B.C.’s Tolko Industries was the first operation in North America to use a winch-assist forestry machine—the ClimbMAX steep slope harvester from New Zealand—and their experience so far has been positive.

By Paul MacDonald

It’s interesting how a bit of chance can play a role in equipment developments for the Canadian forest industry. It might involve trying something new or, in the case of Tolko Industries Ltd. forester Ryan Potter, picking up a logging magazine while on holiday in New Zealand.

Potter, an avid rugby fan, was in New Zealand in 2011 for the Rugby World Cup, when he happened to pick up a logging magazine—and read about the ClimbMAX steep slope harvester, manufactured by NZ-based ClimbMAX Equipment.

This bit of chance led, eventually, to the first winch-assist harvesting machine being brought to North America. Tolko took delivery of only the third ClimbMAX produced, in September 2013.

So what is this piece of Kiwi-manufactured equipment all about?

The ClimbMAX steep slope harvester is an excavator-based machine equipped with a felling head and a winch and is capable of felling trees on extremely steep slopes. It essentially allows a logging outfit to remove workers, such as fallers, from the hill face and replaces them with one machine operator who is protected by a cab. In addition to being able to fell trees, the ClimbMAX is also able to hoe chuck wood or bunch logs for more efficient extraction via a yarder or skidder. All the way around, it’s a win on the safety side.

Since 2013, Tolko has been working with ClimbMAX #3 on steep slopes in the B.C. Interior—and ClimbMAX #5 is also now in use on Vancouver Island, with several more machines ordered for use on the Coast.

Tolko stepped up in an effort to support their logging contractors in making the move to new equipment, and to encourage innovation.

“But the real driving force was safety,” says Potter, who is now area supervisor - steep slopes specialist for Tolko.

“It was primarily safety driven, the concept of getting guys off the hills, and reducing exposure for hand fallers.”
So far, the ClimbMAX machine is showing it has good application on steep slopes—notably where Tolko needs it, in the B.C. Interior. And there is also high interest in the equipment on the B.C. Coast.

Tolko is doing increasingly more logging on steep slopes in the Interior—and there is more to come in the future, says Potter.

In fighting the mountain pine beetle, Tolko has been focused on logging lower elevation woodlands in the B.C Interior. “A lot of the flatter, easier slopes have pine, so they were salvage-logged. Now, we are going back into more of our traditional areas, that have lots of different species—and significantly more challenging slopes,” explains Potter.

Over the past half-dozen years, they have been logging on gentle slopes, with only about five per cent of the volume coming from steep slope operations. “Going forward, we’re looking at doing probably closer to 30 per cent of our volume on steep slopes. It’s a significant shift.

“We’re looking at contractors re-tooling, and we’ve hired some new contractors with cable and a couple of other systems, to try and help us address the steep slopes.”

With the ClimbMAX and other equipment such as yarders, they are looking to go beyond the ground that is handled by leveling bunchers. The self-leveling bunchers can operate on steep slopes up to around 50 per cent. But Tolko has significant amounts of ground on slopes up to 80 per cent—perfect ground for the ClimbMAX.

The ClimbMAX is not alone in this equipment niche. There are a number of winch-assist logging machines in the market now. “But the ClimbMAX looks to be the only large static line system out there at the moment,” says Potter.

There are static line machines at work and available from Europe, but they are usually smaller machines, and are designed for much smaller wood than is standard in B.C. “The ClimbMAX is definitely unique in the piece size that it can deal with.”

Although one ClimbMAX machine has been built on a Hyundai 270 carrier, the machines have mostly been built on Hitachi carriers. The first machines were built on Hitachi 400 carriers, and more recently, on 330 carriers.

Though their machine was built on a 400 carrier, the 330 carrier would have worked fine with Tolko, too, says Potter.

“The 330 is a little bit lighter, with about 2,000 kgs less weight. But the 400 works fine for us. There is very little wood that we have that the machine would have any issue with.”
ClimbMAX essentially takes a Hitachi machine, and strips it down, building a wide undercarriage, and re-positioning components to get as much weight as low as possible, to achieve a lower centre of gravity. Among the items they keep, though, are the engine, the pumps and some track gear—pretty much everything else is custom. There are custom hydraulics, a custom boom and arm (which are longer) and a custom cab, all manufactured by Trinder Engineers, which produces the ClimbMAX.

The machine comes with its own Trinder directional felling head.

“The only difference between the Trinder head and a Waratah or Southstar head is that the Trinder has a retractable sawbox,” says Potter. “It can be retracted out of the way, so you can have the full grapple width for hoe chucking.

“It makes the ClimbMAX way more productive as a hoe chucker—it has a very large (60”) grapple when the sawbox is back and out of the way.”

Some customizing work was done to Tolko’s ClimbMAX before it left New Zealand. “They put in an additional escape hatch, which was a WorkSafeBC requirement, and they installed a cab heater and a hydraulic heater—that was about it,” says Potter.

As ClimbMAX notes, and Potter emphasized, the machine is cable assisted—the cable does not hold the machine in place.

“It’s just a winch assist—it’s not holding the machine on the hill,” explains Potter. “Pretty much everyone you talk to about the machine thinks the winch is holding the machine—until they see it in action.”

Potter notes that in demos of the machine, they have slacked the winch cable completely, to drive home the point. The machine does not need the winch to work—it just helps it get around on the slope, and gives it additional traction. There is little, if any, weight on the cable when the machine is working. More often than not, the winch is in auto mode, which allows it to take in or let out cable, as required, as the machine moves up and down a slope.

“With a feller buncher, in the right conditions you can run to a fairly steep slope. However, at a point, the machine’s tractive effort is overcome by gravity. Even with very large track grousers and with its mass, a buncher has a hard time getting up steep slopes.

“With the winch on the ClimbMAX, you add 15 tonnes of pull and you assist the machine. The going is much easier. The machine does not sit there and chew and dig trenches—the winch, which is secured to an anchor at the top of the slope, helps to walk the machine up.”
The ClimbMAX machine working for Tolko was equipped with 380 m of 23 mm (7/8”) swaged cable. The winch is designed by Trinder.

As a safety measure, the ClimbMAX is equipped with a rear blade that can be activated by the operator to self-arrest the machine should something fail.

Working with the machine’s manufacturer, and Trinder Engineers, Tolko developed an in-depth work procedure for the ClimbMAX before a B.C. operator ever stepped into the cab.

“The operator works on slopes less than 40 per cent for a set amount of time, then does 40 to 60 per cent, then goes to 60 to 80, and can go up to 80 to 100 per cent,” says Potter. “I think we’ve only had two blocks where we have had slopes over 80 per cent so far.”

To say that B.C. workplace safety regulator WorkSafeBC was involved with the new equipment would be an understatement.

“They were very involved because this was the first winch-assist forestry machine to show up in North America at that point,” says Potter.

There were a number of regulations, and education, that Tolko went through with WorkSafeBC.

“We had to get WorkSafe on side, but now we have really good relationships with WorkSafe officers at the local level. They are well beyond coming out specifically to see the ClimbMAX—now, they do general inspections on operations where the ClimbMAX happens to be used.”

Service-wise, Potter says the ClimbMAX people have gone over and above to keep the machine working and productive. “They’ve definitely bent over backwards to keep us operating. Back then, it was a prototype, and when we bought the machine, it was only one of three in the world. We did run into a few issues, as you would with any new machine.”

Potter says that getting parts was initially challenging, but they have been working closely with the Wajax branch in Kamloops, B.C., who is the B.C. dealer for Hitachi equipment, on which their machine is based.

“They have been working with ClimbMAX, and Wajax is a good service provider—they now know the machine inside and out. If we phone Wajax up and have an issue, they can help us out.”

And how is the machine delivering, in terms of production?

“We’re able to eliminate a good amount of hand falling on the steep slopes,” says Potter. Over the course of a year the machine is replacing the falling production of 2 hand fellers.”
The directional felling head is also an especially good fit for wind blowdown. “The directional head gives a lot of flexibility in blowdown—it’s able to retrieve the stems a lot easier and with a lot less breakage than other machines. It has quite a long reach, 10 metres, and with that reach and the full 360 degree wrist, the directional felling head can grab a log and thread it through the standing trees in one piece.”

The six-cylinder Isuzu engine on the ClimbMAX delivers good fuel economy, he added, “Considering that it is a 400-size machine, and is working quite hard on steep slopes, it really does not consume that much fuel when you look at the job that it is doing.”

There were some interesting surprises with the machine over the last two years, says Potter.

“As far as ground conditions, the machine’s ability to work in rock was somewhat surprising because track machines traditionally don’t do well on rock. But as long as it wasn’t solid bedrock, the winch assist can help the machine get around rock and continue to operate.

“Another surprise was that machine does not do well on soft ground. The weight of the machine isn’t conducive to success on soft and wet soils. We found that out with the first high elevation block. But that’s not a big deal—that’s more of a planning issue that we can deal with.”

In terms of log size, the ClimbMAX can pretty much take it all on. The machine was originally designed to harvest 1.5 cubic metre radiata pine in New Zealand. That said, since it has a directional head, Tolko has found it best to avoid large rotten timber. “The bar saw is 43 inches, and if the tree is larger than that, and rotten, the tree can start to come down as the head is being repositioned for the second cut. We quickly figured that out, and designed a procedure to deal with that situation.”

The machine is oversized when it comes to dealing with immature trees.

“In New Zealand, they don’t really have any immature stems, because it is plantation wood—the trees are all a similar size. But in a typical B.C. Interior natural stand, we have everything from trees that are a metre in diameter down to 10 centimetres in diameter.

“Directional felling heads don’t deal well with smaller diameter stems—they need to be removed to facilitate subsequent phases, but they don’t really add any volume. However, it still involves a movement that would otherwise be falling a larger tree. Its not like with a feller buncher, where you have a hot saw and you can brush out the small trees.”

At this point, Tolko is pleased with the ClimbMAX results.
“It’s a new piece of equipment, and with that comes some uncertainty,” says Potter. “But in applications where you have a lot of steep slopes and you’re wanting to either bunch wood for a yarder or not use a yarder at all, it definitely has application.

“With winch-assist machines, you can remove the hand falling, and that gives you options on what you might want to do with the stems while the machine is there, like orient them better for a yarding phase or chuck them down to somewhere you can get them with a skidder or chuck them right to a road. It gives you way more options than you’d have with a guy out there with a chainsaw.”

And, Potter reports, people are excited about working with a new logging concept—which some are calling a game-changer for the industry.

“In our mind, it has revolutionized steep slope logging for us. It’s given us a window into the future and although it has not always been rosy, it’s the way to go forward, as far as we’re concerned.”

And paramount to all these other considerations, using the ClimbMAX means fewer people on the ground—and as a result, safer logging.

“The ClimbMAX may not be necessarily less costly in every application, but it is so much safer,” says Potter.

Potter notes that in the 3,200 hours they have on the machine, they have had zero safety incidents. “No operator concerns, no near misses—nothing,” he says.

“It’s hard to do a direct correlation between that and with hand falling, but if you look at the risk factors with steep slopes, you’re definitely going to have a higher chance of something happening in that many hours of hand falling.”

It’s pretty straightforward, safety-wise, says Potter. “Anytime you can put a guy in a steel box on a machine vs. under a plastic hard hat, you’ve got to do it. It’s the way to go.”