

# Micrometre precision with emotion

**160 years of SIP:** Interview with Adriano Della Vecchia, Stéphane Violante and with the kind participation of Mark Huneycutt, Principle of Equipment Engineering at Bell

Why, in this high-tech age, would a machine manufacturer forego electronic compensation and rely on mechanical finishing alone? Is it still possible to provide long-term guarantees of ultraprecision? The eyes of Adriano Della Vecchia, head of product range SIP, and Stéphane Violante, PR manager at Starrag Vuadens, lit up at their answers, showing their pride in the products that still represent the benchmark standard for uncompromising long-term precision in many high-tech industries worldwide.



SIP 7000 including a palletiser unit



SIP 7000 jig boring machine

“Our machines are well known for being stable all the time.”

**Adriano Della Vecchia**  
SIP Product Range  
Manager in Vuadens

**Mr. Della Vecchia, what makes SIP so special?**

**Adriano Della Vecchia:** We provide very accurate machines because for us this is not only a job, it’s a passion. Yes, we are proud of this. Maybe it’s only emotion, but it is the way we think and why we come to work every day.

**One reason is the scraping of machine elements and their very precise assembly. They continue this centuries-old tradition. Other reasons?**

**Adriano Della Vecchia:** Our machines are well known for being stable all the time and we always think of how we can improve our production solution by reflecting on how to optimise what we have around the machine.

**Mr. Violante, in the preliminary interview you spoke of three important points in the machine?**

**Stéphane Violante:** Over the years, we have introduced a few additional improvements and benefits that simplify our production process and automation solutions, staying at the forefront of innovation and maintaining our leadership of the ultra-high precision benchmark in the machining world. For SIP, this affects three important points: the tools changer, the pallet changer unit and the human machine interface. All things that are not directly linked or fixed to the machine. They are just around the machine and they work with the machine.

**Please can you share some details about the parts that you can handle on your vertical and horizontal machining centres?**

**Adriano Della Vecchia:** The clamping surface is up to 1,200 mm by 1,200 mm and the workpiece can weigh up to 4,000 kg. We know it can take a pretty long time to

fix these types on the machine. As a solution for this constraint we have developed a complete system including a setup station, a storage station and a transfer station. This means that the customer can prepare the part, take time to adapt the fixture if necessary, aligns the part and so on, in order to keep unproductive periods to a minimum. Because sometimes you need 20 minutes, sometimes you need more. The aim is to efficiently change pallet at the end of the production process and to maintain a high level of accuracy. While loading the same pallet, we can achieve a maximum difference of two microns in terms of repeatability.

**What about the enclosure?**

**Adriano Della Vecchia:** It’s a stand-alone solution. Neither the enclosure, nor the tool changer or any of the peripherals are in contact with the machine.

“We are not reducing the actual machining time, but increasing production throughput.”

**Mark Huneycutt**  
Principle of Equipment  
Engineering, Bell

And they have no influence on the machine itself. In front of the machine we have the palletisation system. The team can work on it while the machine is boring or milling. As concerns safety, the operator can safely prepare the part on the setup station. Moreover as there is no contact between any elements, there is no impact on the accuracy of the machine.

**Flexibility in the factory also depends on the automatic change of tools. How is your tool changer designed?**

**Adriano Della Vecchia:** You can have between 40 and 120 tools; depending on what you are producing, it can help you to save time by having spare tools in case of breakage.

**Mark Huneycutt, Principle of Equipment Engineering at Bell in the USA, gives us his point of view on the collaboration with SIP which started a long time ago.**

**Mark Huneycutt:** Bell is a well-known manufacturer of commercial and military helicopters used worldwide. Their production of precision gearboxes is perhaps the best in the world. And one part of Bell's success is the precision requirements of their gearboxes that provide high horsepower to low weight ratio.



SIP production centre at Starrag in Vuadens

Bell is equipped with many types of machine tools and among them are 31 SIP machines throughout all facilities. Bell has worked with SIP over the years, primarily for the machine's accuracy capability. SIP has improved their production solutions, which provide ultra-precision and repeatability for many years. Newer technologies such as tool measurement and probing capabilities have improved throughput, but the basic machine design hasn't changed, and that's a big benefit!

But it's difficult to automate this type of a precision machining operation into a production process, which typically demands highly skilled human interactions with the parts. A challenging step to support an effort for a simple automation approach was to install a two pallet-changer for shortening the time of part-to-part

changeover. The biggest benefits are related to operational efficiency improvements such as reducing setup cost, part-to-part changeover time, and reducing spindle idle time. We are not reducing the actual machining time, but increasing production throughput. Now we can produce more parts in the same time frame with a pallet changing time of 1 to 2 minutes. The pallet changer integration with a high precision SIP will result in a very productive machine, with no loss in  $\mu\text{m}$  precision!

**That was a very interesting example: What are the special features of your machines?**

**Adriano Della Vecchia:** Most of our customers produce components with an extremely high level of accuracy. Just to give you an idea, some of the parts can cost around 50,000 USD



Adriano Della Vecchia, SIP Product Range Manager in Vuadens



Scraping requires expertise, something that SIP have been developing since the company's early years.



Control of precision at every step of the production process

after being machined. That means you cannot run the risk of breaking the part.

**Does repeatability also play a role in spare parts?**

**Adriano Della Vecchia:** Certainly! Some customers in the aircraft industry in the USA need to repair parts: They need to have the same level of accuracy and to use the same production configuration as when they initially made the part. And they know, that with our machine they can find the same exact position to reproduce the component to be replaced.

“Newer technologies such as tool measurement and probing capabilities have improved throughput.”

**Mark Huneycutt**  
Principle of Equipment Engineering, Bell

This is very important for the customer. This way they are sure that the part will be exactly the same as the original.

**But quality is not only machine made, it's man-made. What's about the human machine interface?**

**Adriano Della Vecchia:** We use the standard interfaces from Siemens and Fanuc. For some companies we have a special interface. We train the operators in the use of the control system and give some tips for special applications.

**What else is particularly important to users of your machines?**

**Stéphane Violante:** Machine accessibility, security and protection. These points should be treated together. We have wide machine access areas with large doors. Of course, you can enter in when the machine is not in production. You can work right inside the machine, calibrating with a probe, visually verifying each one of the machine elements before starting production, checking the positioning of tools. Thanks to the palletisation system which works independently to the machine, safety is guaranteed for operators preparing new fixtures for the next production part. ▀