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Shop

Metalworking Technology

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Sustainable Machining

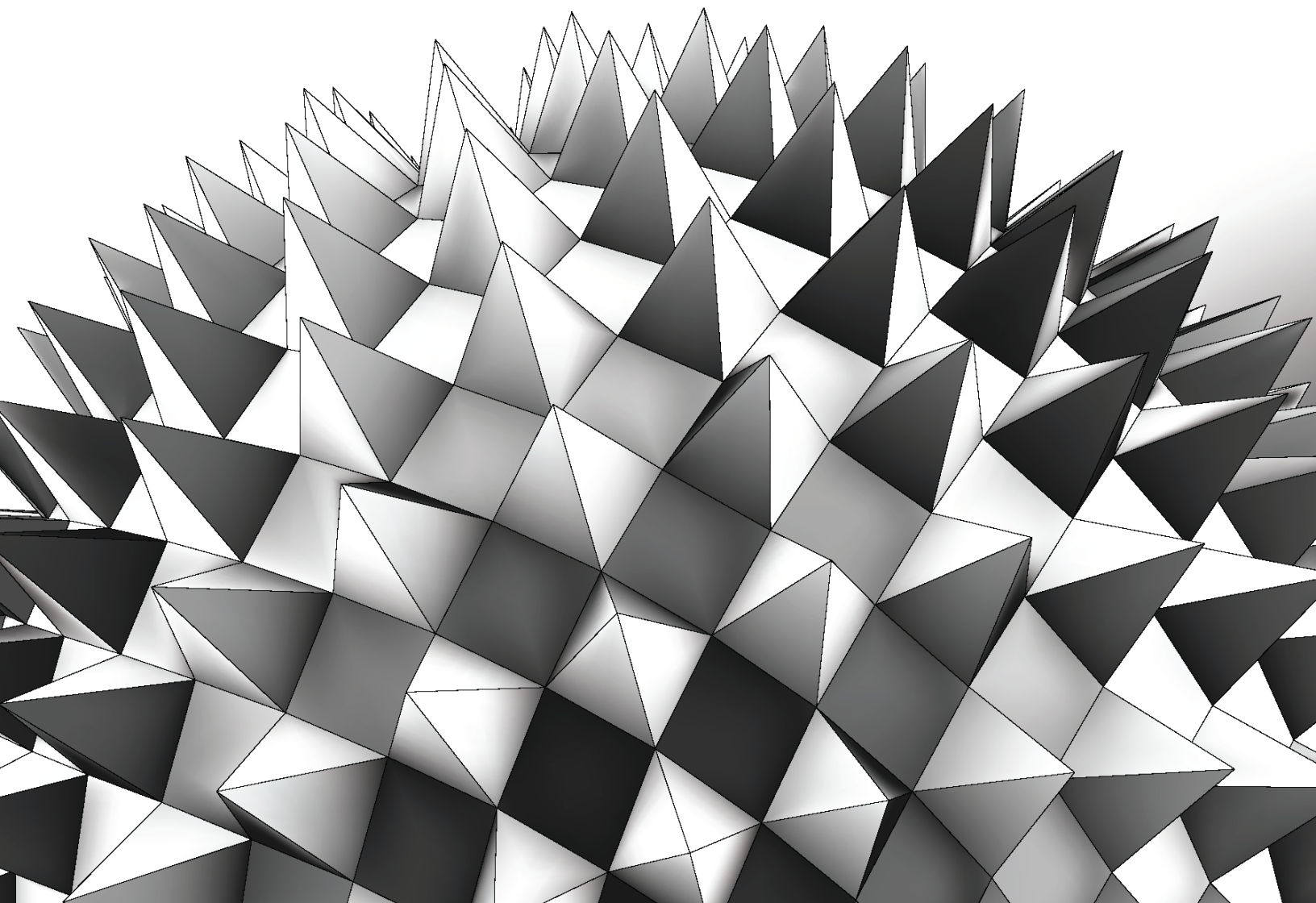
40 CUTTING TOOLS
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CWB's 100th Anniversary

A New Era¹²

Metal additive is about to jump from the lab to the shop floor



KEEP IT CLEAN

Environmentally-friendly manufacturing is not just good for the planet; it's also good for a company's employees, productivity and bottom line.



Climate neutral: Customers worldwide will receive completely climate-neutrally produced machines from all DMG MORI production plants. DMG MORI

BY KIP HANSON

Concerns over climate change and the environment have spawned numerous green initiatives throughout Canada and beyond. For example, the Department of Natural Resources has developed strategies to create everything from clean hydrogen to clean infrastructure, electricity, and jobs. And even though the notion of green machining or green sheet metal fabrication doesn't yet carry much weight for many manufacturers, the fact remains that our future as a species depends on sustainability.

Shop Metalworking recently spoke with representatives from three companies that agree with this vital concept, and gathered some insights into the hows and whys of going green.

Green Machine Tools

Dr. Maurice Eschweiler, chief representative of DMG MORI Aktiengesellschaft, notes that sustainability has always been an important topic for the machine tool builder, long before becoming a focus

of global attention. In December of last year, the company announced its intent to manufacture all machines in a “completely CO2-neutral” manner by January 2021. It has developed three programs — GreenMachine, GreenMode, and GreenTech — that support this goal, and help its customers do the same.

“DMG MORI's own value creation is completely climate-neutral, and the upstream processes along our supply chain as well,” says Eschweiler. “We increasingly evaluate and select suppliers based on sustainability criteria, relying on digitized processes to enable the transparent recording of emissions, then support our suppliers in reducing them. It's also important to point out that our customers do not pay extra for a GreenMachine—this is our new corporate standard, and we are taking on responsibility for the environment.”

Eschweiler explains that sustainability is a topic of global relevance, adding that there are many ways to become more sustainable. Most start with small, low-cost measures that can make a big difference — green electricity, for instance, as well as the use of durable, highly productive machine tools that reduce waste. The energy consumption per manufactured part and the machine's carbon footprint over its entire lifetime are also key factors.

“With our ‘First Quality’ campaign, we strive to ensure that our products remain in service for up to 30 years or even longer,” he says. “In this way, we avoid waste and conserve resources. We also focus on using a high proportion of recycled and recyclable resources in our machines, and use energy-efficient, state-of-the-art components wherever possible — for example, we were able to decrease energy consumption in our DMF 200|8 traveling column machine, introduced in 2020, by around 25 per cent compared to its predecessor.”



Machining with minimum quantity lubrication (MQL) is not only good for the environment, it's good for productivity and tool life. DROPSA USA

DropsA

MAXTREME
MACHINE TO THE EXTREME

MQL

A DropsA MQL Solution;

- Completely removes coolant from a facility's machining process.
- Extends tooling life.
- Improves upon the final finish of the product.
- Produces a dry chip for easy disposal and a dry finished part.
- Speeds up production and decreases down time.
- Reduces lubricant waste through minimum quantity lubrication processes.
- Is available for external or through-tool machine applications.
- Can be retrofitted to utilize existing machine coolant lines for simple installation.
- Has no moving parts, therefore, is virtually maintenance free.



Green Lubrication

Ryan Mikolasik, marketing manager at lubrication system provider DropsA USA, offers numerous reasons why shops should switch to minimum quantity lubrication, or MQL, energy savings chief among them—compared to a 7 kW (10 hp) coolant pump at 80 bar (1160 psi), an MQL system saves roughly \$3500 annually in electricity expense. In addition:

- Up to 15 per cent of overall machining costs are directly related to cutting fluid. MQL greatly reduces this figure.
- Routine checking of concentration levels in emulsion-type cutting fluids adds approximately \$650 per year to machine operating costs.
- MQL eliminates the need for filtration units, chillers, chip

dryers, coolant disposal, and associated handling costs.

- And because MQL delivers smoother surface finishes and longer tool life than traditional cutting fluids, the machining cost per workpiece is generally lower.

According to a study conducted with a leading European equipment supplier, the total operating costs for a typical machine tool over a ten-year span are up to 18 per cent lower when running MQL, due to reduced energy and fluid consumption, improved tool life, and the reclamation of floor space that would otherwise be needed for fluid handling equipment.

“MQL can also be used with cutting fluids that are much more environmentally friendly than traditional

oils and emulsion-based fluids,” he said. “In our case, we recommend a proprietary mix of grapeseed oil that’s blended with various additives. It contains no harmful VOCs (volatile organic compounds) so is healthier for the environment as well as the machine operator. In addition, it’s proven to be highly effective when utilized with our MQL dispensing units.”

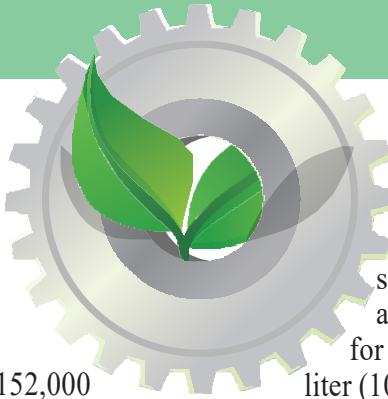
Green Manufacturing

And then there’s Skyline Zipline Ltd., a vertically-integrated zipline manufacturer whose owner Kevin Smith “has always been passionate about the outdoors and wanted to minimize our impact on the environment.” That’s from marketing and business relations manager Noah



SERVICING & SUPPORTING





Smith, who says the company prides itself on minimizing its ecological footprint wherever possible, and reuses, refurbishes, or recycles many of the components used in its 152,000 m (500,000 ft.) of zipline installations.

Smith offered an impressive list of green technologies leveraged in the “ultrapassive construction” of the company’s facility in British Columbia. Among them are an 8 kW solar array on the roof, one that’s already large enough to power the machine shop but will soon be expanded to 16 kW. And to store any excess electricity not sold to the regional power grid, there’s a Tesla wall onsite that also

acts as a backup system in the event of a power failure.

Aside from housing solar panels, the roof also collects rainwater for storage in a 38,000 liter (10,000 gallon) reservoir, which is used to irrigate the plants and green space around the site. High efficiency appliances and LED lighting are installed throughout, and the largely underground building itself was constructed with extra-thick walls and triple-pane windows. Says Smith, “We’re so energy efficient that it can actually get too cold in the summer and too warm in the winter.” He laughs. “It’s not a bad problem to have.” **SMT**



A drone's-eye view of Skyline Zipline's earth-friendly facility in British Columbia. **SKYLINE ZIPLINE**

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