

**ISMR SAYS:**  
"Laser cutting from coil offers a host of benefits and efficiency savings for manufacturers"

The advent of the high power fibre laser has strengthened the case for lasers as a potential alternative to blanking presses, particularly for the processing of high strength materials

## LASER FROM COIL

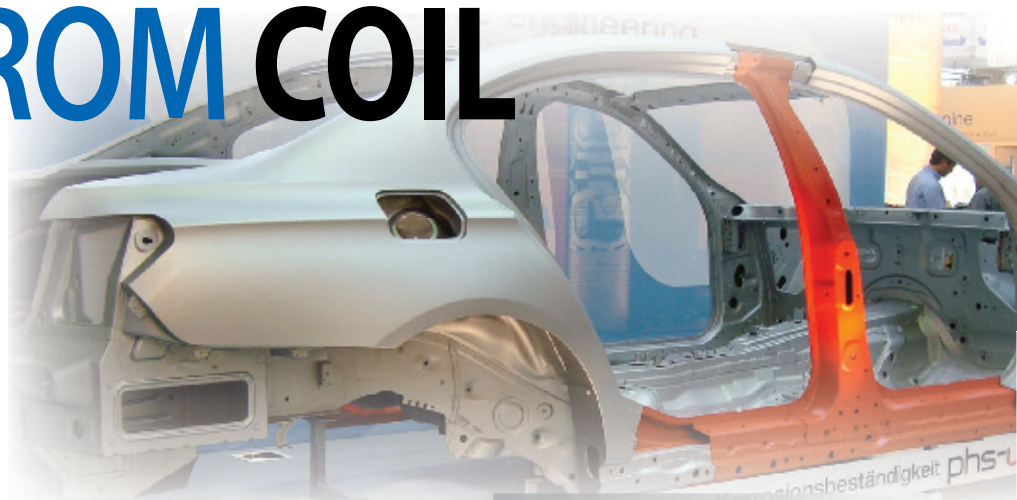
**I**RON has built a niche for itself as a flexible partner and creator of special and complex coil processing, punching, bending, stamping and blanking lines. Established in 1969, the family-run company manufactures a range of cut-to-length lines, slitting lines, forming, punching, stamping, bending and flexible integrated sheet metal working solutions.

It is determined to continue serving and expanding its European customer base by continuously innovating its product lines and services to customers. Its strategy emphasis on high value manufacturing and special projects means, as its director Massimo dalla Pace explained to ISMR, 'continually developing new products, new lines and new projects – coping with new challenges every day'.

### LASER CUTTING FROM COIL

There are many special projects that are close to Dalla Pace's heart but none more so than laser cutting from coil. IRON has, in the past, developed laser cutting from coil lines for automotive applications which require rapid line speeds (typically 35 strokes per minute).

The advent of the high power fibre laser has strengthened the case for lasers as a viable alternative to blanking presses for large volume production, particularly for the processing of high strength materials. Laser blanking can use nests from



Above: The laser can be a viable alternative to the blanking press for volume production

wide coils and still yield improved material utilization rates (vital for industries, such as automotive, where scrap costs need to be reduced). Coil slitting is no longer needed when laser blanking, which reduces another stage of operations.

"There are many reasons why customers should consider laser cutting from coil," Dalla Pace told ISMR. "There are no tooling issues (no tool set-up times, no tool maintenance etc.) and it is a more efficient process than using a press, as it consumes less power and less space. For example, with a blanking line of 1250 tonnes, you typically consume around 500kW of power. Laser cutting from coil typically consumes around 100kW of power – far less energy. You can use up to 4kW of power in the laser cutting head. There is also more flexibility in the overall process and less material is used (for greater cost savings)."

The challenge is to design lines that can cope with higher strength materials (e.g. high strength steels, which are widely used in the automotive sector) and different material types (i.e. aluminium, titanium etc.).

Dalla Pace's original concept for a laser cutting from coil line, for automotive applications, was based upon a static cutting head and dynamic material, with the laser running at 1.5m or 2m width, depending upon the width of the material, to guarantee constant quality of cut across the length. The principle echoes that of the hybrid laser, giving full control across the sheet material. That concept has evolved and been refined over time to the current iteration of IRON's TEMNOS line.

Multiple operations on specialized lines, including punching, are IRON's speciality. It recently developed a new concept line for flexible punching and bending from coil (FPB) for a new customer in Germany. The



Above: IRON's new flexible punching and bending from coil line

Right: Each head in the FPB features four servo-drive motors





Above: The TEMNOS line incorporates an IPG fibre laser

## “The challenge is to design lines that can cope with higher strength materials”

customized line, for the production of stainless steel cabinets, was delivered in April 2010.

It is a flexible modular and servo-controlled line that incorporates a punch press (with thick turret tooling), a part-turning device (after punching), positive and negative bends on the punched parts and can handle part dimensions ranging from 650mm width x 1500mm length to 1500mm width x 3600mm in length.

### THE TEMNOS CONCEPT

“TEMNOS is a technological evolution in the control of strip feeding in conjunction with laser technology,” explains Dalla Pace. “The technology developed on the systems for the flattening of sheet metal guarantees the strip with the quality of flatness necessary to obtain the best finished product result. The entire system can also trim the edge of the metal directly as an in-line operation. In this way, the entire width of the strip is used and minimises cutting time, thus increasing productivity.”

The line is made up of a decoiler unit, a levelling unit and a fibre laser cutting unit. The fibre laser cutting unit consists of an electronic feeder and a turret, which carries out the transversal motion of the cutting. The characteristic of this line is therefore its ability

to continuously carry out cut machining from strip. The cutting is carried out according to the various types of shapes required on a range of sheet thicknesses (which, for the 4000W-powered version, can range from 0.5 to 2.5mm for stainless steel and up to 3.8mm for mild steel).

Machining is possible due to the combination and interpolation of the longitudinal axis of the electronic feeder with the transversal axis of the head motion. The system is very compactly built and is able to exploit the entire length of the coil, which enables it to cut very large shapes whilst maintaining a maximum width of 1500mm or, in the other versions, a maximum width of 2000mm.

The decoiler has a capacity load of 20 or 25 tonnes with a maximum strip width of 1500mm. The decoiling operation is carried out by an AC motor, equipped with a pressure arm for the automatic threading of the strip end and mounted on a slide for the transversal adjustment, which helps the operator to load the coil. The straightening unit with centralised lubrication is equipped with fifteen counter-rollers power driven by homokinetic joints. An automatic strip feed unit completes the line equipment.

The laser cutting system consists of a fibre

laser source (available in 2000 and 4000W versions) which can cut mild iron, aluminium and stainless steel using a Precitec cutting head. The cutting system has an electro-welded bridge structure, while the moving section, which supports the Precitec head, is made of aluminium to allow rapid operation.

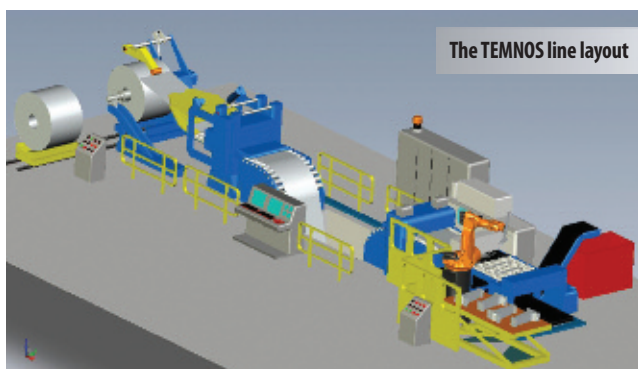
The focusing head control system can adjust the laser power according to the cutting feed rate.

“The demand for this type of system has been expressed not only by companies who already use the laser to cut sheet metal, but also by manufacturers who need to trim edges and cut medium quantities of sheet metal,” said Dalla Pace. “It is also suitable for manufacturers who only have a small amount of specific cut machining and who deal with large surfaces e.g. the production of cupboard drawers, shelves, water heaters etc. Usually, in these cases, there is no time limit for the loading/unloading, while the active time for the machining is limited: therefore, strip is the ideal solution.

“TEMNOS is also suitable for manufacturers who have material storage space problems and, by using coils of various thicknesses, can avoid the issue of storing various sized sheets. The cost of a strip coil is lower than the cost of commercial sheet metal and it is possible to produce shaped parts using the entire length of the strip, because the only limit to the machining is the length of the coil itself. Overall, the savings made between the use of sheets and the use of a coil, taking into consideration various factors, can be between 10-15%.”

The strip, using the same TEMNOS system, can also be trimmed along its edges and the drilled sheets, cut by length, are finally stacked.

“This system is the only one in existence today that allows the operator to directly produce finished sheets, ready for levelling, and starting from coils which are untrimmed. Temnos can therefore be defined as a production line and, as far as economic convenience is concerned, it places itself next in line after press technology,” concluded Dalla Pace. **ISMR**



The TEMNOS line layout

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