Salvagnini's laser cutting machines enhance sheet metal processing

L3 and L5 fibre laser cutting machines are consolidated systems in the market. In line with the Salvagnini tradition, they are constantly perfected with the introduction of new hardware and software solutions.

With its progressive shift from a make-to-stock strategy and from the economic batch to a lean, make-to-order, just-in-time strategy, the modern economic and industrial context has been driving Salvagnini's product development for some time.

The two Salvagnini laser product lines are both based on fiber technology: L3, a versatile system intended for transversal use, whatever the applications, materials and thicknesses, and L5, a highly performing, high-dynamic system for thin and medium-thin material. The adoption rates of the L3 and L5 vary according to the customer's industrial sectors but, above all for the L5, we can identify an interesting trend: the choice of relatively low powers, precisely in those sectors where thin sheet metal is used the most, demonstrating that increased power is not always the best answer. And it is particularly interesting that this is confirmed by the customers themselves, when seeking the most suitable solutions for their own sector and their own needs.

However, Salvagnini has also extended its cutting power range, introducing first a 6kW high-density power source, and then a 10kW source. This extension has benefited the L5: its high dynamics have further improved the cutting speed reached by more powerful sources. From early 2021, both product lines will have higher XY positioning speeds.

So, the L3 and L5 are both consolidated systems in the market but, in line with the Salvagnini tradition, they are constantly perfected with the introduction of new hardware and software solutions.

"In this sense, we have focused on three main trends," explains Pierandrea Bello, Salvagnini Product Manager for laser technologies. "The first is that of simplification, developing easy-to-use, lean solutions allowing operators to effortlessly solve some of the everyday problems involved in their work. This category includes for example a series of artificial vision devices, including the recent

Salvagnini's L5 fibre laser cutting machine
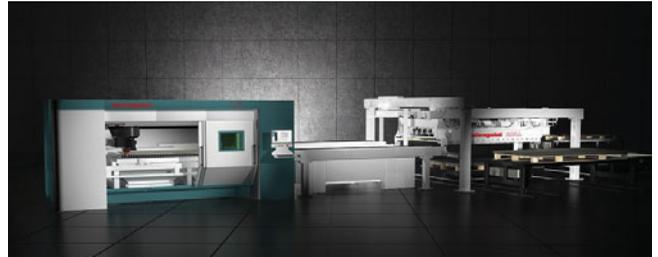
Salvagnini's L3 fibre laser cutting machine

addition, the NVS (Nozzle Vision System). The second area is that of automation, which helps to recover significant efficiencies. The third is that of process optimization, to improve overall factory performance through digitalization and OPS, the modular production management software."

Solving problems with artificial vision

For some time, Salvagnini has been developing and implementing artificial vision applications on its systems, allowing operators to effortlessly solve some of the everyday problems involved in their work. These lean, easy-to-use solutions have the advantage of increasing flexibility and extending the sectors of laser cutting applications.

"To accelerate sheet metal centering, and to allow centering even on parts that have already been punched or pre-holed, we have introduced the AVS," Bello explains. "The AVS can transform laser cutting into a downstream work station after punching. Then we focused on the SVS."

The SVS, acronym for Sheet/Scrap Vision System, helps to re-use sheet metal leftovers - the residues of previous machining which are often used for samples, to make urgent parts of different sizes, in single batches, and to replace any machining scrap after cutting. Directly on the machine, the SVS calculates a dxf to use as the starting sheet for quick, easy and error-free nesting of the new parts to be cut. The SVS is supplied combined with STREAMLASER on Machine, the on-board version of the Salvagnini CAM.

"The SVS comes in two versions," Bello continues. "SVS1, which has a single camera focusing on the leftover and a working range of 1600x1500mm, and SVS2, which uses two cameras and has a much larger working range of 3000x1500mm. The latest innovation is the NVS, acronym for Nozzle Vision System. The NVS checks the centering of the laser beam and the state of the nozzle, solving various imprecisions in a truly rapid and intuitive

Salvagnini's artificial vision devices, like NVS (Nozzle Vision System), allow operators to effortlessly solve some of the everyday problems involved in their work

manner. With the machine learning algorithms applied, it can suggest solutions that help to reduce waste."

Automation for recovering efficiency

In the world of laser cutting systems, automation plays an increasingly important role. On one hand, the cutting speeds achieved today have shifted the attention of many companies in the sheet metal sector to the phases immediately up- and downstream of the actual cutting: unloading and loading often risk becoming dangerous bottlenecks. On the other, automation can help reduce the impact of labour costs.

"Obviously, both perspectives are correct," Bello resumes. "But, in our vision, what is truly decisive is the positive impact automation has on the efficiency not only of the individual machining phases but of the production process as a whole."

Because system configurations can have a decisive impact on efficiency.

"With LINKS, our IoT solution that continuously monitors the data from systems connected all around the world, we have assessed the efficiency of their configurations, analyzing the many variables that come into play, such as the type and weight of the sheet metal used and the material handling and waiting times. The results of this study are remarkable: while stand-alone solutions have an average efficiency of around 60 per cent, automated systems have much higher efficiency values, reaching 80 per cent or even 90 per cent, if we consider the LTWS store-tower," Bello explains.

Automated loading/unloading coupled to a store-tower is an enabling factor for increasing the autonomy of the cutting system, as it makes different materials and thicknesses available continuously for just-in-time machining, reducing waiting times due to sheet metal feeding. Above all, in production contexts marked by low volumes and rapid production changes, combining the store-tower with automatic loading/unloading devices is a winning strategy.

"And if we add an automatic sorting solution to the loading/unloading device, we can also regain efficiency

not just in the cutting phases but also in the machining phases after cutting," Bello continues. "In this sense, our LTWS store-tower with MCU sorting is very interesting. The store-tower can manage different materials, thicknesses and sizes, reducing waiting times and making the loading/unloading phases extremely fast, indeed 50 seconds. Moreover, the software controlling the store-tower is able to identify the trays loaded with the sheet metal to be machined, when empty, as trays used to stack the machined material, thus increasing the operating autonomy of the store-tower, thanks to dynamic tray management. The MCU sorting device can cleverly stack parts of different shapes, sizes and weights, in multigripping mode, thus allowing several parts to be picked up by the same gripping device. Automatic sorting considerably facilitates the work of the operators, who can pick up the parts already stacked without having to separate them, thus greatly reducing the waiting times between the end of cutting and the start of the next phase. But sorting can also make single parts available for downstream machining in urgent cases, or in some cases can physically integrate the laser system with panel benders or robotized bending cells downstream."

Complete, modular product range

The Salvagnini laser automation range has always been very wide and modular, and each system can be configured differently to suit different production needs. Today the whole range has been updated, not only to respond to practically all layout and configuration needs, but above all the need to reduce loading/unloading times even further. While faster cutting speeds have reduced cutting times, Salvagnini automation has naturally evolved as a consequence.

The new ADLU connection automates the sheet metal loading and the machined sheet unloading phases, with a cycle time of less than one minute. It is equipped with a suction-cups loading device and independent forks unloader, and is naturally set up for integration with the MCU or with any tray store if required. ADLU is also a flexible solution in terms of layout, because its floor-based structure is modular and can be adapted to the available spaces in the workshop. At the same time, ADLL, the Salvagnini connection with performance similar to the ADLU, but used in longitudinal configuration and which

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