

## WALK THE LINE

A BYVENTION WAS MADE TO WALK THE LINE BY GESTAMP AUTOMOCIÓN, A MANUFACTURER OF PARTS AND COMPONENTS FOR THE AUTOMOTIVE INDUSTRY. THE COMPANY IS ONE OF SEVERAL THAT HAVE INCLUDED THE SMALLEST BYSTRONIC LASER CUTTING SYSTEM AS PART OF A HIGHLY EFFICIENT PRODUCTION LINE: A PRACTICAL EXAMPLE OF SUCCESSFUL INTEGRATION.

Text: Martin Engel, Photos: Alfredo Caliz

**NO, THE BYVENTION** was never a conventional laser cutting system, in fact quite the opposite: with the conceptual design of this machine, Bystronic chose to break new ground in many respects. The innovative material flow concept, the radically simple operation, or the compact design come to mind, for example. However, the fact that the ByVenton, which was originally designed as a stand-alone system, has recently been integrated into highly productive assembly lines is something that even its developers found to be remarkable. Since 2009, a concrete example of such integration can be found at Gestamp Toledo in the Spanish town of Seseña Nuevo.

### STARTING POINT AND CHALLENGES

Gestamp Toledo is one of more than 60 production centers of the international corporation Gestamp Automoción, manufacturer of parts and components for the automotive industry. The factory in Seseña Nuevo predominantly punches small to medium-sized structural parts. Furthermore, this factory has welding robots and welding workplaces for the production of subassemblies. The third, and newest, production area is responsible for the manufacturing of parts for industrial vehicles.

It was to this factory that the Italian utility vehicle manufacturer Iveco outsourced the production of the frame side rails for its Daily range of transport vans, namely for all the vehicles of this type that are sold in Spain. This was a very profitable order for Gestamp, and the occasion for setting up a new dedicated production line that deserves the sobriquet "spectacular"; not least because of the unique roll forming unit that was integrated into the system. Altogether, 42 different chassis beams are produced in several steps on this production line for use within the Daily range of vehicles. Every one of these beams has a different shape and features a specific number of individually punched holes.

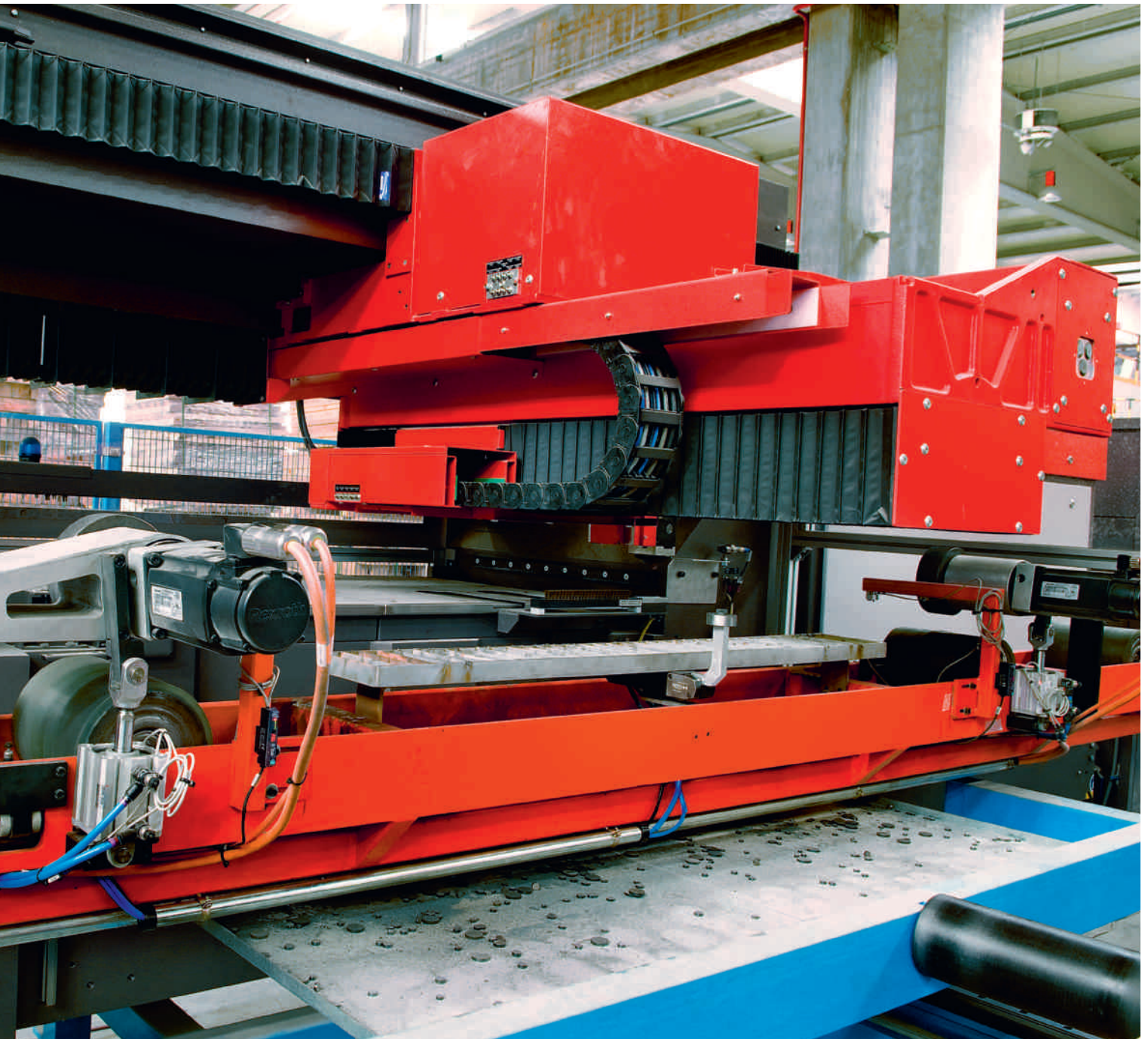
The planning and implementation of the production line took place under the technical supervision of Gestamp Linares, another of the company's production centers in neighboring Andalusia, which unlike their colleagues from Seseña Nuevo already had experience in producing frame side rails. Antonio Talavera, Managing Director of Gestamp Linares and technical head of the project, determined that

*"It was immediately obvious to me that the ByVenton was the right machine."*

Antonio Talavera,  
Managing Director  
Gestamp Linares



At Gestamp Toledo, the ByVenton was integrated into a new production line. The incorporation went flawlessly in terms of both hardware and software.



the production of parts on the new production line had to be optimized on several levels, in particular with respect to quality, time, and costs.

At the same time, the company was forced to deal with a practical problem that can never be completely eradicated: from time to time, individual punching tools fail to function correctly, and the corresponding holes are either not punched out or not punched out completely. And the corrections that become necessary then are extremely tedious, time-consuming, and expensive.

#### SOLUTION AND IMPLEMENTATION

"The solution was quickly obvious to us: we decided to integrate a laser cutting step in the production line as a separate island, which would then always be actuated when

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#### Gestamp Automoción

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Gestamp Automoción designs, develops, and manufactures metal components and structural parts for the automotive industry and is a leading supplier in this segment. The company maintains more than 60 production centers and 13 R&D centers in 18 countries. Gestamp Automoción employs a workforce of more than 13,200 and in 2009 generated a turnover in excess of 2 billion euros.

The customer base of Gestamp Automoción includes well-known automobile and truck manufacturers such as Audi, Bentley, BMW, Chrysler, Daewoo, Fiat, Ford, GM, Honda, Hyundai, Iveco, Jaguar, Land Rover, Mazda, Mercedes-Benz, Nissan, Peugeot-Citroën, Porsche, Renault, Seat, Škoda, Suzuki, VW, and Volvo.

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## WIP Proyectos Industriales

WIP Proyectos Industriales is a Spanish machine manufacturing company with headquarters in Valladolid, a city in north-central Spain. The company handles planning and implementing of a wide range of industrial projects for its customers. Amongst the services offered by the company are mechanical, electrical, and pneumatic developments, industrial and scientific programming, the production of machines and machine components, and mechanical and electrical assemblies including final adjustments.

one or more holes were not punched out," says Antonio Talavera. That sounds easy, but it raises one or two not quite so trivial questions: would it be better to adapt a commercially available laser cutting system, or rather to develop a unique solution based on a bought-in laser source? This question was considered in depth, the market for laser cutting systems was explored, and a separate concrete proposal for a one-off solution was prepared. "In the end, our decision was based on three fundamental factors: first of all, with a unique, one-off solution, the cycle time would have been too long. Secondly, a standard machine also includes standardized replacement and wear-and-tear parts, which means they are cheaper and more quickly available. Thirdly, it was assumed that a series-produced machine was more mature and hence less susceptible to faults than a one-off solution," explains Eusebio Quero, who is responsible for the machines installed at Gestamp Linares and who monitored the project in Seseña Nuevo.

The first encounter with the ByVenton took place during a machine demonstration at Bystronic's headquarters: "It was immediately obvious to me that this was the right machine," says Antonio Talavera. "Like a stone mason who contemplates a rock and in so doing already sees the final sculpture," he adds. Among the factors in favor of the machine were its extremely compact design and the ByVenton material flow concept that does not require a shuttle table, which would not have been required at Gestamp anyway. Further central elements were its favorable price and the laser source, which with 2.2 kilowatts offered precisely the right power – 3- or 4-millimeter-thick material is generally used for the production of the frame side rails. And ultimately, of course, the machine was simply a Bystronic system. From his own experience, according to Antonio Talavera, he knows that they are very good machines. Moreover, Bystronic has its own subsidiary in Spain and hence offers fast and competent service.

The purchase agreement for the ByVenton was consequently signed very quickly. Even before this step, the company WIP Proyectos Industriales from Valladolid had been engaged to deal with two aspects of the project: to configure the island and to create the hardware and software prerequisites for the integration of the island into the production line. The two companies have already had dealings with one another: in the past ten years, WIP has implemented several industrial projects for Gestamp. "However, with the integration of a standard machine, we were entering new territory," explains the CEO of WIP, Ángel Rodríguez, since his company usually concentrates on custom-made products. For Ángel Rodríguez, the greatest challenge was "to create optimal interfaces between a fully automated production line and

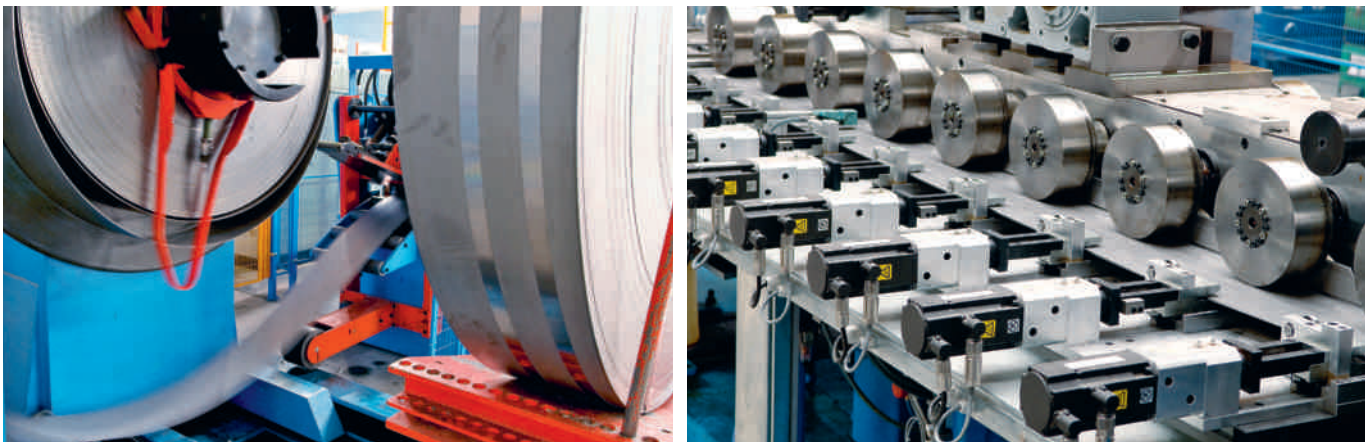
a commercial laser cutting system that was designed for stand-alone operation."

Bystronic's part in the project was to provide the information needed for the integration, so that a direct interface to the CNC of the machine could be set up. This was a necessary measure to ensure the fastest possible processing of the cutting plans and hence to avoid slowing down the operating speed of the production line. "With the appropriate data, it was easy to implement the software integration," says Ángel Rodríguez. From the hardware point of view, too, it was possible to integrate the ByVenton into the production line without problems. Individual elements such as the safety fence and the cutting table were eliminated. The only changes made were the position of the calibration plate and the brush for cleaning the nozzle.

### MANY BENEFITS

Once all the prerequisites had been created, the island was connected. This step was done by Gestamp together with Fagor. The company was the main integrator in the overall project and as such was responsible in particular for the control of the production line as well as for the material flow and the monitoring. Today, frame side rails with a length of up to 7.5 meters are produced in one-minute intervals. After the material has been unrolled from the coil, the shape and all the holes have been punched out in a series of steps, the wings have been folded with the aid of a roll bending unit, and the rail has been cut to length and finally turned over, a camera is used to automatically check that all the holes have been punched correctly. If this is the case, the roll forming unit brings the parts into their final shape. Otherwise, a check is carried out to see if the faults that occurred during punching can be corrected on the laser cutting machine. This is

*In several steps, the production line creates side rails for the Iveco Daily. Holes that are not punched out ...*



*"We are able to correct 95 percent of the punching faults using laser cutting."*

Antonio Talavera



*In charge of the successful integration project: Antonio Talavera, CEO of Gestamp Linares (third from right), Vicente Aguilar, Industrial Director, Gestamp Toledo (first from left), Eusebio Quero, Installations Manager Gestamp Linares (third from left), Ángel Rodríguez, CEO WIP Proyectos Industriales (first from right), and other members of the project team.*

not the case, for example, if a hole has been punched, but deviates more than two tenths of a millimeter from its foreseen position. In case of such mishaps, the rail is marked in color as a reject.

"However, we are able to correct 95 percent of the punching faults using laser cutting," explains Antonio Talavera. Thus, if the camera detects a fault, the corresponding part leaves the main path of the production line and is fed to the ByVention. In a drum, which replaces the cutting table, it is firstly divided up into virtual segments that correspond to the cutting length of the machine. It is then transported to the laser cutting system and positioned. Subsequently, the cutting plans that were automatically prepared for each affected segment are fed to the machine, the cutting process is executed, and the part is returned to the main path of the production

line. These processes take place so quickly that the timing on the production line itself can be maintained even when corrections have to be carried out on all of the maximum of five segments.

Although commissioning the complete production line was a costly measure, those responsible for the project at Gestamp are very satisfied with the results. Furthermore, the ByVention has fulfilled all expectations, according to Antonio Talavera. "We benefit from this machine on several levels," he explains. Firstly, the system reduces the number of rejects and hence saves money. Secondly, the ByVention ensures that all the holes are really in the rail, and that they are precisely at the correct place with a tolerance of maximum two tenths of a millimeter. Thirdly, production without loss of time is guaranteed. "And fourthly," says Antonio Talavera, "thanks to

the ByVention, we are very flexible, particularly with a view to custom-made models of the Daily, for which special frame side rails with a very small lot size have to be produced." Instead of the company having to invest unnecessary time and money for specially manufactured punching tools, the required holes are cut using the laser cutting machine – quickly and economically.

Hence, Gestamp is already looking forward to commissioning a second production line in the near future, which will also be used to manufacture frame side rails for Iveco; however, this time, the rails will be used not for utility vehicles, but for large trucks. Antonio Talavera is convinced that "the second production line will be even more spectacular." A ByVention will also be used, "based on the good experience."

*... correctly or completely due to faulty tools are automatically identified and cut out simply and rapidly by the ByVention.*

