



Evelyn May, Shawn Michaels, and Dan Robinson from Kwantlen Polytechnic University unveil a new body armour prototype for arborists.

From chainsaws to sewing machines

By Sarah Ripplinger

A new body armour for arborists moves into the prototyping and testing phase with a WorkSafeBC Innovation at Work grant.

Shawn Michaels almost lost his leg to a chainsaw when he was 16 years old. It was his third day cutting down trees for a transmission line right-of-way — essentially, clearing the way for electric power lines. A co-worker's chainsaw flew back unexpectedly and ended up cutting into Michaels' left leg, leaving him with 18 stitches. Luckily, Michaels was wearing protective leg gear at the time of the accident, which prevented him from losing his limb.

"I realized how valuable chainsaw armour is," says the now 52-year-old.

Michaels' dream is to create similar protection for the upper body, which would add to an arborist's protective gear contingent of head, eye, hearing, hand, leg, and foot protection. It would also bring to market something that is virtually unavailable for purchase in North America.

Moving from concept to prototype

Michaels — who has worked with trees for most of his life and as an arborist for more than 20 years — started

developing his design in his garage. He then enrolled in the Wilson School of Design at Kwantlen Polytechnic University (KPU) to get help turning his concept into a reality. In 2018, his supervisor received a WorkSafeBC Innovation at Work grant, which is being used to support his research.

"Shawn is one of the few students who came to the program knowing exactly what he wanted to work on," says Dr. Dan Robinson, a kinesiologist, Canadian Certified Professional Ergonomist, and faculty member at the Wilson School of Design at KPU. He's the principal investigator of Michaels' research project.

Michaels' design — which looks like a high-tech safety jacket — uses similar technology to what is currently found in chainsaw leg protection. The jacket includes layers of chainsaw blade-stopping Kevlar yarns, a synthetic fibre that is five times stronger than steel.

The goal is to block kickback, says Robinson. "That's when the end of the chainsaw makes contact with wood and flings the saw back and upwards into the operator's body."

Blazing new trails for tree work

A multitude of factors go into creating technical apparel like Michaels'. Urban foresters need adequate

venting to release the heat they generate when climbing up and sawing trees, sometimes saddled with up to 70 pounds of gear.

Unlike tree fellers who cut down trees with both feet firmly on the ground, arborists can climb 50 feet into a tree using spikes and rope, or operate out of a cherry-picker bucket. They prune, trim, and cut down trees one section at a time, which changes their body position and grip when operating a chainsaw. They also need to be cautious of power lines, getting snagged on branches, urban traffic, and animals and insects living in the trees they work beside.

“Arborists in urban environments may need to operate a chainsaw with either hand and in awkward positions,” notes Robinson. “The more layers of protection we add, the more heat will get trapped in the garment and the more range of motion may be compromised, which is why testing is so important.”

Real-world testing

To ensure their prototype will adequately meet the needs of urban foresters, Michaels and Robinson are

working with an industry partner, the City of Vancouver’s Urban Forestry Department. The City’s team of almost 100 arborists will test the functionality of the garment — from range of motion to comfort — and provide Michaels and Robinson with feedback.

“Fundamentally, it’s important for researchers to connect with stakeholders who can put the results of their research to work in the real world,” says Lori Guiton, director of WorkSafeBC’s Policy, Regulation and Research Division. “In this case, the City of Vancouver employs urban arborists who could benefit from this innovation in protective apparel, making them safer at work.”

Part of the WorkSafeBC grant will be used toward lab testing, which will involve sawing several garments to see how well they would protect the wearer. It’s a significant but necessary investment to make the technical apparel market-ready.

“Modern chainsaws with carbide chains can cut through rocks,” notes Michaels. “We want the technology that is going into this jacket to set the bar high for this type of protective gear in North America.” ☺



Reduce workplace incidents by inspecting and maintaining your equipment at frequent intervals.

Find health and safety resources for steep slope harvesting at worksafebc.com/forestry and search for “traction assist.”

WORK SAFE BC