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Overview of the bullet catchers behind the targets that collect the projectiles.

Every day, bullets fly on the Nicosie firing range at the 2nd Canadian Division Support Base in Valcartier. Unlike at traditional firing ranges, the ecological footprint of this new “green” firing range has been greatly reduced with the new bullet retrieval boxes, designed in Canada by the team of researchers at Defence Research Development Canada (DRDC) Valcartier.

The Canadian Armed Forces have long shared ecological concerns about contaminants from spent bullets on their firing ranges. The solutions found abroad, however, were very costly. “Inspired by the need for an economical yet effective technology on the firing ranges, DCC, DRDC and the Institut national de la recherche scientifique researchers, and the environmental branch of the Land Force and 2nd Canadian Division Support Group in Valcartier worked together to come up with an innovative concept,” said Francis St-Georges, DCC Team Leader, Environmental Services.

Out of this inspirational partnership was born the first ecological firing range in Canada, specifically designed to reduce the quantity of contaminants leached into the surface water and ground water. To achieve this, the traditional firing range butts were cleaned up and renovated, and steel sandboxes were installed. These boxes, covered with a membrane that closes on itself after the bullet penetrates, captures metals from small arms projectiles, while also preventing seepage water from reaching the firing range’s water table.

In two years of extensive testing, these unique structures proved their effectiveness. An independent study estimates that, over a 20-year period of use, these bullet retrieval boxes are 54 times more cost-effective than traditional sand butts because they cut down on the frequency and cost of maintenance at the firing range. A double bonus!

“It is important to recognize the tireless efforts of Dominic Faucher, Coordinator, Environmental Services at DCC, who was directly involved — from the planning stage to the

post-site operations stage — in managing firing range munition residues while also ensuring compliance with the Defence Environmental Strategy. Given the resounding success of this project, it should be adapted to other firing ranges with different climates in other parts of the country,” St-Georges concluded.

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The cable passes this test as it hooks the CF-18 aircraft and brings it safely to a halt.
Photo by John Bruyea

DCC is at the forefront of helping to ensure the Canadian Armed Forces is equipped and ready for whatever deployments may come their way. Nowhere is that more evident than at 8 Wing Trenton where yet another infrastructure improvement is making life easier for the Royal Canadian Air Force.

A new arrestor system for helping CF-18 fighter jets make emergency landings or abort their departures at Canadian airbases is now in place, thanks to the hard work of the DND and DCC project teams. Nicholas Hilts, Construction Coordinator led the DCC team and recently signed off on the substantial completion notice for the new Barrier Arrest Kit (BAK)-14 and BAK-12 combination system at 8 Wing Trenton.

"If an aircraft goes off the end of the runway, that can be a very bad situation," says Hilts. "The C-17 and the new J-model Hercules have reverse thrust so if they have a single engine failure, they can still touch down on the runway and stop within a safe distance. The CF-18 only has hydraulic brakes, so if it gets up to rotation speed and it's about to take-off and needs to abort, there's no slowing it down. It's either got to go in the air or take the cable."

Using the old arrestor system, BAK-12 alone, technicians had to physically drag the cable across the runway, attaching it to above-ground anchors. This took the technicians about 15 to 20 minutes to complete. The new BAK-14 beam that operates the cable is permanently encased in concrete underground and can be remotely deployed from the air traffic control tower. It is completely pneumatically driven.

"When the jets are in the circuit or close to the airfield, the control tower can physically flip a switch causing the cable to rise from the tarmac and be ready to take the aircraft," says Hilts.

“Installed 1,500 feet from each end of the runway, the arrestor cables can be used in emergencies during both landing and departure. When used, the cables can stop the forward motion of the jet within 1,200 feet.”

Unlike the old arrestor system that stopped the jet based on only one variable – the need to arrest the aircraft – the BAK-12 Smart arrest system uses smart technology to account for aircraft weight, speed and fuel with input from its user. This increases the probability of a safer, more successful landing or abort.

“This has been a very rewarding project to work on and very interesting as well to stand there and watch the cable take the CF-18 knowing how much easier it is to do than before.”

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You never know what will be found when digging into the ground, especially when excavating a tunnel 800 metres across an over 100-year old naval base, as crews digging the new utilities corridor at CFB Esquimalt learned during two years of construction.

Old railway ties, inert mortar shells, decommissioned electrical lines and even an underground tunnel prepared during the Second World War are some of the notable finds unearthed during excavation of a new underground tunnel created to house services for the base.

“It was a really unusual project,” said Eivin Hoy, Program Leader, Capital Program for DCC. “We really didn’t know what we would find.”

The utilities corridor was identified as a priority in 2011–12 when plans began for the construction of two new jetties at the Esquimalt base and it was recognized that updated, reliable services would be needed.

Because of the age of the site, Hoy said they knew there may be challenges with old records and that they would have to work around existing services as they created the horse-shoe-shaped tunnel.



Utilities Corridor, CFB Esquimalt during construction. This underground concrete reinforced tunnel runs down the centre of the base’s main road for over half a kilometre. The \$26-million corridor houses a wide range of utilities and permits easier maintenance and upgrades.

The biggest challenge during construction was the extensive traffic disruptions resulting from the seven phases of work, and the blasting of bedrock adjacent to sensitive heritage structures. However, the re-routing and excavation work went smoothly and personnel were patient. Now, with the work complete, users can’t actually ‘see’ where most of the construction was done.

“The only difference for them is you have all new roads and sidewalks,” said Hoy.

The four-metre by four-metre underground tunnel carries everything from steam to sanitary sewer, with easy access for maintenance. The new underground structure will also make it easier and less disruptive to add new services when needed.

Despite some of the unusual discoveries along the way,



Utilities Corridor, CFB Esquimalt following construction completion in July 2014. With work complete, users don't see the underground tunnel.

the project was completed on time and on budget – a big success, said Hoy.

“This is one of those gold-star projects at the end of it,” said Hoy. “It was truly a success story.”

The \$26.3-million project was given substantial completion at the end of July 2014. Work on the two jetties is now in the design stage.

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Recipients of DND’s Well Done Award for excellence in workplace health and safety. Front: Renée Roussel, Michelle Carrière, Laura Blais, Christine Émond and Luc Pagé. Back: Scott Munn, Raouf Greiss, Andrew Buchan and Benoit Gignac. Absent: Gaétan Morinville.

The collaborative efforts of a joint DCC/DND committee are helping improve how health and safety is managed at both organizations.

When DCC and DND colleagues relocated to the same Ottawa office space in October 2010 to jointly manage infrastructure projects, an 11-person committee—made up of mostly DND employees with a healthy representation from DCC—was struck to help ensure a safe move and to develop and implement a health and safety program for the office’s 300 staff.

Since then, the committee has carried out a structured evaluation of the program, soliciting input from employees—a diverse group involved in project, contract and design management, and engineering and technical inspections (e.g. fire marshal)—through a survey, and brainstorming by committee members.

It came up with seven improvement themes, with specific activities to implement under each. For example, committee members worked together to develop a wellness program for the office, including lunch and learn sessions featuring presentations by experts, a newsletter and a bulletin board to post health and wellness-related information for staff.

The program improvements, in turn, have been recommended to DND management for implementation across that organization and have similarly been submitted to DCC’s Ideas at Work innovation program.

“When you bring together project experts from diverse backgrounds, and set aside time to work on a corporate goal in a structured and deliberate fashion, you create an environment

where innovation can happen,” says Scott Munn, Technical Specialist, Project Management, who is the committee’s management co-chair, along with employee co-chair and DCC colleague Michelle Carrière, Coordinator, Project Management.

The collaboration is also helping DCC bring greater value to DND, Munn adds. “Our experience working on projects with the Client-Partner means we can also bring techniques such as value engineering to address corporate effectiveness and efficiency issues. The majority of the employees [in the joint project management office] work for DND and these health and safety improvements will benefit them.”

The Client-Partner recently recognized committee members’ hard work and dedication to health and safety and innovation. In September 2014, the committee received DND’s Well Done Award for excellence in workplace health and safety.

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To suggest story ideas or to comment on the newsletter, please contact [the Editor](#).

Look for the next issue of *DCC at Work* in December 2014.



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