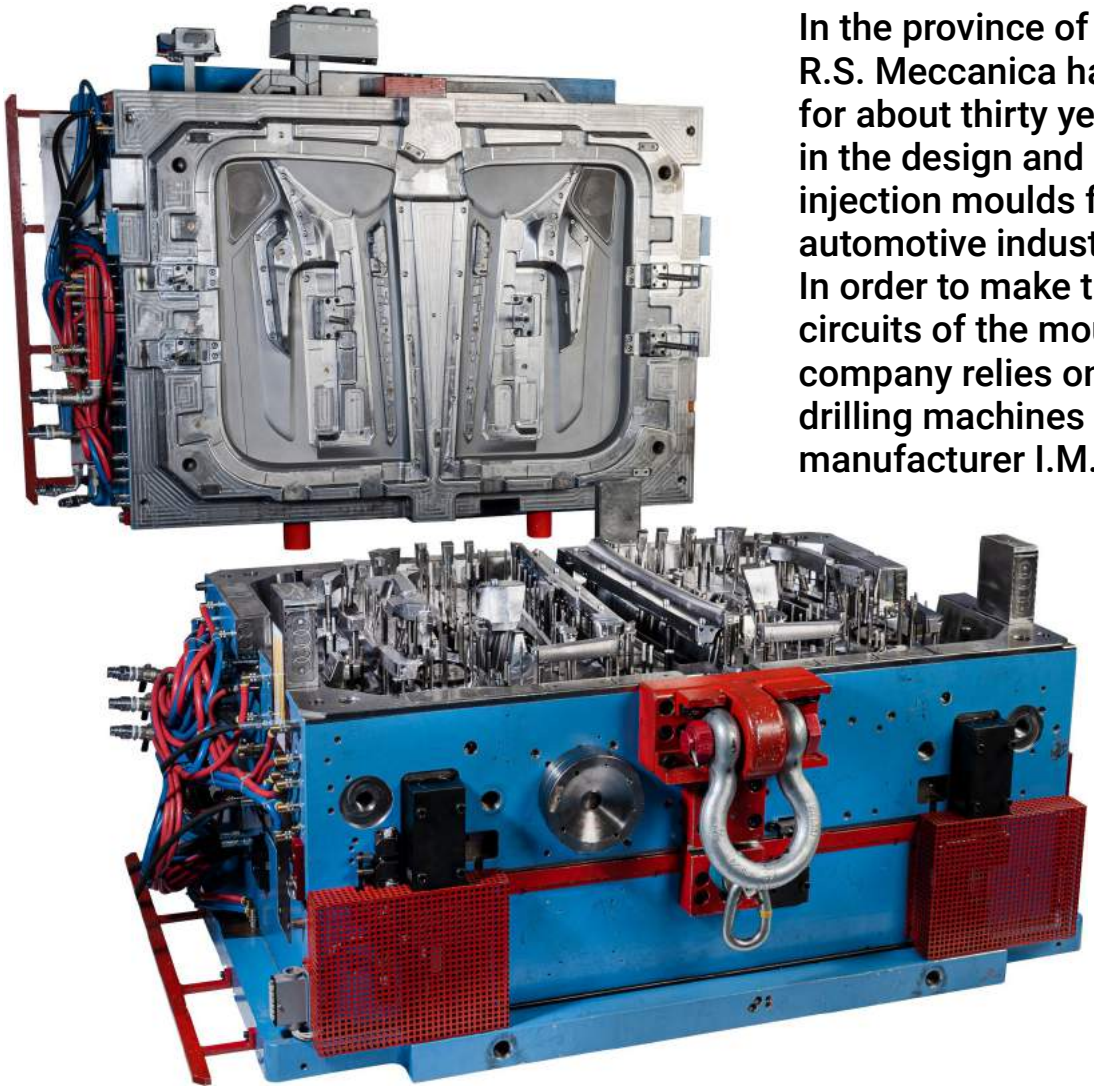
INCREASING EFFICIENCY IN DEEP DRILLING



In the province of Venice, Italy, R.S. Meccanica has been operating for about thirty years, specializing in the design and construction of injection moulds for the automotive industry.
In order to make the cooling circuits of the moulds, the company relies on deep-hole drilling machines from the Italian manufacturer I.M.S.A.

Translation of the article published by the Italian technical magazine "Costruire Stampi" (mold making), November 2021.

12 **Minutes** READING TIME

When the mould is complex and difficult to put into production, R.S. Meccanica, a company founded in 1992 in San Stino di Livenza (Venice, Italy), offers customers a high added value.
“We specialize in the design and production of moulds for plastic materials that fit into the production process of the most prestigious automakers on the market,” says Gianni Sandrin, General Manager and owner of the company along with six other partners: Michele Boatto, Renzo Sandrin, Silvano Mazzon and Luigino Rossi, Equipment Managers; Roberto Moro, Administration/Purchasing Manager; Eligio Rossi, President/Commercial Manager.
R.S. Meccanica was born and developed from the initiative and the entrepreneurial courage of a group of expert partners who all worked in the same mould manufacturing company.
“The founding partners are still present in the company and active in the individual stages from design to production, giving their continuous contribution of know-how,” emphasizes Sandrin.
Over the years, thanks to continuous investment, the company has grown steadily, now having 35 employees, including partners.

Strong experience in the automotive industry

The current orientation of R.S. Meccanica is dedicated to the construction of complex moulds of medium and large dimensions (up to about 2,100x1,500x1,600 mm) for the automotive sector: two-component, over-injected, sandwich, tandem, rotary, rotary cube, compression injection.
“Depending on the size of the equipment, we are able to build twenty to forty moulds per year. For the automotive sector, we make both parts for interiors (from doors to decorations) and exteriors, such as grills,” says Sandrin.
R.S. Meccanica operates mainly in the foreign market, where it achieves most of its turnover. “We work with important international clients, especially in Germany, Sweden and lately in Spain,” says Sandrin.

From design to mould testing

The Veneto-based company is able to provide customers with a complete service, starting from the design to the testing of the mould.
“Technology, innovation and experience are made available to our customers so that they can achieve the quality required in the business-to-business chain,” Sandrin says.
R.S. Meccanica has machinery and equipment in line with the latest technologies: milling machines and 5-axis high-speed machining centers equipped with pallet changer, wire and die-sinking EDM systems, deep drilling centers and classic workshop machines and equipment.
“Our goal is to work as much as possible unmanned, at night and on weekends, so it is essential to have the latest generation of machines equipped with tool magazines and pallet change systems,” Sandrin emphasizes.
The technical office is equipped with CAD/CAM stations as well as CAE software capable of simulating the widest range of processes for injection moulds.

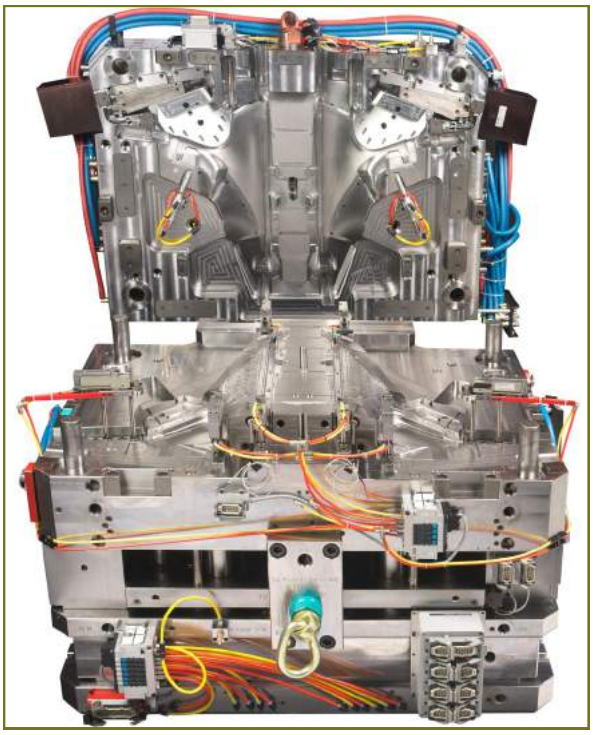
||| The IMSA MF1300/4P EVO deep hole drilling center installed in the tooling shop of R.S. Meccanica.

||| The seven founding members of R.S. Meccanica.

Pioneer in Industry 4.0

A strength of R.S. Meccanica is the ability to monitor internally the entire production cycle of the mould. “In this way, in addition

||| View of the production departments.



||| R.S. Meccanica manufactures medium to large complex moulds.

to meeting delivery times, we are able to guarantee the highest quality of the mould. Only the mould testing activities are carried out externally, at a trusted company in the area," explains Sandrin.
A theme that is always topical is that related to Industry 4.0 and in this area R.S. Meccanica has been in business for several years now.
"In order to effectively manage our machines, we equipped ourselves years ago with management software that can accurately plan production," Sandrin explains. "When the benefits related to Industry 4.0 began, we purchased a new machining center and certified it as we were already ready."

For drilling complex cooling circuits

When building extremely complex thermoplastic moulds, the conditioning circuits must also be proportionate and adequate to the moulding requirements. And it is for this reason that R.S. Meccanica relies on the solutions of the Italian manufacturer I.M.S.A.
"Our first deep-hole drilling machine was the IMSA 1500BB model, purchased in 2002, and still in operation today. It is one of the first large gantry machines made by I.M.S.A., equipped with a 20-ton table and 3,000x1,500 mm strokes," Sandrin says. "Before purchasing the machine, we compared it to models from other manufacturers and observed that the design philosophy of I.M.S.A.'s machines is ideal for our business: performance in any vertical position due to the vertical gantry moving column design; double-tilt machining due to the combination of the rotary table and tilting RAM; separate spindles for deep drilling and fully automatic switch milling."
Last year, R.S. Meccanica purchased another I.M.S.A. drilling center, that is the MF1300/4P EVO model, equipped with 4-position drill changer and 60-position milling tool changer.
"Over the past few years, delivery times have become increasingly tight, so it's necessary to eliminate bottlenecks as much as possible," Sandrin explains. "For deep drilling of medium-sized moulds, we were forced to outsource, as we were not equipped with a dedicated machine. We therefore decided to purchase a model expressly dedicated to moulds of this size. The positive experience we had with the first drilling center led us to turn to I.M.S.A. again for the purchase of the MF1300/4P EVO model, installed at the beginning of last year".

||| The IMSA MF1300/4P EVO deep hole drilling center is suitable for working with moulds weighing up to 12 tons.

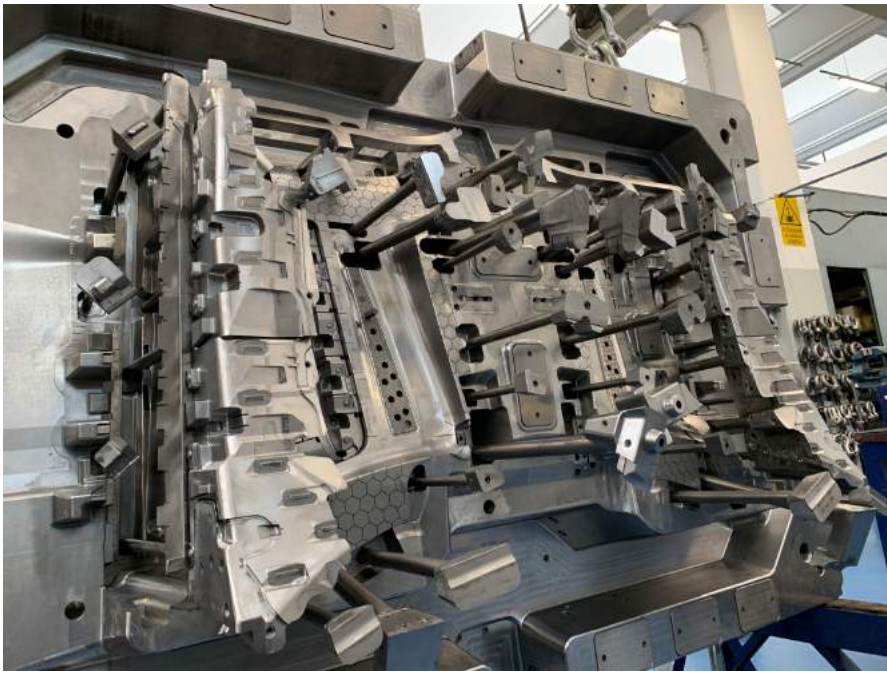
||| The I.M.S.A. gun drill change solution replaces 4 deep hole drilling units each consisting of a gun drill complete with chip box, nose cone bushing, steady rests and ISO 50 spindle holder.

Capable of working 16 hours continuously without operator

The MF1300/4P EVO deep drilling center is especially suitable for tooling shops that need to optimize the profitability of the deep drilling phase. In fact, thanks to the automatic changing system of 4 gun drills, it is possible to drill up to 4 times as much without interruption, or to use different diameters of gun drills.
“Between extraction and conditioning, there is a lot of deep drilling in the injection moulds. Thanks to the MF1300/4P EVO center, we can work up to 16 hours continuously without an operator,” Sandrin explains. “Our goal is to have the machine work unmanned at the same speed it would work with the operator present. For that reason, when we bought the machine, we asked I.M.S.A. for some implementations such as the insertion of cameras to visualize the working area, the addition of bellows to protect the X axis and a double screen. Modifications that I.M.S.A. has reproduced in the models built subsequently”.

A single work piece setup at the center of the table

The MF1300/4P EVO deep drilling center, suitable for machining moulds weighing up to 12 tons, is able to perform deep holes up to 1,300 mm for diameters from 4 to 40 mm from solid. This performance is guaranteed in any vertical position, thanks to the vertical gantry structure that supports the column both at the bottom and at the top (16 times more rigidity than a column guided only at



||| Mould made by R.S. Meccanica

||| The headquarters of R.S. Meccanica is located in San Stino di Livenza, in the province of Venice, Italy.

||| The first deep drilling center purchased by R.S. Mechanics, the IMSA 1500BB model.

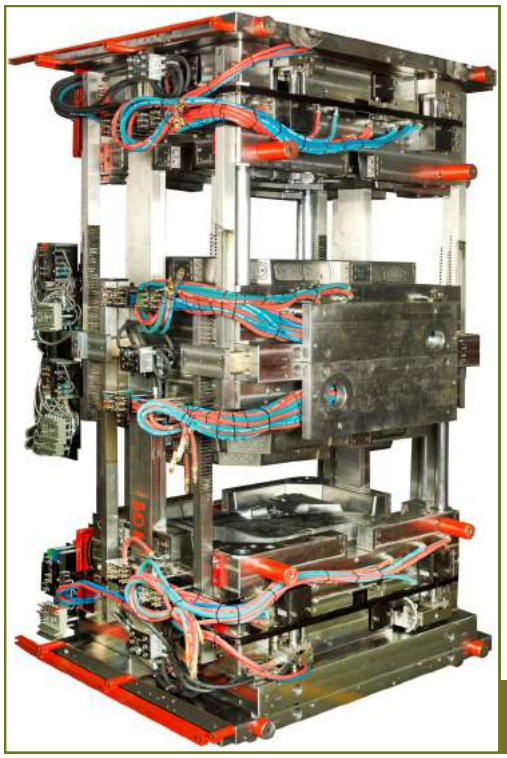
||| R.S. Meccanica is able to work in unmanned mode thanks to machines equipped with pallet changing systems.

the bottom).
Double-tilt machining is also possible, thanks to the combination of rotary table and tilting RAM. The RAM features two separate spindles for deep drilling and fully automatic switch milling.
The MF1300/4P EVO's deep-drilling spindle has an output of 11 kW at 4,200 rpm and is liquid-cooled. Gun drill changer replaces 4 deep drilling units.
The milling spindle has a power of 29 kW and a speed of 6,000 rpm, for a maximum torque of 200 Nm. The tool changer is ISO 50 for automatic replacement of 20, 40, 80 milling tools.
The horizontal milling stroke of 1,100 mm is obtained by adding the ram stroke (W axis 650 mm) and the milling quill stroke (Z axis 450 mm).
Extended transverse strokes and a sliding table increase the reach of the work surface, allowing for a single center-of-table setup.
Other features include: advanced RTCP for double inclination machining; single origin for the management of the two spindles on the 4 faces of the mould; IMSA/HEIDENHAIN specific functions for the control of the deep drilling process.

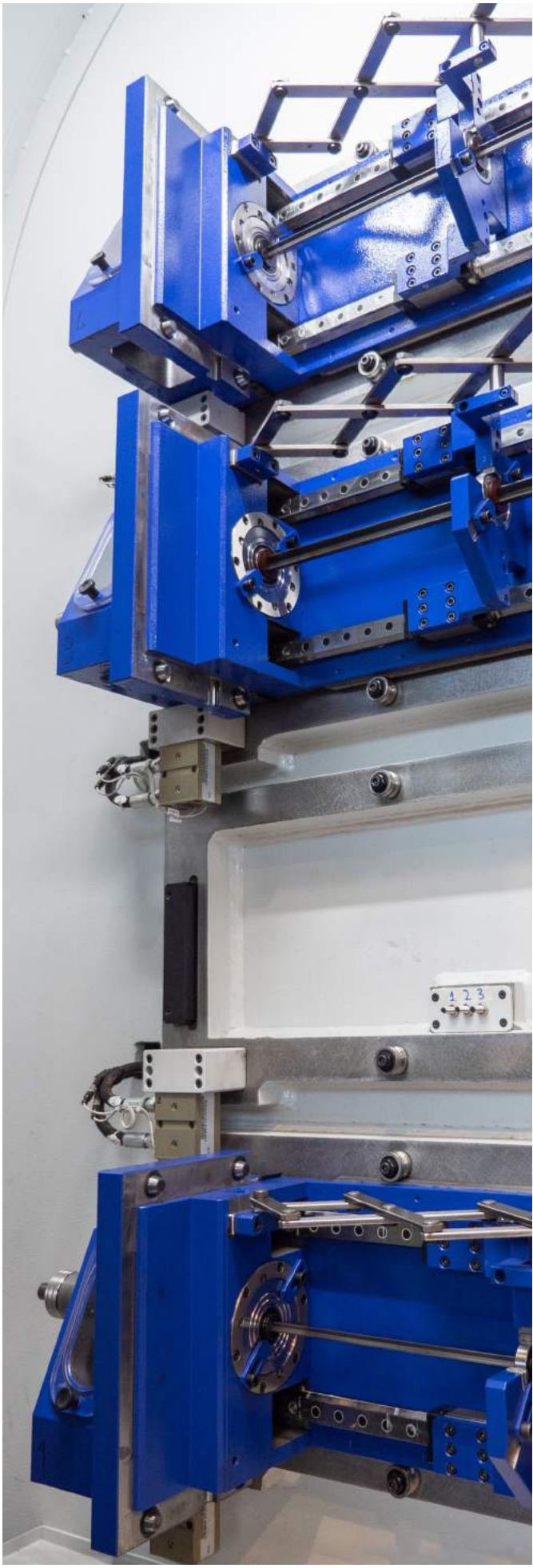
Minimize vibration and increase straightness

The I.M.S.A. gun drill change solution, whose first application dates back to 2009, replaces 4 deep drilling units each consisting of a gun drill complete with chip box, nose cone bushing, steady rests and ISO 50 spindle holder. This allows you to maintain proper constructional alignments and, therefore, minimize vibration and increase straightness.
"Drilling 30-40 m into classic mould materials is already the norm on an I.M.S.A. deep drilling machine, before stopping to replace

||| I.M.S.A. deep drilling centers are equipped with separate spindles for deep drilling and milling with fully automatic switching.



||| R.S. Meccanica specializes in complex moulds.



or sharpen the gun drill," explains Luca Picciolo, I.M.S.A. Sales Manager. "The decision to adopt a "4P" gun drill change solution, therefore, is not necessarily linked to the autonomy of the single gun drill but to the possibility of managing up to 4 different diameters on board the machine, combined with an ISO 50 milling tool changer for all complementary machining on a fully automatic switching auxiliary spindle."
MF1300/4P EVO can be equipped with a 2-station pallet changer.
"Thanks to this I.M.S.A. drilling center, we were able to reduce the time it takes to manufacture a mould, proving that it is an efficient and fast machine that fully meets our production needs," Sandrin concludes. ■