



Hope Sawmill

As soon as you step through the door, you turn back the clock 175 years.

BY ROB BROWN

No Ordinary Shop

As I approach the two-storey mill, the deep drone coming from the two turbines below the building gets louder and louder. The old structure is in great shape, thanks in large part to all the work that has been completed over the last decade by the Hope Mill Restoration Volunteers. Two of the walls are rich, textured 20" thick limestone, while the other walls are covered with weathered clapboard siding. I notice one of the volunteers walking through the building and underneath a group of whirring belts that transfer power throughout. I realize immediately that this is no ordinary shop. I mention this to Bob Rehder, restoration team

leader, who's my guide. Smiling, he says, "every time you turn things on it's like someone is coming to life."

When I enter the old building I actually have to look at everything twice. I knew the mill was equipped with a table saw, bandsaw, jointer, planer/sticker and a lathe, as well as a few other pieces of machinery, but at first glance I don't know what any of the machines are. Dating from the 19th and early 20th centuries, the machinery looks very different from what I'm used to. After a quick look around, I start to recognize a few of the old relics. As I walk across the wooden floor, I realize that the entire building is vibrating from the power of the two large turbines below our feet.

70 Horsepower

The mill is built directly adjacent to the Indian River, just north of Keene, Ontario. This is the perfect waterway for damming, as it's too small for navigation and major log operations that would send logs smashing over the dam, but has more than enough current to power the turbines. Water from the millpond runs into the penstock below the mill and is directed toward the two turbines. These two rotating turbines transfer power to the main shaft, which in turn powers all the machines via a system of belts and pulleys. Depending on which operation is underway, the belts are adjusted and shifted, as some machines run off the same axel. To turn the lathe on, a simple wooden lever attached to a small wood beam guides the rotating belt onto another pulley. A wooden peg is inserted in the lever to hold it in place and keep the belt from moving. With a



Machinery Looks a Bit Different – All the machinery is powered by a system of belts. That, coupled with the fact these machines are around 100 years old, makes them look different from the machines most of us are used to today. The belts are joined together with lacing.

full six-foot head of water in the millpond, all of the equipment can be run simultaneously. The two turbines produce about 70 horsepower.

A horizontal crown gear is mounted on the top of the vertical fixed shaft in the center of each turbine. The rotating power of the crown gear is transferred by a bevel gear to the main shaft. A second bevel gear powers the line shaft and machinery in the workshop. To avoid the risks of metal-on-metal jamming or sparking, the “teeth” in the crown gears are made of hard maple inserts. If the gears shift out of alignment, the maple teeth will give way first and prevent more serious damage to the metal gears. Machining these inserts was quite a challenge as they taper from front to back and top to bottom.

Hard Times

The Hope Mill was built in the 1830s to supply the local area with lumber for the building trade. Due to World War II, the 1940s saw the demand for lumber increase, and a number of “modern” machines were added – a planer, jointer and drill press. After more than a century of strong business, the mill fell into disrepair as the boom propelled by World War II came to a halt. In the following decades, modern methods of producing lumber rendered the mill less critical and its downward spiral began.

The mill has faced many challenges over the years. Saved by the Otonabee Region Conservation Authority (ORCA), which bought the mill in 1966 and made extensive repairs, it closed in 1993 due to funding cuts. A fire decimated a portion of the building in 2001. It wasn't until 2002, when a group of 15 volunteers committed themselves to the project, that the Hope Mill was restored to its former glory. Its engineering and impressive power inspires awe in all visitors.



Wooden “Ignition Switch” – To turn the lathe on, a lever has to be moved, causing the spinning belt to engage with its pulley. Once working, the 100-year-old lathe works great; especially for turning larger posts like the one standing against the wall.



Hard Maple Teeth – The crown gear is attached directly to the turbine. It transfers power to smaller bevel gears, which in turn transfer power to the machinery. The gear teeth in the crown gear are made of hard maple inserts to reduce metal-on-metal jamming and sparking.



Cant Hooks – Once winched from the water, the sawyer and canter use cant hooks to position the large logs on the saw for cutting.

Making Sawdust

The first step in the process of sawing a log into lumber begins at the river's edge. A waiting log, often weighing well over 1000 lbs., is winched up the jack ladder into the saw house. Using traditional cant hooks, the sawyer and canter roll the log onto the carriage and secure it with "dogs". The carriage has small wheels and runs on a track, similar to a train. When the sawyer engages the gears on the underside of the carriage, the gears move the carriage along the track, carrying the log into contact with the saw. Once the cut has



Slice Off a Board – When the sawyer engages the gears on the underside of the carriage, the gears move the carriage along the track, carrying the log into contact with the saw.



Bigger than Most – The impressive 48" diameter blade is fitted with 48 replaceable teeth. It can cut boards up to about 20" wide.

Lateral Movement – After a cut has been made, the sawyer pulls a lever to move the log laterally. The amount of movement is set to the desired thickness of the plank.

been made, the carriage is returned and the sawyer pulls another lever, shifting the log laterally the same distance as the width of the next plank to be cut, and the process is repeated.

The saw blade that's used to slice logs into lumber is 48" in diameter, and has 48 replaceable steel teeth held in by cam locks. If left perfectly flat, the blade will wobble dramatically when it rotates. It is hammered slightly concave, or bowl-shaped, so when it turns at high speeds it remains stable.

Once cut the lumber is stacked and left to dry. Today there is a solar kiln on site that does a good job of bringing the lumber down to a useable moisture content. Then it is either brought into the main section of the mill to be machined further or sold as rough planks. It's incredible to think that all this old machinery was cutting-edge when it first entered the mill. Thick, solid metal frames hold heavy gears that in many ways look like they're almost new. It is evident that these machines were built to last. Most general operations can be made; jointing and planing, ripping and moulding, drilling and turning are all done without missing a beat. It takes a little longer to set up some of these machines, but once ready they work very well.

Today, much of the wood milled is used to fill orders for local jobs. Custom milling of siding, flooring or lumber for the construction or furniture trade is available to anyone who is interested and can wait patiently for the order. The sawmill does make some income selling products, but it's mainly a museum and restoration setting. Some of the wood goes upstairs to the small shop, where a number of different volunteers turn it into small objects that can be sold to the public.

The Volunteers

The main reason the Hope Mill is up and running today is due to the volunteers who give their time, energy and wisdom. About 15 regulars show up to tune and operate the



A Working Museum – Some machines, like this planer/sticker, have many moving parts and require lots of gears for proper operation. Even though these machines are ancient, they work very well. It felt to me like the Hope Mill was a working museum.



Add Some Electricity – Some of the lumber milled goes upstairs to a small shop where the volunteers make small gifts that visitors can purchase. Electricity has found its way to this area as equipment is a mixture of old and new; numerous sets of hand planes, drill braces and hand saws are housed on the wall while a 12" lunchbox planer, contractors table saw and a sliding mitre saw are scattered around the work area. Though there's a slightly more modern feel to this area, the vibe still does wonders for a woodworker's soul.

equipment. They are all retired men who just can't get enough of the mill and the camaraderie that goes with it. Bob Rehder smiles as he thinks of everyone working there. "To each one of these guys, the mill is the greatest thing going," he says. "They can't always agree on how to do things, but things sure get done, and everyone has a great time." He tells me about each of the volunteers' impressive backgrounds and shares some of the stories that are told during a regular lunch hour. He even mentions regular visits from an osprey, which often shows up to play in the river; live entertainment the guys never tire of. When walking through the mill I meet another volunteer, "Doc" McCubbin, who tells me, "I didn't know how I would transition from retirement. I didn't know how to make new friends either, but this place has been great!"



Restoring and maintaining equipment that is more than a hundred years old requires a lot of ingenuity. There are no operating manuals to consult and parts cannot be purchased at the local big box store. A different approach is needed as they often

have to make due with a part that's "close enough". Luckily some of the larger companies in the area help out with parts when they can, as this is a true community effort.

For more information about Hope Mill visit www.hopemill.ca.



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