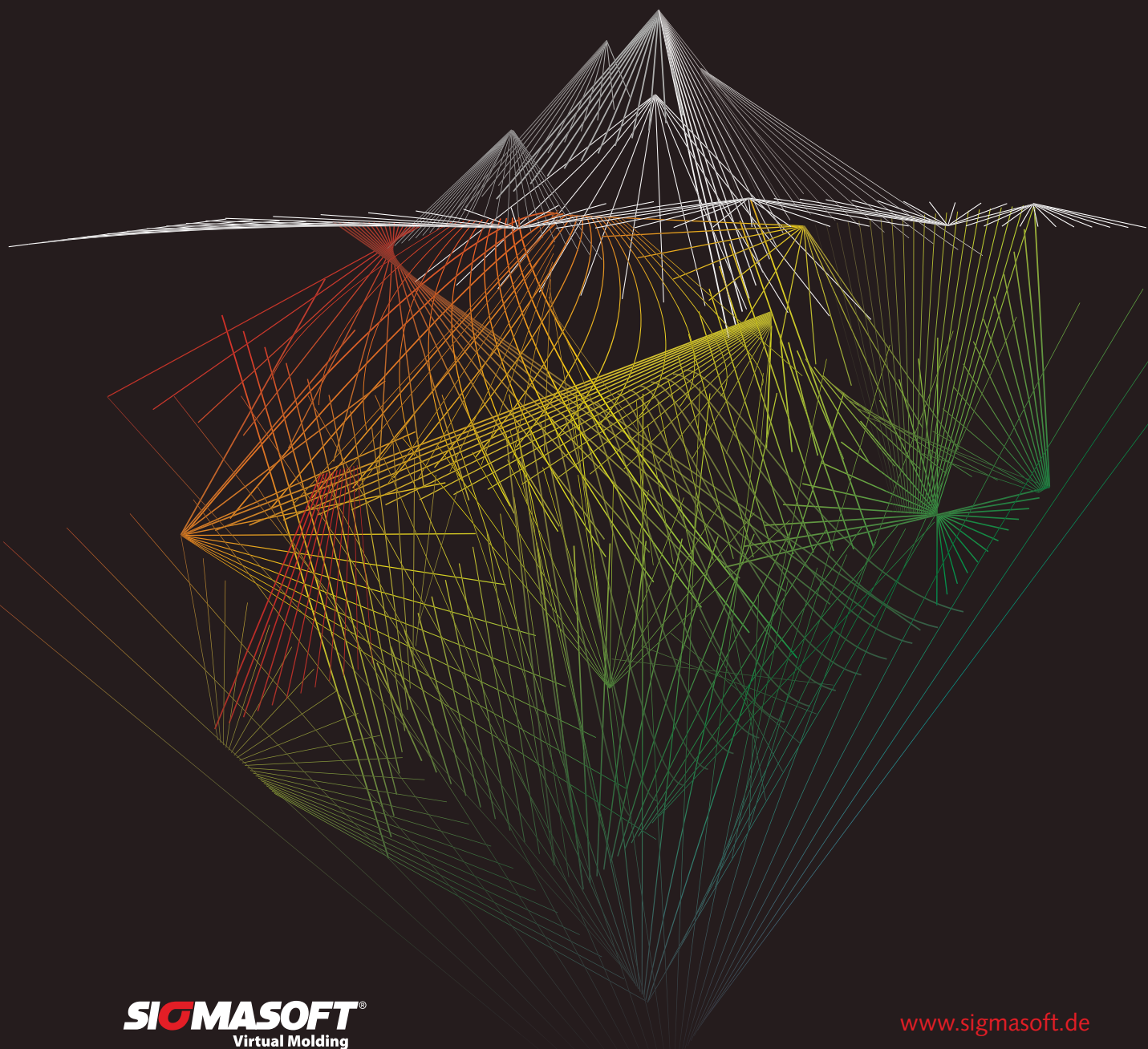




VIRTUAL MOLDING

smart
molding

*THE SECRET OF
SUCCESSFUL MOLDERS*



Plastics...increased challenges and new opportunities abound

While the overall market perspective is rather robust, these days, the challenges in the plastics business are numerous. However, so are the opportunities, both for the builders and processors alike, whether they are injection molders, extruders, blowmolders or players in the supply chain to this global industry.



Mathias Radziwill, Business Development Manager for Plastics at Siemens Digital Factory

Cost pressures, whether on materials, machinery, labor or logistics continue to demand more innovation and adaptation on the part of all the links in that supply chain. A company that built a very successful business selling one tier of the market is in jeopardy today, because the landscape of their industry has changed so dramatically. For example, our own company produced a very high quality, highly reliable line of motors, drives, HMI and other motion control components, as well as machine-to-machine and machine-to-data center communication software for many years. Today, we are faced with the same cost pressures and that challenge has produced a new paradigm in our business culture, one in which we strive to maintain the quality of our products and the efficiencies of delivery on their value to the market. When, for example, the cost of the motors and drives on an entire extruder line might reach 15-20% of the total cost, the efficiencies in manufacturing and time-to-market become more critical for us, to remain competitive. We have responded, as have many in the global plastics market, through innovative designs, a greater commitment than ever to manufacturing efficiencies and a “practice what we preach” philosophy in achieving the digital factory.

On the U.S. market, the need for UL compliance requires more documentation than ever, but we remain committed to produce the best value products for the market conditions, with an ever-watchful eye on safety and enhanced communication capability, so the products can literally “talk” to the machines via remote connectivity. Hand in hand with this trend is the need to develop products,

software and especially HMI that have a user-based functionality and a high degree of ergonomic appeal.

In today’s factory and soon tomorrow’s, the emphasis on higher automation, especially collaborative robots, will redirect the worker talents into other tasks, whether programming, operational supervision or maintenance. When the equipment becomes more integrated and the digital factory emerges as a viable reality at all levels of the supply chain, the workforce will need the appropriate skill sets to meet that challenge. Smart companies will take up that educational banner and carry it, working in conjunction with the academic institutions and workforce improvement sectors in the industry. Displaying this commitment ourselves, Siemens has championed numerous educational efforts for the current and future workforces, a trend that will continue. We are all in this together, as the saying goes.

Perhaps the most exciting challenge remains the drive to digitalization at the plastics processing machine builder and end user factory alike. Today, a “digital twin” of a machine concept can be developed, allowing the conceptualization, runout and even “virtual commissioning” of a new machine, before the first frame is built. This development integrates the full life cycle perspective, from concept to CAD to CAM to component production, assembly, testing and actual production, even the post-install issues of machine fatigue and predictive maintenance, all in a virtual world. As a result, code can be developed by programmers before the machine is built. Likewise, operator and maintenance personnel can be trained before the machine is finished. Simply put, not only must innovation occur constantly, but the innovation cycles must be shorter, so the builders can achieve faster response times to market demand and other factors such as FDA requirements.

After the actual machine is built and installed, new cloud-based data gathering and analytic modeling is a reality today and is available for builder and processor alike. Customized apps can allow an end user to prioritize their KPIs and builders can monitor their entire global install base for machine peer performance, component tendencies and operator efficiencies in use and downtime resolution.

A new day indeed.

Mathias Radziwill, Siemens

Improving part deformation and cycle time with Virtual Molding

The reduction of cycle time is an essential condition in every injection molding operation. At the same time, it is important to deliver the required part quality in terms of dimensional stability. [SIGMASOFT® Virtual Molding](#) with its Autonomous Optimization technology allows comparing multiple scenarios in terms of cooling placement and mold material, to achieve both conditions at the minimum cost per part.

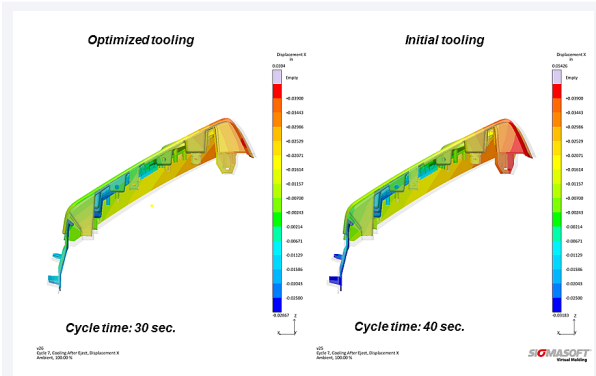


Figure 1 – With the Autonomous Optimization technology available in SIGMASOFT® Virtual Molding, it was possible to find the minimum possible cycle time for an application, while at the same time improving dimensional stability. The part deformation vs. the initial design (transparent) are depicted.

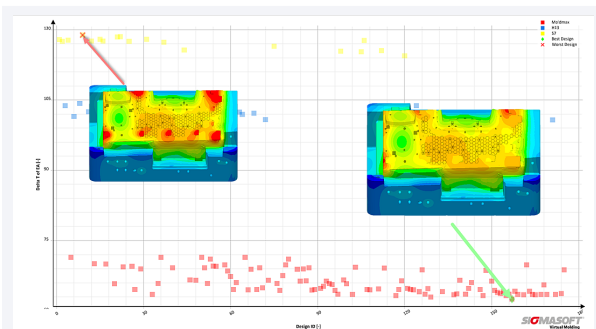


Figure 2 –The image shows the best and the worst configuration from the thermal point of view. The Y axis indicates how big the thermal gradient within the mold is. The color ranges indicate the different insert materials.

The reduction of cycle time is crucial in every injection molding operation. At the same time, it is important to deliver the required part quality in terms of dimensional stability. While many molding operations tend to extend the cooling time inside the mold to achieve the minimum possible part deformation, a proper selection of mold materials and placement of cooling lines can help to dramatically reduce cycle time while at the same time delivering the expected dimensional behavior of the part.

A component for an automotive application was being molded with a cycle time longer than expected; a circumstance that heavily compromised the profitability of the molding operation. In this case, it was seen that the part had several hotspots after molding, and whenever the cooling time was reduced, the part distortion reached unacceptable limits.

To avoid the hotspots, the molder identified two possible solutions: improving the placement of cooling lines and introducing highly conductive alloys at some specific locations in the mold. However, this tooling modification came at a heavy price, and it was important to acknowledge upfront the best possible configuration, and to assess the economic benefit of the modification.

With [SIGMASOFT® Virtual Molding](#), a virtual DoE – included in the Autonomous Optimization technology – was started. In the example, two targets were pursued simultaneously: reducing molding cycle time while at the same time keeping low tooling costs. To achieve them, the cooling lines were modified through several iterations, and the material of specific inserts was changed.

“The iteration process took in total about 176 designs, completed in about 50 hours”, explained Gabriel Geyne, [SIGMASOFT® Virtual Molding](#) engineer in charge of the project. “However, from these only 3 hours were actual engineering labor and the rest was computer calculation time. After this, the optimal mold design was found.”

The exploration of all possible conditions allowed a cycle time reduction from 40 to 30 seconds. While the inserts were more expensive, all in all the molding process reduced costs by \$48.930 over 250.000 molded parts.

About SIGMA

SIGMA (www.sigmasoft.de) is sister company to MAGMA (www.magmasoft.de), the world market leader in casting process simulation technology based in Aachen, Germany. Our [SIGMASOFT® Virtual Molding](#) technology optimizes the manufacturing process for injection molded plastic components. [SIGMASOFT® Virtual Molding](#) combines the 3D geometry of the parts and runners with the complete mold assembly and temperature control system and incorporates the actual production process to develop a turnkey injection mold with an optimized process.

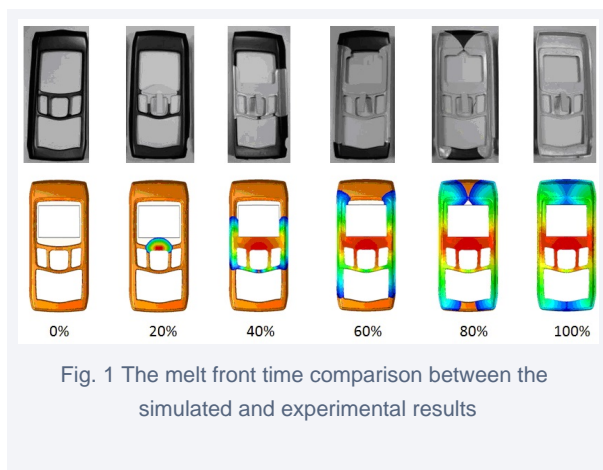
At SIGMA and MAGMA, our goal is to help our customers achieve required part quality during the first trial. The two product lines – injection molded polymers and metal castings – share the same 3D simulation technologies focused on the simultaneous optimization of design and process. [SIGMASOFT® Virtual Molding](#) thus includes a variety of process-specific models and 3D simulation methods developed, validated and constantly improved for over 25 years. A process-driven simulation tool, [SIGMASOFT® Virtual Molding](#) provides a tremendous benefit to production facilities. Imagine your business when every mold you build produces required quality the first time, every time. That is our goal. This technology cannot be compared to any other simulation approach employed in plastics injection molding.

Shorter R&D cycle time through advanced IMD simulation technology

The printing technology is widely applied in multiple industries. Apart from general paper printing, it is utilized in the manufacturing of laptop shells, mobile phone panels, circuit boards, LCD panels, automotive dashboards and daily necessities. The materials for printing include plastics, metal, glass and ceramics. In the past plastic product manufacturing, secondary processing such as plating, spraying and printing are required. Along with the increasing market demands in recent years, In-mold Decoration (IMD), a brand new plastics decoration technology is developed. It is the combination of printing and injection molding technologies, enabling the injection molded parts to be resistant to friction, scratch and corrosion. Furthermore, IMD products will possess exquisite colors and aesthetics.

Two common manufacturing issues of IMD process are ink washout at filling stage and product warpage or distortion due to uneven cooling at cooling stage. Thus, it usually requires many design iterations and would be time-consuming.

To solve the above problems, users can predict the in-mold dynamics through CAE simulation tools and optimize the product design according to the analysis results. In order to attain more accurate in-mold decoration simulation results, Moldex3D has strengthened its capabilities in R15, the latest version software.

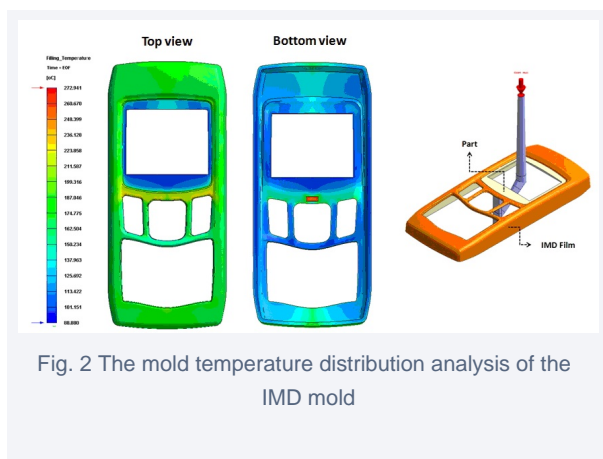


It can now attain more accurate simulation result of the in-mold thin film temperature distribution, and then simulate the filling temperature and velocity vector field. It can also predict ink washout based on the product's geometric properties.

By analyzing the temperature field of IMD process, users will be able to attain a better understanding of the mold temperature changes, cooling and volumetric shrinkage behaviors.

According to these analysis results, users can then reduce product warpage and molding defects, and furthermore optimize product designs. In addition, Moldex3D exclusively supports boundary condition options in pre-processing procedure.

It enables users to efficiently and easily process the mesh layer of decorative pieces. Also, the new "Wash-out Index" feature enables product designers to accurately predict washout and ensures high-quality IMD products.



In the IMD case here, the product's set mold temperature is 80?, and the melt temperature is 240?. As shown in Fig. 1, the simulated melt front is consistent with the experimental results.

Next, we examine the temperature changes of the interface between the model and the IMD surface. Obvious heat hesitation is observed (Fig. 1), and the reason is poorer heat conduction of the decoration layer.

Since the IMD process include product surface processing and coloring procedures, many factors that occur in the mold could lead to product defects. Thus, users need to comprehensively understand the in-mold dynamic behaviors in order to avoid

defective products.

Moldex3D's new simulation capabilities cannot only meet the above demands, but also help tedious trial-and-error process, accelerate product innovation, and significantly reduce manufacturing time and costs.

Advancement of Internet of Things

Belgian Monitoring Systems (BMS) is since many years a leading supplier of turnkey MES solutions for the textile and plastics industry. Its latest generation data collection hardware (data units) includes an IoT broker, allowing direct access to real time information from any remote location or external IT applications.

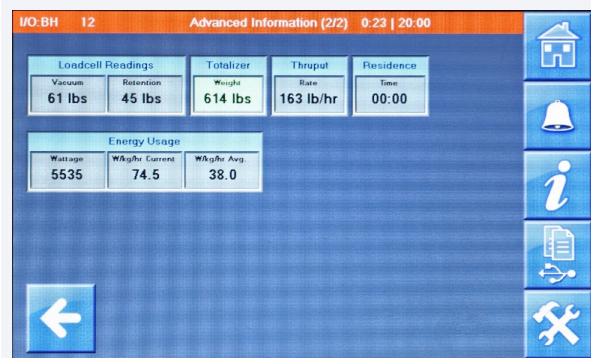
The BMS Manufacturing Execution Systems (MES) are widely used in the textile and plastics industry. These systems, being a combination of data collection hardware and application software, enable managers to achieve operational excellence and to rapidly respond to changing conditions. Till lately, this all happened locally in the plant, with some pre-configured access to the information from outside the company or from third party applications.

A new family of data collection hardware (data units), entirely designed and manufactured by BMS, now allows full disclosure of all data collected from the machines. Using standard IoT (Internet of Things) protocols, the data collected from the machines is published in the Cloud. As such, this information is not only available for managers and employees wanting to access plant data from anywhere in the world, but also for non-BMS applications, such as ERP systems or third party developed Apps.

Furthermore, all data units offer a uniform web based HMI, allowing very easy use at the machine or from any remote mobile device such as tablets or smartphones.

Maguire soft eliminates penalty for low-throughput operation

Software developed by Maguire Products, Inc. for its VBD™ vacuum dryer constantly monitors the changing conditions of dryer operation and automatically makes adjustments to ensure that power consumption remains the lowest of any resin dryer in the plastics industry.



VBD™ Dryer Screen Display Showing Energy Usage

While vacuum dryers are known for using far less energy than conventional desiccant dryers, until now their energy efficiency has been greatest when they were operated at or near their throughput capacity. Actual throughput varies, however, according to the rate that the molding or extrusion process demands. Prior to Maguire's development of the new energy saver software, the vacuum dryer used increasingly greater amounts of energy as throughput decreased, unless the dryer was set up for the lower throughput. At throughputs that were one-tenth of capacity, for example, energy consumption could be ten times greater than at full capacity if the dryer was not set up correctly.

If operated at full capacity of 300 lb. (136 kg) per hour, the VBD-300 dryer typically exhibits an energy consumption of 46 watts/kg/hr when drying polycarbonate at 250 °F (121 °C). Now the same dryer can operate at nearly the same low level of energy consumption at throughputs of only 25 lb. (11 kg) per hour with no operator intervention.



VBD-300 Dryer

“The new Maguire software eliminates the penalty for low-throughput operation by using data acquired from previous heating cycles to make adjustments to the current cycle, ensuring that the absolute minimum amount of energy is used while achieving adequate and complete heating of the resin,” said Frank Kavanagh, vice president of sales and marketing. “We now offer the software as a standard feature on all VBD dryers, and it is available for upgrading existing dryers at no cost.”

In addition, all controllers for VBD dryers now include a standard onboard energy consumption display and logging capability. The controller shows both real-time and time-averaged values in the industry standard of watts/kg/hr.

In comparison with desiccant dryers, the VBD vacuum dryer consumes 60% less energy, dries resin in one-sixth the time, and substantially reduces the heat history to which polymer is exposed. The speed with which the VBD system removes moisture makes properly dried polymer available for production only 35 minutes after a cold start.

MAGUIRE PRODUCTS, INC., headquartered in Aston, Pennsylvania, U.S.A., is the world's largest supplier of gravimetric

blenders, liquid color pumps, and vacuum dryers and also manufactures loading systems, auger feeders, granulators and related equipment and software. Its customers include injection, blow, and rotational molders, extrusion processors, and compounders. Founded in 1977, Maguire operates six manufacturing facilities in Aston. The company maintains a network of distributors in the Americas and overseas and has three sales and service subsidiaries that stock, sell, and service auxiliary equipment systems from Maguire and its affiliate, Novatec, Inc.: Maguire Canada, Maguire Europe, Maguire Asia, and Maguire IMEA.

authentig – MES-solution for the plastic industry

Adherence to schedules, cost reduction and resource optimization are requirements that modern manufacturing companies have to face these days, in order to better survive a world of digital upheaval. Manufacturing Execution Systems (MES) play a key role in the factory of the future.

“authentig” is the modular MES-solution for the plastic processing industry. More than 300 customers from the automotive industry, medical technology, electrical and packaging industry rely on the innovative industry solution of T.I.G. with over 8.000 networked injection molding machines, rubber machines or recycling machines.

Customized industry cockpits deliver productivity, adherence to delivery dates and production quality across the group at the touch of a button. As an optimal link between the ERP system and the machine “authentig” integrates all production-relevant information in one system and thus ensures a measurable increase in productivity, a decrease of substandard goods and well-documented processes.

As a pioneer and development partner T.I.G. is the first MES-manufacturer to provide the free download of a test and validation software for the new EUROMAPP 77 interface for machine manufacturers.

“authentig” can be used both “on premise” as well as cloud- and web-based. It meets all industry 4.0 requirements and supports optimal realization of modern production concepts, such as “Big Data”, “Internet of Things” and “Software as a Service“. Thanks to modularity, scalability and short set-up times “authentig” from T.I.G. facilitates a successful entry into the smart factory of the future.

When people connect, the future is wide open



Sepro Robot on Sumitomo Demag IMM at K2016.

Indeed, Sepro has already taken significant steps toward Industry 4.0, with its proprietary Visual control platform: one control, developed specifically for plastics injection molding that can be customized to control the simplest sprue picker or the most advanced 3-, 5- or 6-axis robots; that can control one robot or an entire automation cell.

This same control can be used to operate not only Sepro robots, but also robots developed by other companies, including Sepro partners Stäubli Robotics, Yaskawa Motoman and Machines Pagès. It can be integrated into the control systems on injection-molding machines made by Sumitomo Demag, Billion, Stork and others, making it easier for molders to set up and operate manufacturing cells.

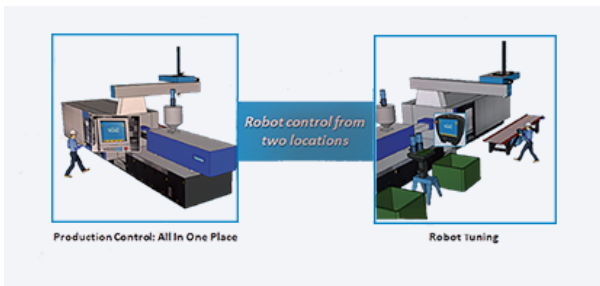
Today, Sepro is collaborating with various IMM partners to offer three different levels of control integration

1. More Ergonomic:

The robot control can be mirrored on the operator panel of the injection molding machine.

The IMM doesn't control the robot, but it does provide the interface to the robot control. In this configuration, it is possible to control the robot from two different locations. For instance, on the operator side of the machine, the machine control interface can be used and on the back of the machine, the robot control pendant can be used. This can greatly simplify the fine-tuning of robot movements without the operator having to move back and forth from one side of the machine to the other.

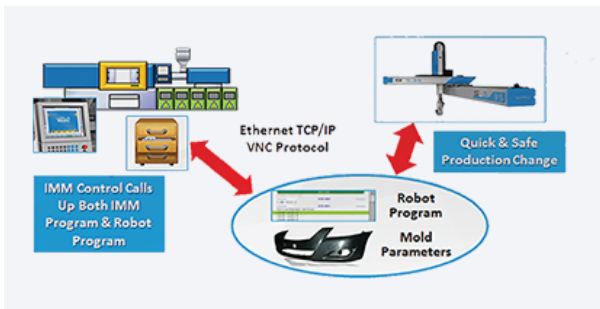
2. Quick Access:



This configuration represents a middle range of control integration. It offers the same operational features and benefits as Level 1, plus the ability to use shortcut icons and keyboard functionality built into the IMM control. For instance, the operator can start up the whole production cell on one touchscreen. Other shortcut operations like 'Reset' and 'Home Return' are also available. Also, IMM set-up actions – like selecting or entering a mold or job code – automatically trigger similar actions in the robot control.

When a specific user (operator) profile is entered on the IMM control, similar access is automatically granted in the robot control. Communication is via Ethernet TCP/IP.

3. Integrated Operation & Data Storage:



Here, the robot application program is fully integrated in the IMM control and all application data, including robot programming and possibly other auxiliary equipment like mold temperature controls, are filed in one place in the IMM control memory. Operation is similar to Level 2, but this configuration files and backs up application parameters of the entire cell in one single archive.

This arrangement is best for molders that want to centralize management of plant production and prevent any chance of a conflict between robot and machine controls.

This integration technology is already reality, as each of these configurations has been implemented to some degree with certain Sepro partners.

We've also been told that Industry 4.0 will see different machines working together as a unit. Increasingly, processors are discovering that they can, in fact, improve productivity and make added-value parts when robots collaborate not only with IMMs but other equipment as well.

These include customized, multifunctional end-of-arm tooling, insert feeders and positioning systems, and post-mold inspection, assembly and packaging equipment that yield specific solutions in:

- Control... vision; presence/absence of components; electrical continuity
- Parts handling... shuttle tables; vertical stackers
- Traceability... marking; labeling; separation by cavity
- Assembly... closing; clipping; screwing; welding
- Cutting... gate vestige removal; flash removal; routing

These systems can get quite complex. For instance, a molder making kitchen utensils created a cell that involves two molding machines, three 3-axis robots, an insert loading station and shuttle table. In operation, a small 3-axis robot stages six metal utensil-handle inserts for pick-up by a larger robot on one of the two IMMs. That machine molds a TPE grip onto the handles and then the robot returns to remove the molded handles and place six more inserts. The molded handles are then placed in a fixture on the shuttle table that moves them over to the second molding machine. The large robot on that machine picks them up and places them into the second mold, where a stiffer, heat-resistant material forms the working end on the utensil. The second robot removes the finished parts, places them on a conveyor to a packing area and the cycles repeat. That's integration.

Collaboration Drives Industry Forward

Because Industry 4.0 is bigger than the plastics industry alone, Sepro is working with other businesses and institutions to share knowledge, resources and perspective.

For instance, Sepro is collaborating with the Robotics Institute at Carnegie Mellon University in Pittsburgh, PA, to develop the next generation of robot and injection-molding machine controls. The project is still in the development phase, but it is likely that the new controls will feature elements like 'agile' ergonomics, similar to tablets, the ability to 'learn by doing,' 3D simulation to make programming easier, extensive customization, and 'apps' to facilitate routine functions like maintenance and troubleshooting.

However, collaboration cannot be confined within one industry. So, Renaudeau is actively involved in developing innovative management practices with Audencia Business School in Nantes, one of the top business schools in France and in Europe. The school has 3470 students from over 80 countries in its bachelors, international and specialized masters, MBA, doctoral and executive education programs.

Sepro CEO Jean-Michel Renaudeau calls this "crossing the border." When people and companies share resources, he says, they develop a more global view. They gain information and understanding that allows them to become stronger quicker. He points to his own company as an example of how these kinds of connections ultimately benefit plastics injection molders. "How does a relatively small company like Sepro, in the middle of nowhere in western France, become a global leader in robotics and automation," he asks?

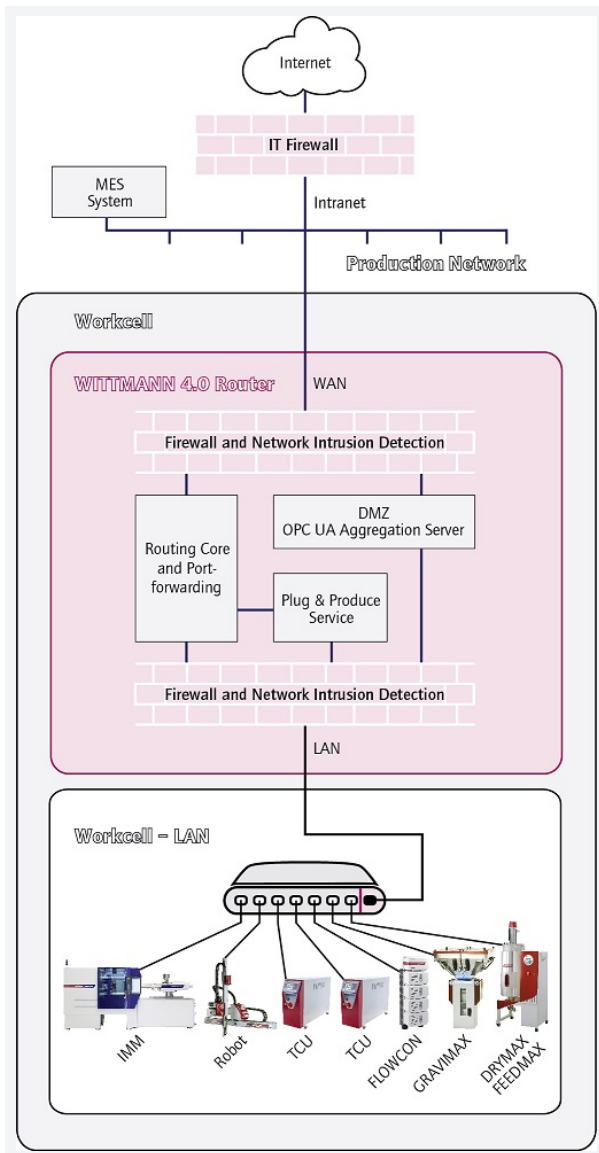
"Industry 4.0 is not just about technology that allows machines to communicate. That's a part of it, but more importantly it is about people and companies multiplying our own capabilities through collaboration and a shared vision of the future. Why else are auto companies like Ford actively working with service companies like Uber?"

This vision of Industry 4.0, what Renaudeau refers to as "the commons sense view," and Sepro's commitment to it, has allowed us has been able to make big things happen in a short period of time. It can help plastic injection molders make great strides too. They will certainly discover that, thanks to today's robots and evolving technology, the future is wide open.

Solutions for maximum cyber security

In the Industry 4.0 era – or more generally speaking, in the midst of the “digital transformation” currently taking place in the world – the networking of injection molding machines, robots and peripheral equipment is proceeding apace. We now have to meet the challenges faced in the field of plant security.

Reports of attacks involving the WannaCry ransomware and similar malware really woke up plastics processors to the issue of security when it comes to cyber-physical systems and facilities. After all, the WannaCry case resulted in numerous very well-known companies suffering the worst case scenario for a manufacturing operation, namely an unplanned production shutdown for an unforeseeable period of time. Like other malware before it, WannaCry worked by exploiting a security vulnerability in the Windows™ operating system.



It is common knowledge that the most fundamental aspect of any security concept is regularly performing software updates so that above all the operating system is kept up to date. While doing this does not afford complete protection, it is nevertheless an important basic step. Performing updates automatically is not, however, feasible for production systems, since an update can have unforeseeable consequences for the functionality of the connected machinery or device. In the worst case scenario, an automatic update may end up causing a machine to shut down, leading to the dreaded loss of production. As such, production systems in an Industry 4.0 environment remain especially at risk and susceptible to any vulnerabilities in the operating systems in use being exploited.

WITTMANN BATTENFELD injection molding machines with B6 and B8 controls as well as robots with the latest R9 control from WITTMANN prevent the operating system from being permanently compromised by viruses due to the fact that changes that affect the system are saved to an internal RAM disk via a Unified Write Filter mechanism. This makes it possible to restore the device's operating system to its factory defaults each time the system is booted up. Because of this, viruses cannot become “embedded” in the system and affect it permanently.

WITTMANN BATTENFELD has nevertheless tackled the wider issue of security and, in close cooperation with one of the leading cyber security companies in the industry, developed a security concept for networked WITTMANN 4.0 workcells that has already been implemented in the field. The development work was based on the assumption that the production network outside a WITTMANN 4.0 workcell could be compromised in terms of security even though the operator is naturally sitting behind a firewall. This is why the system architecture of a WITTMANN 4.0 workcell is designed according to the onion principle.

The firewall of the customer's network forms the outermost layer surrounding the WITTMANN 4.0 workcell. Because the security mechanisms and settings there are unknown to the manufacturing cells, this layer must be regarded as being “unsafe”. The next security layer is

formed by a restrictively configured WITTMANN 4.0 firewall that is installed in a router specially developed for the purpose by WITTMANN. The software on the router is digitally signed and every step of the router's boot routine is designed to be “secure”. This precludes an attack being made via a software update.

In contrast to conventional off-the-shelf firewalls, the WITTMANN 4.0 firewall is tailored to the specific purpose of each device and function that may be expected to be a component of the workcell. The configuration of the firewall is therefore especially restrictive. With the exception of the OPC protocol, which is used for communication with an MES or ERP system via OPC UA, all communication ports are closed by default and can only be opened from within the workcell, and only by the operator performing specific, intentional steps.

Communication with “the outside world”

WITTMANN BATTENFELD injection molding machines with B8 controllers, for example, can create an external connection via TeamViewer in order to make remote servicing functionality available, if desired. Having established a session, remote servicing allows a WITTMANN BATTENFELD office direct access to the authorized injection molding machine for the purpose of analysis.

Manual authorization can likewise be issued for the WITTMANN Group's QuickLook App. This allows an Android or iOS mobile device within the company's network to view the machine status of WITTMANN BATTENFELD injection molding machines with B6 and B8 controls and WITTMANN robots with R8.3 or R9 controls. In this case, the WITTMANN 4.0 router tells the QuickLook App on which ports which machines and robots can be found.

Every opening of an additional communication port does, of course, create another loophole and thus increases the potential risk of cyber attacks. Opening a port is, however, a deliberate act performed by the operator and the port only stays open for the duration of intended use.

Protection against DoS attacks

Another advantage of the WITTMANN 4.0 system architecture is that it protects production systems against so-called DoS (Denial of Service) attacks. These typically attempt to bombard the remote station with such an immense flood of requests that it may no longer be able to cope with its communications tasks and shuts down.

If this flood of communications packets reached a production machine directly, it could well result in the machine shutting down completely. Within the WITTMANN 4.0 architecture, however, the only thing that may possibly shut down would be the router and thus only the communications with the MES/ERP system, though it may be assumed that this system would no longer be active at the time either due to network overload. The processing machines and other equipment within the affected WITTMANN 4.0 workcell are able to continue working unhindered, however.

Over and above this, there is a basic protective mechanism in place intended to prevent the WITTMANN 4.0 router from shutting down in the case of a DoS attack. A special feature of the WITTMANN 4.0 router is that it is able to "estimate" the volume of communication traffic the internally networked devices typically have with an external MES/ERP system. The communication frequency of production equipment is known within certain bounds and can be predicted by dint of the OPC UA protocol used here and the coming EUROMAP standards based on it. Should this frequency vary atypically over the medium term, it must be assumed that there is an anomaly, such as a DoS attack. As a counter measure, the WITTMANN 4.0 router closes the socket being used for communication in order to prevent the socket being attacked. The functionality of the router is thereby maintained.

WITTMANN 4.0: "Plug & Produce"

At the core of a WITTMANN 4.0 workcell is a WITTMANN BATTENFELD machine with B8 controller, WITTMANN robot with R8.3 or R9 controller and the various WITTMANN peripheral devices. This zone is shielded from the outside world, thus allowing for secure operation with the operating system version supplied with the equipment.

The latest peripheral devices from WITTMANN can be plugged in and out of a WITTMANN 4.0 workcell according to the "Plug & Produce" principle at will. After a newly attached peripheral device has been server authenticated by means of SSL/TLS protocol and key exchange via certificate, device identification is performed. The newly attached device identifies itself and is registered in the device list of the WITTMANN 4.0 router with the corresponding identifiers. The device list acts as a database that is used by the B8 controller of the WITTMANN BATTENFELD injection molding machine to configure the newly attached device.

The peripheral devices have their own passwords that are used for logging in. Each device is supplied with a default password that can, and indeed should, be changed by the operator. The responsibility for password security lies with the respective operator, particularly as there are no factory default master passwords. The login process takes place using the previously established secure SSL connection.

The actual data exchange between the various attached devices and ultimately to an MES or ERP system takes place via the standard OPC UA protocol. Communication between the injection molding machine and the MES system will in future be updated to use the EUROMAP 77 standard as soon as it is released – probably in September 2017. Various EUROMAP standards for the peripheral device communication via OPC UA are already in the standardization phase and will be implemented immediately they become available.

Every WITTMANN 4.0 workcell is equipped with the aforementioned components and security mechanisms as standard so as to provide the operator with the best possible cyber protection and maximum machine and device availability.

Over the course of numerous tests conducted by the cyber security company commissioned by WITTMANN, simulated attacks using a variety of different threat scenarios were acted out and tested by "white-hat" hackers. WITTMANN 4.0 proved itself to be robust in all scenarios and enabled production to continue uninterrupted within the entire workcell.

Bringing core manufacturing software to United Kingdom

IQMS, a leading manufacturing ERP software and manufacturing automation software vendor, has launched a core manufacturing ERP software package for small & medium sized businesses (SME).

SME manufacturers will be able to access powerful ERP software features through the small business package, including order processing, financials, material requirements planning, production scheduling, plus shipping and dispatch modules. Uniquely, IQMS is also providing real-time production monitoring as part of the solution.

Implementation and ongoing support of IQMS' ERP and manufacturing automation software across the UK, Ireland and Europe is provided by Proximity, who are based in Leeds and Nottingham.

Aimed at manufacturers with five to 10 users who may be relying on disparate and disjointed systems that are not manufacturing specific.

IQMS' ERP software has been designed specifically to meet the demands of plastics manufacturers based on thousands of customers globally.

Nick Jackson, Client Director at Proximity, commented: "We have had an overwhelming response to IQMS' core manufacturing package for small and medium sized businesses from prospective businesses across the UK, Ireland and Europe. The package provides businesses with a comprehensive ERP system that helps smaller manufacturers meet the challenges, and opportunities, in the manufacturing sector such as rapidly changing domestic and international markets, digital transformation and Industry 4.0."

"Scalable in its design, the small business package is cost-effective and enables businesses to take advantage of more advanced ERP features and functionality as their customers demand with the choice of over twenty additional modules. IQMS is providing small manufacturers with the tools so that they can operate on a level playing field with their larger competitors".

As part of the package, manufacturers are given access to IQMS' comprehensive e-learning program, which offers short, topic tutorials covering all functional areas of the IQMS system across more than 40 modules covering 275 topics.

Manufacturers can learn at their own pace and work towards completion whilst fitting training into their busy schedules. Different learning styles are catered for through the web-based training platform, which enables access 24x7, from any location, on any device.

About IQMS

IQMS' EnterpriseIQ ERP software and manufacturing execution system (MES) has been designed specifically for the manufacturing environment. Combines ERP and MES functionality to give manufacturers a comprehensive end-to-end suite for running the business, backed by the real-time performance and scalability that companies demand. Developed specifically for mid-market repetitive, discrete and batch process manufacturers, IQMS provides robust capabilities for addressing strict customer and regulatory certification and compliance. IQMS achieves this by delivering traditional ERP functionality for accounting, sales orders, material requirements, inventory, and purchasing, plus extended native features for CRM, human resources, production scheduling, shop floor control, warehouse and quality modules.

About Proximity

Based in Leeds and Nottingham, Proximity develop, deliver, maintain and support high performance solutions and applications for leading global companies in the logistics, warehousing, manufacturing, finance and retail sectors..

From large-scale, enterprise-level implementations to small business ERP, Proximity has the specialist knowledge, expertise and software options to help manufacturers accelerate growth. Proximity is a certified IQMS reseller and provides IQMS implementation services across the UK, Ireland and Europe.

KraussMaffei Group makes a push for digitalization

The KraussMaffei Group is writing another chapter of its 180-year company history. Its existing claim to build the best machinery for plastics processing is now being supplemented with a wide variety of digital offers in the areas of service, new business models and products. Installing its new "Digital Service Solutions" (DSS) business unit, the KraussMaffei Group is pushing ahead with the digitalization of the company with great Impact.

Three strong pillars

"We firmly believe that the combination of mechanical excellence and service excellence will make the difference in our market in the future. Our worldwide service will be the very reason why customers decide in favor of KraussMaffei. Our goal is to create measurable added value for our customers," explains Nadine Despigneux, who has been heading the new DSS business area since July of this year. "Customer Care", "Customer Value" and "Digital Solutions" make up the three strong pillars of DSS which were on display at Fakuma.

Global customer service – The new e-service platform

Customer Care includes the present conventional service as well as future service, which must be seamless both chronologically and in terms of content: 360°, 365 days a year. The best example is the e-service platform presented in Friedrichshafen, which already offers a wide variety of service functions to our customers today. Among these are access to machine-specific documents, the 3D spare parts finder with direct purchase order trigger or the integrated ticket system. In short, the customer benefits from an additional safeguard of production efficiency. This service can be accessed at any time, from any location.

The new e-service platform was first presented as a test version at the K 2016 trade show. "Since then, we have been specifically gathering customer feedback. We have developed the desired new features quickly and with agility, and then we have implemented them so that already last year we could move on to field testing and win our first customers for the platform," says Despigneux. For fast implementation, the initial focus has been on what is called the "speedboat variant" for the Netstal products. Now, the platform is to be expanded to cover all products of the KraussMaffei Group—following the motto of "Think big—act small & fast."



Service 24/7: The e-service platform offers a wide variety of service functions such as access to machine-specific documents, the 3D spare parts finder with direct purchase order trigger or the integrated ticket system

Customer Value includes new business models such as "Rent it – don't buy it," introduced in 2017, and the Gindumac platform for used machinery, in which KraussMaffei holds a stake. They provide the answer to one of the most pressing challenges of plastic processors. The purchase of a machine is an expensive investment especially for small and mid-size injection molding companies (and the long service life of the KraussMaffei machine is rather a competitive disadvantage here). On the other hand, companies that rent flexible production capacity tie up only a little capital and always stay at the technological forefront. The first wave of customers has already deliberately decided in favor of this model.

However, presenting such a model in a way as commercially attractive as KraussMaffei does it is possible only if the lessor is capable of taking back a large number of used machines after the lease expires. This is why KraussMaffei decided earlier this year to invest in Gindumac, a startup company. The startup operates a globally oriented Internet platform for used machinery. The platform connects all quotations and interested parties with each other globally. The advantages of this business model, in turn, have a positive effect on the calculation of leasing rates.



With AnalytiX, customers can keep their machines in view, anytime and anywhere, and benefit from automated evaluations of processes and machine statuses

Under the keyword of Digital Customer Solutions, APC Plus could be viewed at Fakuma as well as the DataXplorer and AnalytiX tools and interfaces. DataXplorer is the name of an analytical tool for recording, storing and evaluating up to 500 signals at a resolution of 5 ms. These can be standard signals of the machine or special signals such as the mold cavity pressure. This provides a fascinating view, rich in detail, of systems and processes that can be used for improving production efficiency or for Condition Monitoring.

AnalytiX is an evaluation tool for the customer to keep its machines in view, anytime and anywhere, and benefit from automated evaluations of processes and machine statuses. Using intelligent key figures for stability and productivity, the user can identify negative trends or performance deviations of individual machines at one glance. "Our customers often do not wish for 'Big Data' but rather for a solution allowing them to monitor their injection molding machine in production using simple key figures while having breakfast—an injection molding machine for their pocket, so to speak. And we are offering this in the form of AnalytiX," explains Despigneux. Like the e-service platform, AnalytiX was developed as a "speedboat" for the Netstal products and it is now being consistently and comprehensively extended to cover all KraussMaffei products.

New location for DSS in Munich's Neuaubing district

The new Digital Service Solutions business unit will move to a new location in Munich's Neuaubing district in February 2019. There, currently space is being created for up to 50 employees in a creative environment in which agile working methods will be the order of the day. "Not only is this highly attractive for recruiting new talent in the areas of business architects, product owners or data analysts, but it also provides the new business unit with a high impact capability in the market," says Despigneux.