

HARDLY A DROP IN THE BUCKET

Vancouver's SEI Industries Is Putting Out Fires Worldwide

BY PAUL DIXON

SEI Industries may be famous for creating a product named Bambi, but it is anything but meek and mild on the international firefighting scene.

From an industrial park in suburban Vancouver, B.C., SEI Industries serves clients in more than 110 countries around the world. SEI prides itself on creating innovative product solutions for its customers by fostering a dynamic and flexible culture that allows SEI to continually engineer new products. The corporate motto is, "We Engineer Solutions" and it has succeeded on its promise for three decades.

SEI's aerial division was launched in 1982 with the introduction of the original Bambi Bucket. Firefighting buckets weren't new at the time, but SEI was the first company with a fully collapsible bucket with a pilot controlled, instant opening valve, which provided an accurate and concentrated flow of water from the bucket to the fire. The valves on existing first-generation buckets were difficult to operate and released the load in a fine spray. Through consultation with helicopter operators and government agencies in North America, SEI created a collapsible bucket with a simple gravity-actuated valve that delivered the desired volume of water onto the target.

Today, SEI controls more than 90 per cent of the world market and the familiar orange Bambi has become ubiquitous in the world of aerial firefighting. The product line literally includes the right product for just about every class and model of helicopter, from the 260-litre bucket for the Robinson R-44 to the monster 9,800-litre version for the CH-47 Chinook. The Mi-26 has even been fitted out with twin 7,600-litre buckets mounted in tandem.

Shawn Bethel served more than 20 years with the BC Forest Service before joining SEI in 2007 as division manager responsible for aerial firefighting, fire ignition and ground firefighting products. Acknowledging Bambi's 30th birthday, he says, "Our messaging is we have new product and are proud of our innovations but we're not losing sight of the need to improve the old."

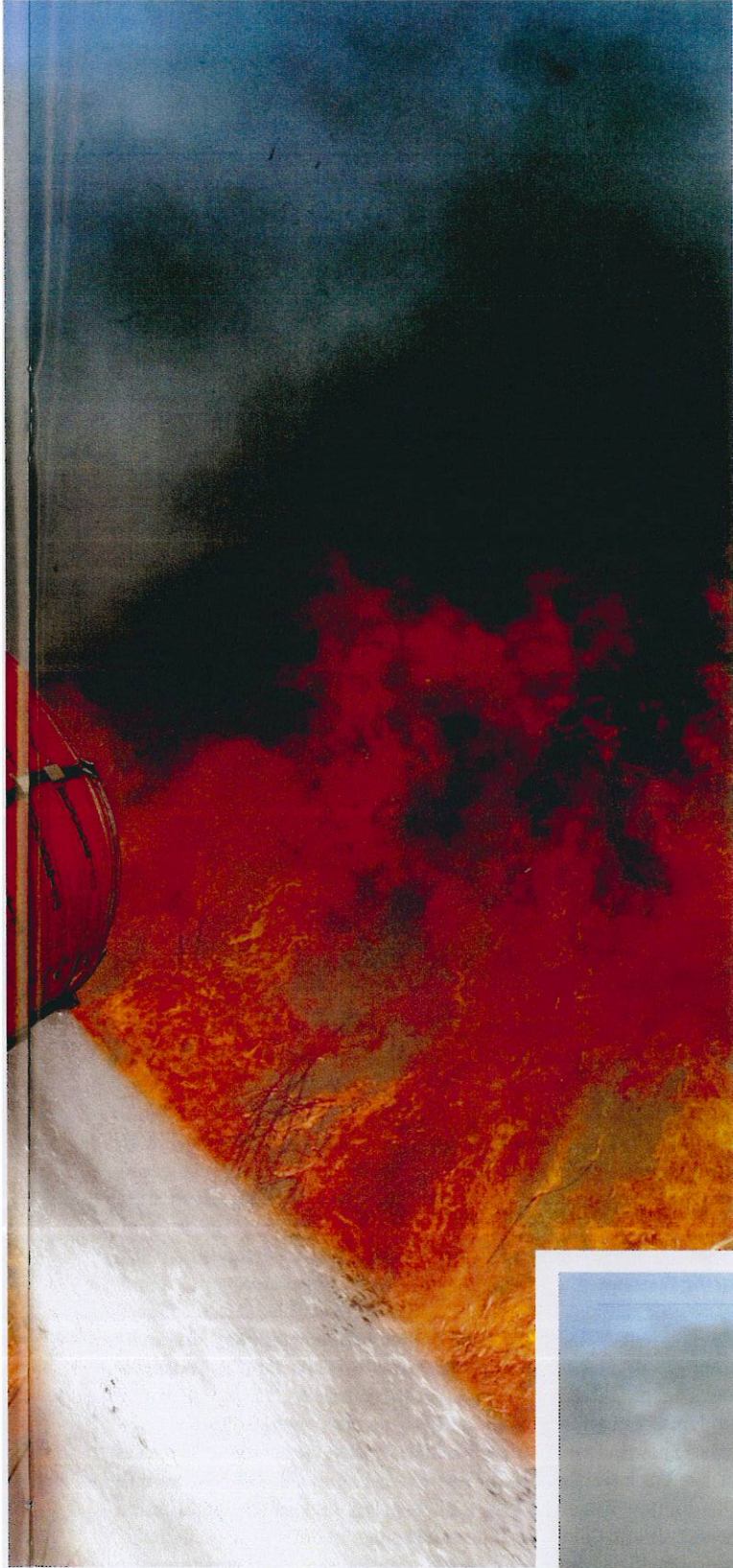
Over the past 30 years, Bambi has grown in many different direc-

tions to meet different needs in widely diverse markets. The trademarked Powerfill system allows pilots to draw from water sources that are too shallow for dipping – as shallow as 18 inches. With a long-line, Bambi Powerfill allows pilots to access water sources in areas that would be inaccessible to tanked helicopters with snorkels, such as tree-lined streams and other sources of water with few to no rotor clearance issues.

This year's new Bambi Max features a lightweight, quick operating multiple drop valve wrapped in the standard tough Bambi Bucket shell that increases volume per drop through a fuel cycle. The ability to pre-select loads allows efficiency at both the dip site and over multiple hot spots, which can be targeted by releasing portions of water over each one, is an important feature. The helicopter operator can also choose to unload as many separate drops as required to lift his bucket load out of the dip site, safely to the next target. Greater efficiency on each fuel cycle makes this a desirable piece of equipment prompting many firefighting agencies to request operators with these capabilities first and release them last. Many firefighting agencies in North America, Europe and Australia give preference to these bucket performance capabilities in their contracts.

Bethel talks about SEI's level of customer service, and how it fuels their every move. "Our customers will continue to see proactive communication from us rather than just waiting for trade





ABOVE: SEI controls more than 90 per cent of the world market in aerial firefighting and the familiar orange Bambi has become ubiquitous in the world of aerial firefighting. (Photo courtesy of SEI Industries)

RIGHT: The Bambi Bucket product line literally includes the right product for just about every class and model of helicopter. (Photo courtesy of SEI Industries)

shows . . . we like to travel to see our customers, work with them and support their operations from the start of fire season, through to the end. Our customers like it when we go to their hangar, pull out their buckets and provide technical input on how to keep them maintained and working the way they are supposed to. Helicopter operators have a lot on the 'line' (literally) and having a bucket that works every time on a fire is critical to their revenues. We did a survey two years ago and resounding feedback from our customers was, 'this is what we like about SEI – you guys support us all the time and there's great customer support.' We will never lose sight of that."

Today, Canada represents only about 10 per cent of the Bambi market, with the U.S. accounting for the lions share at 60 per cent, but emerging markets in Brazil, Russia and especially China will tip the balance in the future. Speaking specifically to the emerging Chinese market, Bethel says, "They don't get a lot of fire, but they are manufacturing a lot of helicopters over there. They've gone from a handful of helicopters to fleets everywhere. Our agent in China is very close to the two major OEMs, so the helicopters are coming off the production line with Bambis wired in and delivered to the customer with the Bambi Bucket and systems installed, fire ready." SEI recently purchased the FAST Bucket assets and is currently incorporating the new "yellow" bucket within their aerial firefighting manufacturing and sales organization.

In 2003, SEI developed a new aerial ignition system with the objective of introducing aerial and ground-based ignition dispensers that simplified the task, reduced costs with an improved standard of efficiency and operator safety. The result was Dragon Eggs, a delayed chemical ignition device that offered a significant advancement over the outdated plastic spheres of the time by improving reliability and burning dynamics. At the same time, SEI also engineered the Red Dragon – aerial plastic sphere dispenser (PSD) – and the Green Dragon, the first automated ground-based plastic sphere launcher. The teaming of the Red and Green Dragon dispensers with Dragon Eggs has resulted in the next generation of fire ignition systems that offer more safety features and better operability than any other system available today. In October 2011, SEI





SEI's aerial division was launched in 1982 with the introduction of the original Bambi Bucket. (Photo by Paul Dixon)



SEI employs approximately 60 production staff – and their work often consumes them. (Photo by Paul Dixon)

purchased the Premo fire ignition assets and are now able to offer legacy aerial fire ignition PSD and the Premo fireballs that work with them. The Premo PSD technology has been around since the early 1970s.

Paul Reichard manages the remote site/environment division of SEI and tells how the Canadian Forces brought a problem to their door that in turn opened up a whole new market for SEI and resulted in the CF becoming SEI's single largest customer. "The Canadian military came to SEI 20 years ago when they ran into a problem with their American supplier of fuel tanks," Reichard says. "We weren't making fuel tanks at the time, we were making Bambi Buckets. They said it looked like we had the technology to do what they needed and asked if we could try doing this because they needed a domestic supplier who could support them when they go to war, peacekeeping or have an emergency."

SEI developed the bladder based on the American military specification of the time, but the American standards presented problems for the Canadian military. The Americans treated the bladder as a commodity: use it once and dispose of it. The specifications called for a life span of 18 months or three moves. As well, the Americans had gone to a single fuel type years before, so the fabric used in their bladders was only good for that type of fuel. As Reichard relates, "The Canadian military didn't have the money to replace their bladders every 18 months, so they needed a bladder to last five to six years, so we abandoned the U.S. military specifications in 1999 and drafted up our own specifications for the Canadian military."

The bladder SEI created far exceeded the previous specification.

The American bladders were built to a 2.5:1 safety factor, but by using computer-controlled 100 per cent RF welding and engineering a unique cross-seaming procedure, the SEI bladder achieved a 5:1 safety factor and a much longer life expectancy. Then, came the realization that there were a number of military users around the world facing the same financial constraints as the Canadians.

With a market identified, the King series of bladders was developed. "The Desert King was developed for the Egyptians, the Arctic King was developed specifically for the Russians and the Canadians and the Jungle King for our South American clients," Reichard explains. "For the Canadian military, we also went into turnkey systems. They don't just want a bladder, so what we have is three pieces of kit. We have the warehouse, which is our FSDS – Fuel Storage Distribution System, a 100,000 U.S. gallon tank farm with filtration in and filtration out, pumping systems in and out, so they can deploy two containers, open it all up and you have all you need to set up your bulk fuel storage solution – that is your warehouse. It has both electric and diesel. First in, green field, the diesel runs, and as soon as they get their generator set, it goes to electric. That led us to develop other kit for them, which is the High Pressure Refueling system – it fills up the aircraft or bowsers if it's on tarmac. The newest part of the kit is the F34DS, which is our big gas station can. They use it to fill the jeeps and tanks. So, you have a whole turnkey system. We are the sole supplier to the DND for their fuel needs."

SEI has expanded the concept to create a complete fluid management system – the design, engineering and manufacturing of products that transport, transfer, filter and store fuel, water and sewage,

often as a complete turnkey liquid management systems.

Wherever the Canadian Forces have gone in the past 20 years, SEI has enabled them to complete the mission. From the desert heat of Afghanistan to CFB Alert, the most northerly inhabited spot on the planet and everywhere in between, if the CF has a need for fuels and fluids, SEI has provided the solution. Humanitarian missions to Haiti, Turkey and Sri Lanka with the Disaster Assistance Response Team (DART), security operations in support of the Vancouver Olympics and G8 – SEI has been there.

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As the only company in the world that engineers, manufactures, installs and provides customer operational support for complete turnkey fuel storage systems designed around collapsible fuel storage tanks, SEI finds itself creating solutions for challenges brought by clients. Their products have been deployed in operations around the world – for mining companies, oil and gas exploration, remote-site construction projects, helicopter bases and disaster relief operations. To name just a few:

- Siberia's Bema Gold. During winter conditions, SEI delivered, installed and connected a two million-gallon diesel fuel tank farm for exploration activities in one of the world's largest gold deposits.
- Yukon's Selwyn Resources. At the top of two raw mountain sites, SEI provided a complete turnkey 400,000-litre fuel system that allowed the establishment of two airstrips and base camps for mining exploration.
- Oak Ridge National Laboratory. SEI provided containers for heavy water storage to enable Oak Ridge National Laboratory to perform nuclear-related maintenance on their equipment.

Reichard echoes Bethel when he talks about SEI's clients. "We do a lot of is field support," he says. "We do a lot of turnkey systems and we send a lot of people into the field to support the product. If you buy a fuel system from us, we won't just sell it to you, we will engineer it, manufacture it and come up and set it up for you; we'll teach you how to use it."

A recent development for SEI is the Bulk Aviation Transport Tank (BATT), another example of a client bringing a problem to SEI in search of a solution. "It started originally in Latin America because we have one specific client, much like our Canadian Forces," Reichard says. "They have a lot of jungle bases with our Jungle King bladders. Typically, they were being supplied by truck, but at the height of hostilities, the trucks were being hit. They were losing trucks, losing drivers and losing fuel. They needed a way to get the fuel off the ground and the only way they could do it was to fly it in drums, but they couldn't get the number of drums into the sites very easily, so they came to us and asked us if we could build a bladder. We originally said no, we weren't interested, as we had no experience in building transport bladders. But they said, 'We're already doing it with your bladders and it's working very well.' They had bought a bunch of smaller bladders from us, shoved them in the planes, they weren't the right shape and they were flying around with them. We just freaked out. It didn't fit, but it was working. So, we worked with them to develop a specification. They didn't know what they wanted more than a bladder on a plane."

In developing the BATT, SEI worked with the client and their civil aviation authority and came up with a product that satisfied all the needs. "That was 2009 and it took a few different versions of the tank to get it right, but eventually we came up with three different patented baffle systems, one for big tanks – we call it the "Divide" – the restrictor baffle for smaller tanks. And for rotary

wing, we have an 'X-baffle,' to give you the hover load of a helicopter," Reichard says.

SEI patented three baffles and determined they needed to develop a double tank; the inner tank would be strapped down with different types of cargo nets or strapping. But it was moving too much, rubbing and abrading, so they decided to put a tank within a tank – which had never been done before. "We worked with a couple of suppliers to come up with the zipper we needed, something that is fuel-resistant, but very, very easy to work with and strong enough to build a tank out of," Reichard says. "We worked with a German company that came up with the zipper and we learned how to put a tank inside a tank, so the outer tank is what secures the tank to the aircraft. It takes all the abuse from rolling and abrasion and it's fuel resistant, but the inner tank is the one that's baffled, holds the fuel and it works really well."

The BATT minimizes deadhead flights as the bladder can be easily folded up and stored when not in use. Damage to the aircraft from drums is eliminated and there is no fuel spoilage. The elimination of drums relieves remote site operators of concerns for environmental impacts from spilled fuel or abandoned drums. In the end, it was a win-win-win situation.

With years of international success behind it, SEI is certainly not cooling its heels and dousing potential projects. Says Bethel: "SEI will continue to build its worldwide reputation for excellence by harnessing the strength of its innovative product lines and entrepreneurial corporate spirit to meet the increasingly challenging needs of its existing customers as well as emerging markets."

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