

Cosmo delivers fibre laser cutting solution

African Fusion talks to Petrus Pretorius, General Manager of the Cosmo Group, and Johan Griesel, General Manager of Pretoria-based steel construction specialist, Jubilee Suppliers, about the state-of-the-art 6.0 kW Jinan Acme/Max Photonics fibre-laser cutting system recently installed in Jubilee's Pretoria workshop.

Founded in 2021, Jubilee Suppliers is a manufacturer and construction specialist in structural steel installations in South Africa and across Africa. "I completed my apprenticeship as a fitter and turner in the mining industry, but mining wasn't for me, so I joined my father in his construction company," Johan Griesel tells *AF*.

"I grew up on a farm, though, where I developed a love for working with steel, cutting and welding to make all kinds of structures for the farm. In 2001, my wife and I opened a new steel construction and contracting company, which we ran until 2021 when we stepped up again to form Jubilee Suppliers to be able to broaden the variety of products and services we could offer," he adds.

Laser cutting at Jubilee

From a fabrication perspective, Jubilee receives structural steel detailing, typically as DWG CAD files, which are then used to cut and fabricate the components needed for onsite construction. Accuracy is imperative to ensure on-site construction proceeds without delay. "We strive to ensure that the steelwork we manufacture can be assembled onsite like a Meccano set. Whether

bolted or welded, every individual piece of the final construction must be joined securely to the surrounding pieces," notes Griesel, adding that the starting point for achieving this is precision CNC laser cutting.

On the laser, Jubilee typically cuts base and connection plates, brackets and flange cleats, which are then welded onto cut-to-length steel channel sections. The completed component set is then shipped to the site for the erection of the steel structure.

"In one section of our factory, we also manufacture, under licence, a patented grid for storm water drainage. The ones currently being manufactured are destined for use on the runways at Dar es Salaam Airport. The bars are precision-cut with slots, assembled into a grid, and then welded at the end of each bar to secure the grid structure.

"We then fasten these grids into a cast frame using snap-off bolts – to prevent theft once they are installed – before sending them to be galvanised. The result is a very strong grid structure capable of carrying a significant load (up to 1 000 kN), including a Boeing jet passing over them on take-off and landing.

"These grids are very intricate structures

that we could not manufacture without the accuracy of our laser cutters," Griesel points out.

The 6.0 kW Jinan Acme CNC cutting system

The new laser recently acquired from Cosmo Group is a 6.0 kW Acme laser with a Max Photonics fibre-laser cutting head.

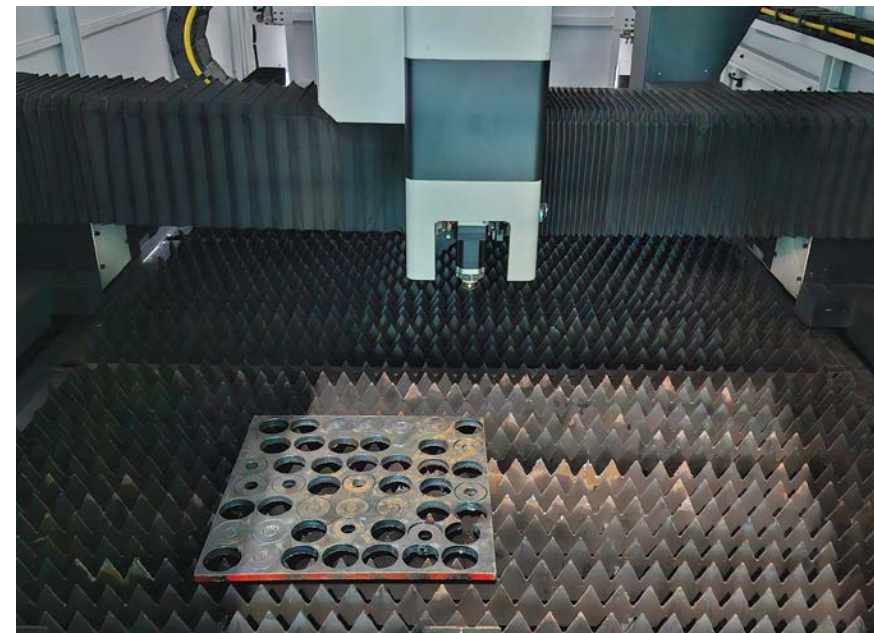
The fully closed unit, featuring a 3.0x1.5 m double exchange table, boasts a heavy-duty, stable structure for accurate performance and a design life of over 100 000 hours. A high-strength cast aluminium gantry with a double-drive structure carries the laser welding head, enabling high cutting speeds.

Most notable about this system is its double-exchange worktable, featuring a fully enclosed laser-cutting area. This enables the machine to be safely unloaded and reloaded while the previously loaded plate is being cut. Once a cutting cycle is complete, the worktables are exchanged again, minimising delay between cycles.

A CypCut/Beckhoff CNC cutting control system supports flexible production and easy operation, while imported high-precision transmissions and servo systems ensure precise cutting and efficiency. The machine's enclosures and safety guards all meet CE safety standards, ensuring operator protection at all times.

Key features included in the Jinan Acme fibre laser CNC cutting systems range include:

- **Double exchange tables:** Two automated work platforms enable alternate operation. While one table is cutting, the operator can load or unload material on the other, providing a continuous workflow and eliminating the downtime traditionally associated with material handling.
- **High efficiency and speed:** With the dual-table setup, Acme's machines can boost production efficiency by up to 40%, with table exchange typically tak-



When using oxygen, the 6.0 kW Max Photonics fibre-laser cutting system can deliver a 24 mm cut with exceptional cut quality.

- ing between 15 and 25 seconds.
- **High-power fibre laser sources:** Jinan Acme uses reputable fibre laser sources from brands such as IPG, Raycus and MAX Photonics, with power options ranging from 1.0 kW to 30 kW. This allows for faster cutting speeds and lower operating costs compared to traditional CO₂ lasers.
- **Material versatility:** The systems can cut a wide range of sheet materials, including carbon steel, stainless steel, aluminium, copper and galvanised steel, in various thicknesses.
- **High accuracy and repeatability:** Precision engineering and a sturdy, anti-deformation machine body ensure a high degree of accuracy. The system typically offers positioning accuracy of 0.03 mm and repeatability of 0.02 mm.
- **Full protective cover:** Many Acme systems include a fully enclosed cover that meets safety standards such as CE and FDA. This protects operators from laser radiation, cutting debris and noise.
- **Automated operations:** The machines have advanced CNC control systems that are easy to operate and reduce the need for manual intervention. They can also feature automatic focus adjustment on the cutting head, which optimises cutting conditions for different material thicknesses.
- **Automatic nesting software:** Integrated software optimises the cutting path and layout of parts on a sheet to maximise material utilisation and minimise waste.
- **Safety interlocks and fume extraction:** An enclosed cutting area, along

with automatic fume extraction, emergency stop functions and safety interlocks, guarantees a safer working environment.

- **Heavy-duty welded frame:** The machine body is constructed from high-quality, whole steel plates that are welded and then heat-treated to ensure exceptional stability and resistance to deformation over a long service life.
- **High-precision transmission:** Quality components from international brands such as Yaskawa and Panasonic servo motors and Taiwan-manufactured guide rails, gears and racks ensure smooth, reliable and precise movement.
- **High-quality cutting head:** The systems use auto-focusing laser cutting heads from brands such as Raytools and Precitec, which feature a double-layered, contamination-proof design to protect the lens.

"From our new 6.0 kW Acme laser cutter, we can achieve a high-quality cut in a carbon steel sheet up to 10 mm thick using compressed air as the assist gas. And when using oxygen instead, we can go up to 24 mm while still achieving exceptional cut quality. We tend not to push our machines to their maximum, though, so this machine will be used for cutting material between 16 and 20 mm thick," says Johan Griesel.

The first set of components to be cut on the machine? "We are building a luxury lodge in the Kruger Park at the moment, and we will be cutting the base plates, cleats and other components starting from next week. We expect it will take five or six sheets of 16 mm plate for all the components we need," he adds.



Jubilee Suppliers manufactures, under licence, a patented grid for storm water drainage. The bars are precision-cut with slots, assembled into a grid, and then welded at the end of each bar to secure the grid structure.

The future of laser cutting

Petrus Pretorius says Cosmo Group is seeing strong demand for laser-cutting and welding equipment in South Africa. "We have ordered three more of these Acme fibre laser cutting systems for our new showroom, which we will open next year, so that customers can come in and see what we can do for them.

The one that Johan bought was actually supposed to be one of these, but he bought it before it reached our warehouse," he says, adding that, at the time of writing, the other two were due to arrive in the next week or so.

"The intention is to showcase the 3.0 kW and the 6.0 kW versions, each with a 3x1.5 m exchange table, and a 3.0 kW CNC laser system with an open 3x1.5 m table, which has a smaller footprint," says Pretorius.

When asked about the current state of modern CNC fibre-laser technology compared to CNC plasma alternatives, he notes that, cost-wise, laser cutting is now approaching the cost of plasma cutting systems and is, in fact, cheaper for thinner plate sections. "This Acme CNC system can be fitted with a 30 kW fibre laser, which can cut through 80 mm material, which is potentially competitive in terms of costs on thicker sections as well," he points out.

Handheld laser welding machines are also gaining popularity. "By mid-January, we will receive 10 laser welding machines as well. We can't get enough of these new handheld machines, which are proving highly effective in modern fabrication shops," Pretorius concludes.

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Jubilee Suppliers' new 6.0 kW Jinan Acme CNC cutting system, recently acquired from Cosmo Group, features a Max Photonics fibre-laser cutting head, a 3.0x1.5 m double-exchange worktable, and a fully enclosed laser-cutting area.