A partnership for green innovation to improve competitiveness

Gutmann AG awarded Presezzi Extrusion Group a prestigious contract in October 2020 for the supply, installation and commissioning of a state-of-the-art extrusion press and innovative software package to optimize the extrusion line in Weißenburg in Bavaria, Germany. The decision to use Presezzi technology was based on the company's long-standing experience and solid reference list in this field of business: accurate machine tolerances of the press frame allow for perfect profile shaping, and all the special options have been tailored and fine-tuned to fit the Gutmann requirements.

Founded in 1937, Gutmann Group today employs 1,480 people in three enterprises in Germany: Gutmann AG, Gartner Extrusion GmbH and Nordalu GmbH. The annual turnover is 350m euros, and total production amounts to 65.000 tonnes a year. Offering flexibility and a broad range of profiles make Gutmann AG a reliable partner for all industries, especially for the construction industry when it comes to new and impressive buildings. The company has been a successful provider of building system profiles for decades. Customers not only benefit from the very specific competence fields of the individual companies, but also from the joint range of services provided by the entire group.

Some of the iconic projects developed by Gutmann AG are:

- The Allianz Arena Munich: for the membrane of the roof structure, 2,800 rhomb-shaped, transparent air cushions for an area of approximately 60,000 square metres with 1,400 different rhomb-shaped profiles.
- The Coca Cola Beatbox Pavilion in London: three types of profiles were produced for the pavilion on the occasion of the Olympic Games, resulting in an order quantity of 100 tonnes in total. It only took six weeks from the drawing to the fully edited series profile. This is how Gutmann Group defines flexibility, understanding the market, and skillfulness.
- BMW: Gutmann supplies aluminium profiles for the hybrid storage of the BMW series 3.5 and 7 Active Hybrid. The cooling profiles ensure heat removal from the battery cells.

A step ahead in capex and opex through energy-saving solutions

The new front-loading 25-MN, 8-inch extrusion press for billets from 350 to 1,200 mm is able to respond more quickly and more flexible to the growing demand for aluminium profiles and to offer a consistently high product quality to Gutmann's customers in the automotive, mechanical and electrical engineering, construction and furniture industries.

The press has been engineered with the aim of reducing operating expenditure, especially in terms of energy savings and maintenance. In this regard, electrical driven movements instead of oil hydraulic drives are applied wherever convenient and possible – with the aim to generate the following benefits for Gutmann:

- Reliable technical solution
- Competitive price
- Lower capital expenditures (capex)
- Lower operative expenditures (opex)
- Reduced environmental impact through energy savings
- Short return on investment.

All main forged components, made in forged steel ASTM A105 or ASTM A266, are made in Italy, as Presezzi does not shop around for noble equipment. By doing so the company is able to manufacture optimal components exactly tailored to the needs of the customer.

Tie rods are made of forged steel C35 EN 10083-1, designed to improve the force distribution within the press frame and thus attain a long service life.

The press is equipped with the Presezzi Extrusion Energy Saving System (PE.E.S.S.), by which only the pumps required during the high density of force phase (high pressure phase) are activated, and during the high density of speed (low pressure phase) the delivery of the pumps is improved, increasing the motor speed. It is based on the use of fixed

Coca Cola Beatbox Pavillion in London

delivery pumps driven by electrical motors, which are controlled by variable frequency drives (VFD).

The PE.E.S.S. makes it possible to switch off without limitations any unnecessary motor pump unit during extrusion. Moreover, VFDs allow operators to run the system under maximum efficiency conditions, during both the high- and low-pressure phases of the extrusion cycle. By using only the pumps required during extrusion in order to produce the requested extrusion speed, motors and pumps work within their best range of efficiency: this at no cost in terms of hardware complexity, but with a system configuration that is much simpler than traditional architectures and, of course, with no compromise in terms of press performance (speeds and dead cycle times).

Further, in the event of problems with a motor or a pump, the other motors (or other pumps, as the case may be) can independently compensate for the malfunction, continuing to operate at reduced speed.

The PE.E.S.S. version for Gutmann is equipped with fixed delivery pumps mounted on a skid in an enclosed pump room, with fixed delivery pumps mounted on a skid, with the electrical cabinet / inverter and relevant piping. This significantly shortens the erection and start-up time, gradually turning the press into a Plug and Go concept, with reduced erection and start-up time compared to an older power station with the press mounted on the ground.

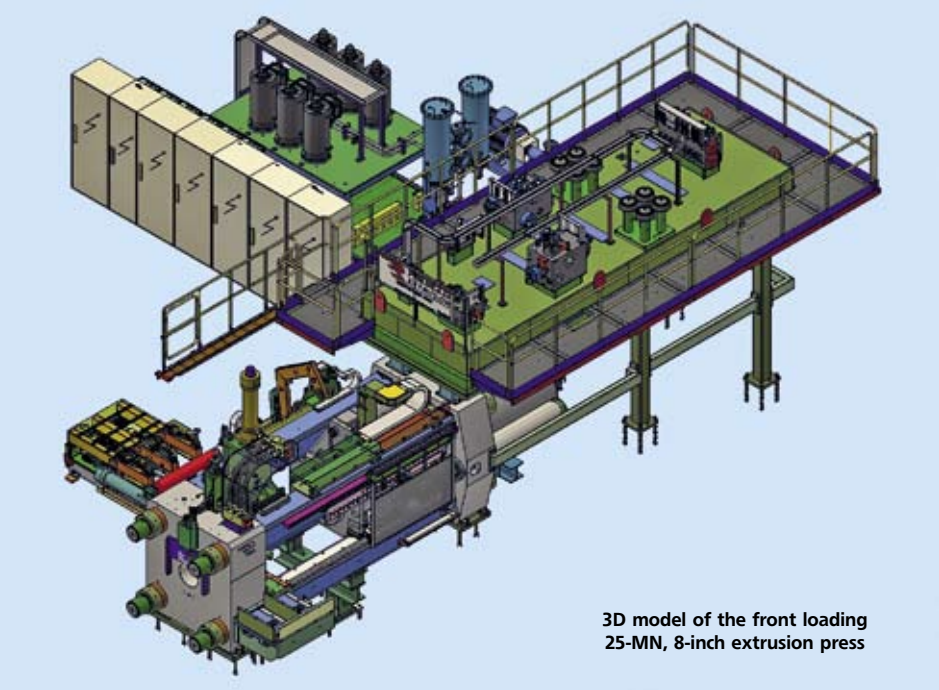
Thanks to the installation of the PE.E.S.S. the following results were achieved:

- *Energy savings up to 35% compared to modern presses without this system:* the system automatically activates the number of motor-pump units strictly necessary for the production by acting on the motor inverters. During machine stoppages or production changeovers all the motor-pump units are immediately put on standby. Therefore PE.E.S.S. reduces energy consumption both during production as well as during plant shutdowns
- *Significant reduction of the dead cycle time with an overall increase in annual productivity* in comparison to the previously installed press at Gutmann
- *Reduced installation time:* greater flexibility for the installation of the pump room, which takes up a lot less space than traditional systems. This can be installed in existing layouts mounted on horizontal or vertical frames or positioned above the tank, according to the customer requirements. With this solution no foundation works are needed for the pumps
- *Pump and press testing before shipping (dry test).* With the 'dry test', movements of the press are carried out without load before the press is disassembled for shipping. Unlike to other suppliers, Presezzi performs a complete assembly of the press (mechanical, hydraulic and electrical) before shipping. The dry test of the presses is performed in the company's premises in Vimercate (Monza Brianza, Italy) and in line with its standard practices. During this test the Presezzi team performs an inspection of the press and completes the main movement with no load of the main components of the press, for example:

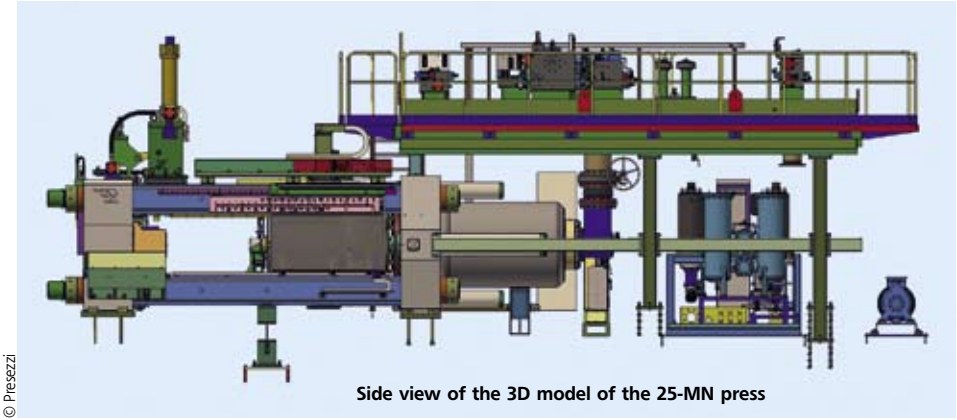
a. Movement container housing forward / backward
b. Movement moving cross head forward / backward
c. Movement butt shear up / down
d. Move butt knocker for proper operation
e. Movement die cassette forward / backward
f. Movement die-changing system forward / backward (three positions)
g. Movement billet loader (carriage, arms and clamps)

- *Reduced footprint with a 'stretch to fit' solution,* with a remarkable impact on civil works
- *Reduction of current spikes and pressure spikes,* which translate into reduced opex
- Easy maintenance
- *No need for auxiliary or pilot pump for servo valve management*
- *Lower degree of oil filtration equal to 5 µm*
- *Reduced number of spare parts*
- *Longer life for the hydraulic oil.*

Extensive use of electrical actuators such as on the billet loader and on the die-changing system, ensures easy maintenance and enhanced availability of the press. This in addition to fast dead cycle times and quick changeover times, which ensure that press operators can meet high productivity demands: a fast die-changing system equipped with electrical motors



3D model of the front loading 25-MN, 8-inch extrusion press



Side view of the 3D model of the 25-MN press

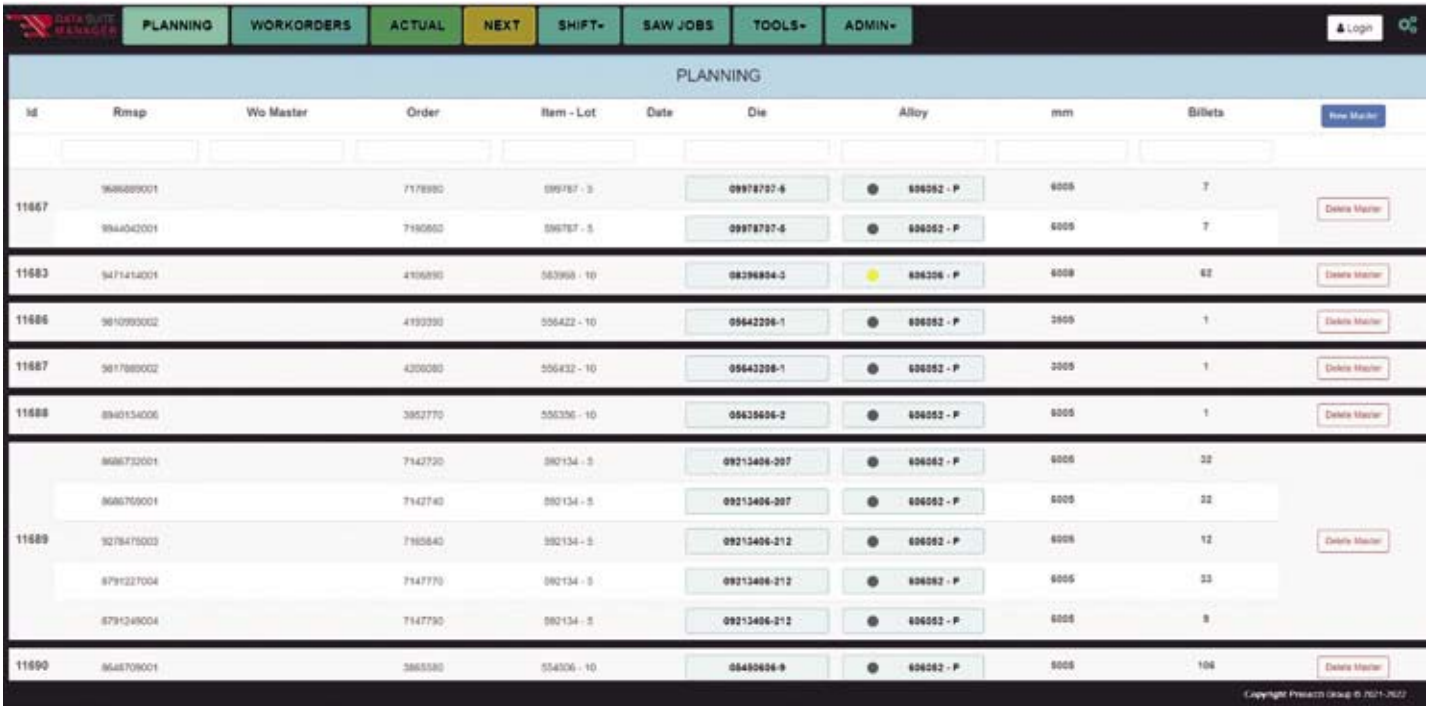
reduces the die changing time compared to a standard hydraulic solution, thus improving plant flexibility of the line for small extrusion jobs. It is important to note that the cassettes were realized in three pieces according to Gutmann's specific design.

A closed-loop temperature profile control both and at press mouth allows constant and reliable monitoring of this variable to ensure it never exceeds preset threshold values, which would degrade the part's metallurgical properties. Furthermore, continuous temperature monitoring can be used as a feedback to set parameters for both the press and the furnace, to increase press speed – thus maximizing productivity – without the risk of exceeding the maximum profile temperature allowed.

Another highlight of the press is the self-adjusting moving butt end shear, which automatically adapts to the set-up of the tool package and ensures optimum and clean cuts. The shear automatically compensates for horizontal tolerances in the tools stack: after the cut the shear moves a few millimetres away from the die; so when the shear is moved up, there is less danger of the aluminium being pulled out of the die pre-chamber. This reduces the risk of air inclusion in the extruded profile.

The scope of supply includes further crucial auxiliaries:

- Vertical press mouth safety device (tailor-made solution)
- Nitrogen cooling device
- Billet lubrication system with Presezzi Extrolube
- Dummy block and cleaning block manipulator takes over all work operations previously performed manually, installed in a dedicated safety area on the left side of the press
- Container heating in four zones (tailor-made solution), diameter 210 x 1,230 mm
- Grease lubrication with Perma cartridges, no centralized pump (tailor-made solution)
- Visual indicator for position of container and moving crosshead
- Tailored butt knocker shear blade design
- Barrier protections for the operator
- The lubrication of the butt end shear blade with a dedicated Microjet system, tailor-made
- Safety devices.



DMS suite page

Energy savings by process automation and optimization

Presezzi Extrusion's advanced automation tools are capable of providing decision makers with complete, correlated information, and therefore with a solid basis for a proper decision that will provide the maximum effect, ensuring the optimized results in terms of energy savings, improved product quality and maintenance sequence.

In addition to this, the group has started to bring innovations to the market, assisted and integrated by a modern automation system, technology packages, advanced sensors and software to change the maintenance approach from a reactive to a proactive one.

The PLC software, combined with a user-friendly and intuitive HMI or 'man-machine' graphic interface, improves the way the operators control the press. The installation of transducers for precise positioning allows the user to have complete control of all machine movements. This helps optimize all movements for each part of the machine and the modification of the acceleration and deceleration ramps used for all machine operating cycles and to complete work phases.

This type of control allows smooth, fluid movements to be maintained so that the hydraulic system is less stressed and therefore more durable – thanks to the drastic reduction of the number of frequent 'pressure peaks' that, over time, can cause premature deterioration and failure of the mechanical and hydraulic elements. The accuracy of the PE system allows the extrusion speed to be controlled and maintained within a precise 'range' of 0.1 mm/sec during the working phase, leading to finished products of much higher quality.

The PE software package provided to Gutmann to support production and maintenance offers several features, including:

- *Data Manager Suite (DMS)*. All the production processes of the extrusion line (not only the press) are automated through a data management suite, DMS – a powerful web-based software system supplied by Presezzi Group that can manage all of the equipment involved in the extrusion process on a single data platform. The DMS is able to collect

data from the extrusion line and optimize the process with automated set-up and self-adjustment of the profile recipes. This way the plant is able to avoid manual interaction and associated human error, thus increasing productivity and reducing scrap. For Gutmann, which produces a wide range of products, the DMS provides the ability to increase and control quality while reducing manufacturing costs.

- *Data Ingestion.* This suite, installed as standard on all PCs, is an advanced web-based telemetry system with a sampling rate of up to 20 ms. Today, the system helps onsite or remote maintenance to carry out optimizations or analyse process problems.
- *Preventive Maintenance Package.* This package has the purpose of guaranteeing the reliability and capability of the press by means of continuous and accurate monitoring of its conditions, giving a complete view of the critical parameters affecting the machinery endurance, and supporting strategic decisions for maintenance management.
- *Exclusive Presezzi Extrusion Service Portal.* The portal provides customers with total maintenance service, including maintenance personnel, maintenance of the spare parts and trouble shouting, and to advice customers on those areas that show most significant or strategic room for improvement.

Execution of the project and results achieved

The period from concept to design, from the production of the machine, the construction on site, the commissioning to industrial production, is an exciting and adventurous journey. It is a challenging path for which not only ideas, but also determination and courage are essential. In this regard, "we can never stop thanking our partner Gutmann who, like us, is a front-runner in taking up the challenge of innovation to always be a step ahead," Presezzi says.

Even during this period of uncertainty and unpredictability, Presezzi Extrusion maintained its promises and commitment to Gutmann: leveraging all of its experience in the extrusion market, the Presezzi Extrusion design and project management team followed a framework based on continuous communication, coordination and engineering techniques to increase efficiency during the whole project phase.

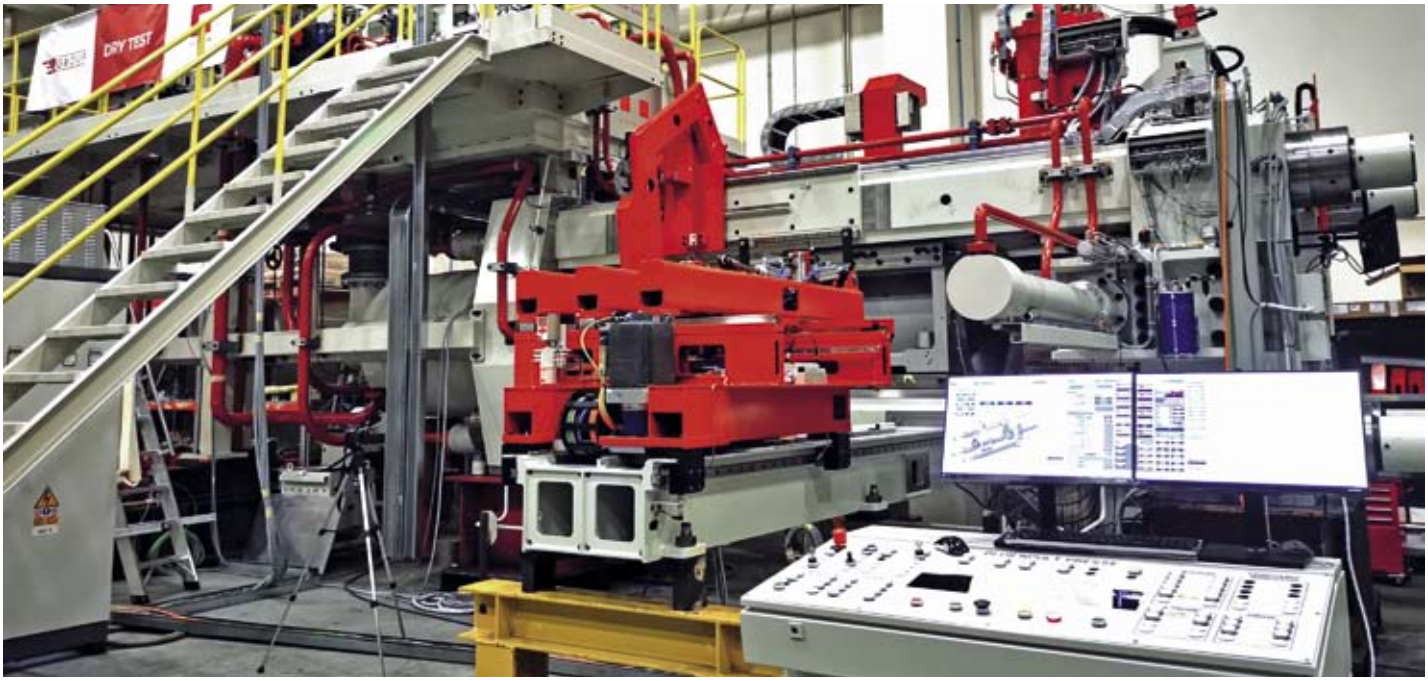
Hot start-up and first extrusion was performed successfully in January 2022 following an extensive period of cold and hot commissioning. Thanks to the quality and reliability of Presezzi's equipment and technology packages, in synergy with the experience and knowledge of the Gutmann operating and maintenance teams, the final acceptance to Gutmann's full satisfaction was given in March 2022.

One key of the successful project execution was the open, honest and respectful communication between the parties, starting from the price negotiation to the final project implementation. Presezzi Extrusion Group highly appreciates Gutmann's business approach, which along with its solid technical commitment, enabled an extremely smooth installation and commissioning of the press. The Final Acceptance Certificate is just the consistent conclusion of a job well done.

Ulrich Auer, project manager at Gutmann, said: "With Presezzi as an experienced partner in the field of aluminium extrusion, we managed the installation and commissioning of the new press in a reasonably short time. Despite some adjustments during operation, we are already above the performance level of the previous press. At the beginning, we had some doubts because of the language barrier and the different approach, but during the project we were impressed and convinced by the effectiveness and productivity of the supplier's equipment and personnel."

Once again Presezzi Extrusion demonstrates its successful approach, deeply rooted in its traditions, toward development of innovative and customized technical solutions, combined with a strong focus on customer needs.

Presezzi is proud to be a partner of Gutmann and to offer advanced technological solutions for extrusion lines capable of producing high-level products. Staying a step ahead is a challenge that requires not only a constant input of efforts and resources, but also a strong determination and clear vision for future objectives, as well as ideas to achieve them. "And in this connection, we would like once again to thank partner Gutmann – who are in fact real front-runners – for the constant stimulus, ideas and co-operation they offer in the spirit of a win-win partnership, always striving to be a step ahead," Presezzi says. ■



The Presezzi extrusion press for Gutmann in Bavaria, Germany