hole decided to use the electric resistance fusion method. With that method of connection, wire coils are moulded into the couplings. When current is supplied, the plain end fittings and pipes fuse together, turning into a contiguous joint that's stronger than the pipe itself.

On this project, nearly 6,000 lineal feet of polypropylene double containment piping is used. Sizes range from half-inch carrier (inner layer) pipe with two-inch containment (outer layer), to four-inch carrier with eight-inch containment. The containment piping completely surrounds the carrier, even at elbows and joints. The carrier is installed and pressure tested first, followed by completion and testing of the containment system.

AN INTENSE INSTALLATION

"We pooled the pipe out on the steel floor of the electroplate shop, then used ultrasound equipment to mark where studs needed to be welded to the underside of the floor," explained Dave Small. "After the studs were welded in place and epoxy coated, we began hanging and fusing pipe.

"What was easy above-deck was far more complicated once underneath, in the dark and on your hands and knees," he continued. "Working around the pilings and steel floor joists only made things harder."

Six entirely independent pipe systems (cyanide, chromium, acid alkali, gravity oily waste, pumped oily waste, and acid alkali standpipes) snake across the underside of the shop.

Each toxic chemical has its own system. Some are pressurized, while others are gravity flow. Fifty-seven tanks of varying size hold chemicals before and after use. Eventually, everything ends up at the treatment facility.

According to Small, the easiest part of the installation was actually connecting the sections of pipe. The clamp-free electrofusion system uses a heavy gauge wire coil that's moulded into the coupling, so the pipes fuse together after they're placed and slipped together. Once the heating process has been started, there's no need to move the pipe.