

Far More Than Forgings

Northern Ontario forging and machining company defines “state of the art”

THE PROBLEM

A need for increased throughput of forging dies

THE SOLUTION

Purchase a seven-pallet, five axis high speed machining centre

When most people look at a forging, they're probably not thinking about how accurate it is. Robert Miller does. The operations manager at Lofthouse Manufacturing, Miller says without extreme accuracy in the manufacturing process, forged parts would be porous, and might assemble improperly. And without extremely accurate machine tools, Miller and his team would be unable to produce the hardened forging dies to 0.012 mm tolerances (0.0005 in.) and mirror finishes needed to make those forgings, and the precision machined parts produced from them.

A long history

In 1957, tool designer George Lofthouse opened a forging shop in Whitby, ON. The company prospered, and by 1978 Lofthouse was looking for additional space. Struggling to find space and staffing, he moved his company north to Burk's Falls, a village in the Almaguin Highlands where he was able to find space and a hard-working, loyal work force. Over the coming decades, Lofthouse transformed the company from a small forging house to a global manufacturer with extensive machining and design capabilities. Today, the

company has 11,150 sq m (120,000 sq ft) of production space and operates 24/7, and is the largest producer of brass and aluminum forgings in North America.

“Another key to Lofthouse's success is our ability to work closely with our customers.”

To say it's the area's major employer is an understatement. Miller says that, on a good day, the population of Burk's Falls numbers 1,000 residents, of whom 185 work at Lofthouse. The company has the capacity to produce millions of parts annually, and is one of the largest consumers of brass rod in the world. It also boasts a number of complex, high volume machine tools, including a Vertiflex 450 rotary transfer machine from Riello Sistemi, a BTB Flex Series M10 multi-station five axis machining centre, vision-equipped rotary transfer machines, and a 550-ton Praber auto-forge, the

only one of its kind in North America.

All of this manufacturing technology is the result of a \$40 million investment by Lofthouse's parent company, Brawo SPA, which acquired the assets of Lofthouse Brass in 2008. Since then, the Italian manufacturing group has reinvested all profits earned back into the company. Aside from extensive upgrades in equipment and software systems, Lofthouse has also recently expanded its facility, adding on another 4,460 sq m (48,000 sq ft) of manufacturing space.

“Another key to Lofthouse's success is our ability to work closely with our customers,” says Miller. “We can help with the design or the redesign of their parts or assemblies utilizing the forging/machining process, giving them more robust products. We can also combine several machined parts into one forging, resulting in less assembly and eliminating any chance of leakage or mismatching of subassemblies. Forgings also eliminate any chance of porosity or voids in the part or assembly, a common problem in castings, and produces the densest possible materials available. We have a complete engineering staff, and are constantly working with our customers on improving their product designs. This, along with our manufacturing abilities, allows Lofthouse to offer the forging/machining process at a very competitive price point.”

THE EQUIPMENT



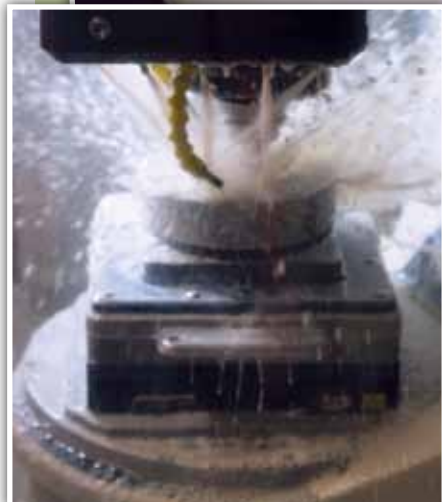
LOFTHOUSE'S NEWEST five axis machine is the Mikron HPM 450U from GF Machining Solutions. The machine is equipped with seven pallets and a 20,000 rpm spindle. The new machine's greater workholding capacity allows unattended machining of dies to meet increased demand from Lofthouse's customers.

X axis:	600 mm (23.62 in)
Y axis:	450 mm (17.72 in)
Z axis:	450 mm (17.72 in)
Work table Ø:	280 x 280 mm (11.02 in)
Spindle:	20,000 RPM
Tool shank:	HSK-A63
Max tool capacity:	220 tools (with external toolchanger)
Max workpiece weight:	150 kg (331 lb)
Cutting feedrate (X·Y·Z):	15 m/min (590 ipm)
Rapid traverse (X·Y·Z):	22 m/min (1,260 ipm)
Control:	Heidenhain iTNC 530

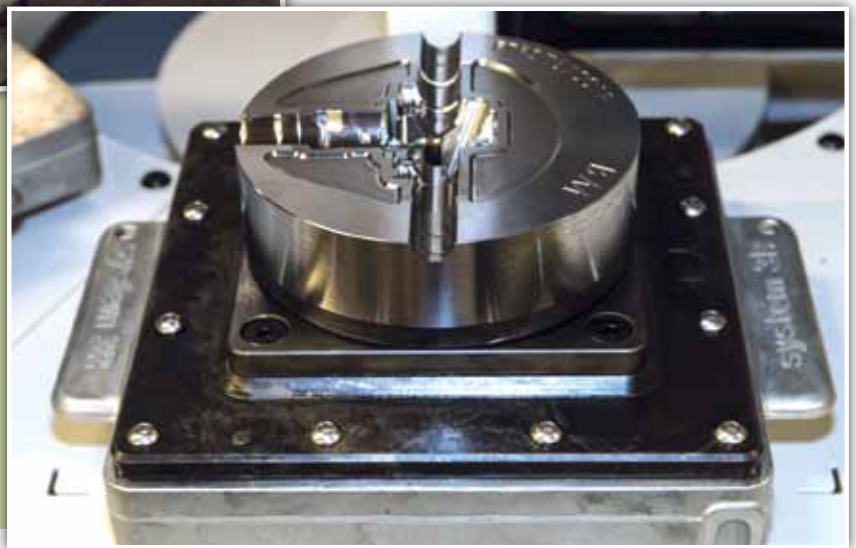
Just getting started

It's clear that Lofthouse has grown far beyond its original vision. From a garage-sized facility making non-ferrous forgings for the plumbing market, it is now a key supplier to the automotive, electrical, recreational vehicle, and other industries. And yes, Lofthouse still makes valves, millions of them each year – in fact, the company is a major exporter, and sells more than 95 per cent of its products into the US, Mexico, and German markets each year. “The mandate from Brawo is for Lofthouse to be the most technologically advanced forging and machine shop in North America,” says Miller.

What's so tough about making accurate high volume forgings? Consider this: each billet of brass or aluminum is heated to approximately 700°C (1,292 F) before being placed in a forging die, where it receives a single hit of up to 700 tons. The part is then moved to a trim die before being finish machined in one of Lofthouse's rotary transfer machines. Miller says the company is like a job shop on steroids, producing 100's of different part numbers in lot sizes ranging from 1,000 pieces to 100,000 or more.



Lofthouse's newest Mikron, the HPM 450U, equipped with a 20,000 rpm spindle and seven pallets, has greater workholding capacity, which allows for unattended machining of dies to meet increased demand from customers.



MACHINING | Five Axis

It's a high-tech manufacturing company. Lofthouse's newest forging press is able to hit at 1400 strokes per hour. Its Gnutti and BTB transfer machines perform dozens of simultaneous metalworking operations, automatically moving hundreds of parts each hour. Parts and tooling is measured on Zeiss continuous-scanning CMMs. State of the art technology, to be sure, but all of it starts with the forging dies produced on Lofthouse's Mikron five axis high speed machining centres.

Forging dies 101

Lofthouse bought its first Mikron in 2008, an HPM 1350U machining centre. Miller says forging dies begin with a blank of 60 HRC pre-hardened tool steel. Depending on the size, each is machined to size in a single operation. Because of the Mikron's extreme accuracy, no EDM is needed for finish machining. Nor is any polishing required, and the dies can be put directly into service. After every 100,000 or so parts, dies are typically sent back to the Mikron for re-machining, where the entire form is sunk another 1.5 mm (0.06 in.) or more if needed.

Lofthouse's newest Mikron—an HPM 450U—has seven pallets and a 20,000 rpm spindle. The new machine's greater workholding capacity allows unattended machining of dies to meet increased



Robert Miller, top image, has known Lofthouse for eight years and is proud to now be part of the company. "I can tell you without a doubt that this is manufacturing at its best."

www.gfms.com
www.lofthouse.ca
www.machinetoolsystems.com

demand from Lofthouse's customers. Sean Smith, sales manager at Machine Tool System in Mississauga, the exclusive Canadian distributor for Mikron, says the HPM is equipped with 3R Dynafix chucks for two micron (0.0008 in.) repeatability, a Blum laser probe with automatic tool calibration and compensation, redundant tool capability, Schunk toolholders, and integrated programming and toolpath verification from CAMplete. "Together, these functions give shops the ability to repeatably locate parts every time, improve part quality, and run completely lights out," says Smith.

Out of the dungeon

Miller agrees. "Many think of forging shops like they're some sort of dungeon, dirty dark places no one would want to work," he says. "But we've taken all the black magic out of forging. Our shop is clean, the processes are fine-tuned, and we're now a leading edge manufacturer. The equipment and capabilities we have are enough to blow your mind."

People are taking notice. Miller says the company is one of three finalists in Canada's exporter of the year award, and is headed to Mississauga soon to hear the results of the competition. "I've known Lofthouse for the past eight years, but have only been working here for the past eight months," he says. "I once sold machine tools and have been all over the country; I can tell you without a doubt this is manufacturing at its best. I'm very proud of the Lofthouse team and what we do here." SMT