

POTATO BUSINESS DOSSIER

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FACTORY of the FUTURE





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All About Connectivity

This project is supported by



Who Knows What the Future May Look Like?



DAN OREHOV
managing editor

COMMENT

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avoiding unplanned downtimes, identifying problems, analyzing data: these are some of the major challenges facing the potato processing industry. Increasingly, systems must be efficient, reliable, flexible and intelligent, while of course meeting the requirements of hygienic design. Digitalization offers many new opportunities to fulfil these demands that meet the customers' requirements and individualize products to make them stand out from the crowd.

Digital technologies offer optimized processes and a higher product efficiency across the entire value chain. The processes and workflows can be optimally aligned, which creates a constant high product quality, more sustainability and a more flexible work organization. Whether using the IoT as a source of ideas, 3D printers for individual products, ERP systems for controlling business processes, virtual reality as a computer-generated reality with images, IT safety for the protection of the entire production plant, artificial intelligence for mechanical learning, blockchain solutions for traceability, big data for the processing and evaluation of huge volumes of data, all these may be an integral part of the potato factory of the future.

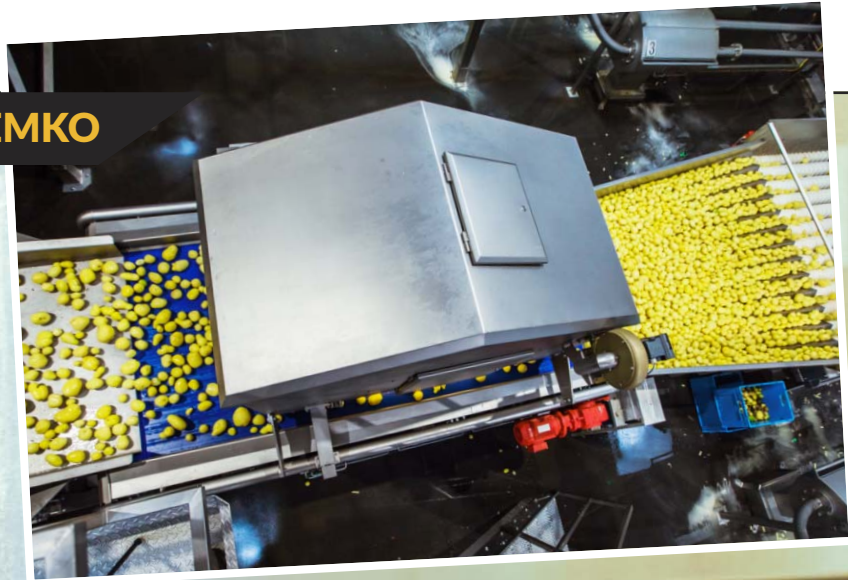
In turn this leads to an increase in earnings, productivity, minimization of safety risks, optimization of resource management and an improvement of the load of machines and systems. Moreover, the future processing factory can lead to a high degree of efficiency, flexibility, economic efficiency, all of which can be achieved using innovative automation systems, flexible robots or intelligent image processing systems. New technologies save time and spare the employees from performing repetitive tasks, so they can focus on more important tasks.

How do you think the future will look like for your potato processing company and which OEM do you turn to, in order to upgrade or invest in new equipment?

Stay safe! ■



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Potato In, Data Out

“We will never share data with anybody else” is a famous quote of potato processors we hear regularly”, **Kiremko’s General Sales Manager Ton Hendrickx** states. “But I think that sharing data will be the key to future success of potato processors. We don’t want data about the process, that’s corporate knowledge of our customers. But if we get data from the process, we can help our customers improve on overall equipment effectiveness and Total Cost of Ownership. And even remotely, we can support our customers to reach the highest standard in quality with lower costs.”

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iremko has made up their minds. Processing potatoes will become sciences, based on data.

A FAMILY OF DATA COLLECTORS

Kiremko's vision on Smart Industry goes a long way back. In 2009 Kiremko introduced their first processing "Guard", the Kiremko PeelGuard®. This piece of equipment measures the peel result of the highly sophisticated Invicta steam peeler and – by Artificial Intelligence – lets this PeelGuard control the steam peeler. In the meantime, Kiremko has introduced a whole family of Guards, ranging from PeelGuard to WeighGuard, to KnifeGuard. Within the next few months, the OilGuard will be presented to the outside world, a Guard that measures and guards the oil quality in the Kiremko fryers for chips, pellets and French fries. In the end, the Guards are nothing more than data collectors in a processing line, improving the performance. On this principle, Kiremko has based a strategy for the short term and the long term.

PROCESS IMPROVEMENT AS KEY

The key to success is improvement. "What's in it for me?" will be the customer's question to answer. And subsequently, what's in it for us all. Because sustainability and the usage of energy, water, steam, oil or heat will be part of the collection of data as well. A lot of improvement within potato processing is still possible, if you take a look at the process and the amount of raw materials needed, technology has to develop towards lower consumption and higher performance. In order to do so, we need data. Sharing data is inevitable, but will lead to instant results. "The first in line who are willing to share the performance data on equipment will be the first to profit from it."

MORE THAN ENOUGH DATA, IT'S ABOUT ANALYSIS

Kiremko has set their mind on data collection for the future, both in quantity and in quality. At first, data will show what happened, but as the quantity and quality increases, data show why it happened. Far more interesting than at first, but still, we are looking in the past. And what we really want is look into the future. Predict our process flow and adjust to circumstances or changes. By the time we reach that goal we will be able to make things happen, create the future. "It is not that far away", Hendrickx says, "dashboarding, servitization and pay per use in our business are closer than we think. Therefore, we need to prepare ourselves to handle the data that will come out of our equipment. Analysis of those data will help to build better machines, better processing and a better and more sustainable world."

WHO OWNS THE DATA?

Kiremko sees Smart Industry as a separate functional layer, adding value to their equipment: "But we also recognize the difficulty of sharing data. Our customers don't want to strengthen their competition. That is why we draw the line at equipment data, not product data. We don't care what recipe our customers use, we do care about data that meet requirements about time, temperature, water usage, energy feed, weight, etc. Those are the data that allow us to improve performance, without showing any precious corporate or intellectual knowledge of the end product. At all times, the data are the customers ownership. The customer manages the product, we help to manage production. Look at our Invicta steam peeler with our PeelGuard. That combination meets the requirement of best peeling result in the market place. We peel, we measure, and we adjust the peeling process to the measured results. Every few seconds. Based on how the customer wants the potatoes to be peeled. In this case the measurement data are used in a loop between peeler and PeelGuard. The next step is using that data for the next step in the process."

FROM LOOP TO CHAIN

Creating loops like a steam peeler with a PeelGuard is the level where Kiremko is at right now. At peeling, at cutting (with their KnifeGuard) and more steps in the process after that. "Our newest member of the Guard Family will be the OilGuard. A data collection system to manage the oil quality in the fryer. Now the oil management is done by sampling, taken to a lab to check. The OilGuard does a quality measurement every few minutes, completely automated and, again, this data can be used to manage the fryer and the oil farm. Adjusting temperature, adding new oil, everything that is needed to make sure that quality levels of the oil are consistent throughout the whole process. We tested this technology for more than a year and at this moment we are in the phase of inviting so called «launching customers». These customers help us to further develop in exchange for support and a modest discount. This will lead to the market introduction of the OilGuard in 2021. Another loop, but the next challenge is to go from loop to chain. How can data in peeling improve and manage cutting? Or drying data improve frying? That is the real factory of the future."

STEEL AND BYTES

The integrated design of software is essential in this vision. Stainless steel is controlled by software. And that software has to help operators produce a high quality and consistent end product all year. The Process Automation Department at Kiremko is growing, as the development of Smart Industry is increasing. "Right now, we have a complete team of software engineers, working full time on software architecture. In all innovations that are about to be



The first in line who are willing to share the performance data on equipment will be the first to profit from it.

25
years ago,
you could
save a
company's
data on a
50 Mb hard
disk. Now
that is the
size of a
10 seconds
videoclip.

presented in the next few years, software is an increasingly important part. You don't recognize it when you look at our equipment, but the bytes are taking over. Or as we often say, potato processing is developing from a craft towards a science. A science of data, where technology helps to define the optimal result. And most of our customers are already on the same track. They know how to use data to get the right French fry in the supermarket or fast food kitchen. We know how to build the machines and controls to make those fries.

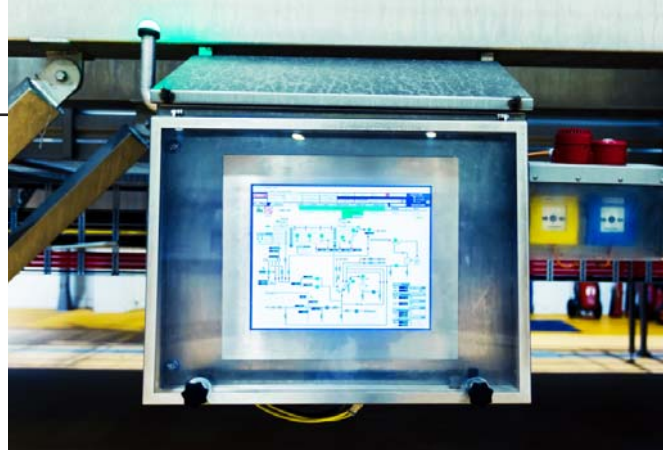
REMOTE SERVICE AND MAINTENANCE

A higher level of digitalization also makes it possible to operate remote. "The COVID-19 crisis made it almost impossible for our engineers to travel to our customers. We speeded up our pending development of Remote Service to anticipate these challenges. At this moment in time, we installed three complete processing lines remotely. One in Asia, one in Africa, one in North America. We could have never done that without the automation level of our equipment and the digital skills of our team.

Behind monitors in Montfoort, and with camera «goggles» on site, they managed to get the jobs done. This shows that preventive maintenance and additional service can be provided by the use of this data technology. And here as well, we just use the customers data on equipment. If we can prevent line stops by guarding data, we can solve problems before they occur."

WE ALL WANT THE SAME

"In the end, we all want the same: Predictability of processes and consistency of results. We used to find those in experienced people, high level knowledge and «trial and error» management. That made us all good at what we do. Now we add data. And we're entering a whole new world. If you look at the level of scientific research that is going



on right now at our lab on cutting technology, you will be amazed. Questions like: 'How to cut for coating', 'how to improve water flow', 'how to optimize potato orientation before impact on cutting knives', are answered by the data from high-speed cameras and other technology you would not expect in a factory like ours. But the generated data out of the research determine the cutting systems of tomorrow. Our customers have new requirements, big data help us to meet the demands on the way to predictability and consistency."

YOU DON'T SEE A THING

"When we discuss or present our vision on the factory of the future with our customers, we always show a black slide. 'This is your processing line of the future'. And by the time the audience thinks that power point let us down, they realize that it's a picture of a processing line in the dark. The processing line of the future needs no operators at line, so why leave the lights on? It is not rocket science; we already see it happen today. The management of the line is done by data. We see a big difference in the sizes of operating staff at different sites. But we also see a growing trust in the data that are collected for the control systems. So, in the end, potato processing lines will be the dullest factories you can imagine. You don't see a thing."

THERE'S MORE TO COME

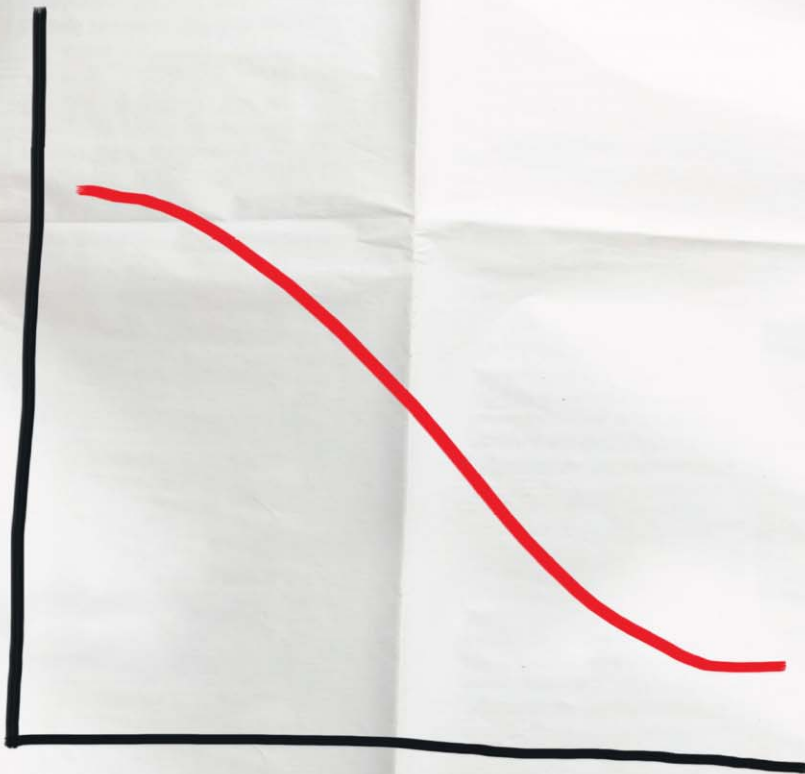
In the development of the factory of the future, Kiremko is more than just scratching the surface. And there is more to come. Optimizing potato processing can be supported by so much more information. About dry matter content, fat content, sugar content, you name it. In fact, technology now is able to follow every individual potato strip from washer to palletizer. It would probably need a data center the size of a potato processing plant, but once something can be done, in the future it will be done. Our kids today digest the amount of information daily that took a lifetime four generations ago. 25 years ago, you could save a company's data on a 50 Mb hard disk. Now that is the size of a 10 seconds videoclip. So, there will be more to come in the future. And Kiremko is ready for it: "Our customers and our planet need us to continuously improve the performance of our equipment. Saving water and energy, improving quality, safety and consistency, it all comes together in this factory of the future. Data are the invisible motor." ■



KIREMKO INTRODUCES THE OILGUARD

The quality of fried potato products highly depends on the quality of the oil that is used. The Kiremko OilGuard measures total polar material (TPM). The data collected allow constant monitoring of the oil quality. This in line measurements makes sampling and lab testing redundant. This way the OilGuard not only saves money in manpower, it also intensifies the sampling data. Depending on the process and the end product, the OilGuard does three to six measurements per hour. In the testing phase we saw oil quality levels rise towards quality requirement levels, leaving the operators more than enough time to adjust, so no end product was lost. Again, a money saver. But the most important guarding functionality is the food safety. The Kiremko OilGuard assures food safety specifications more than any other system in the world. After the testing phase, Kiremko now is looking for "launching customers" to further develop the OilGuard, by shared innovation, based on sharing data. The definite market introduction of the OilGuard is foreseen for Q4 2021.

**Our target for all
our clients this year**



Are you up for a reduction in your:



Cleaning time



Oil consumption



Power usage



Total cost of ownership

Head to kiremko.com



Future Processing



As the recognized global leader in industrial food cutting technology, Urschel is continuously adapting to the everchanging needs of processors. As an engineering/manufacturing company, every part and every process behind each part is consistently reviewed and refined.

By Expert Mike Jacko, vice president of Applications & New Product Innovation at Urschel and Expert Dustin Gereg, engineer at Urschel.



With so many capabilities under one roof, valuable developments and improvements are fast-tracked. Constantly partnering with processors and line builders, Urschel readily implements new methods

and efficiencies to benefit the overall production line-up, both upstream and downstream from Urschel cutting equipment. As businesses slowed due to the COVID-19 pandemic, many processors delved more deeply into the needs of their daily operations. Production lines functioned with a reduced workforce. Processors oftentimes ordered additional spare parts to keep at the ready, not knowing what to expect. Others looked more deeply into R&D. Processors are eager to look past the pandemic and toward the future. Knowledge learned during COVID-19 time will shape future decisions. As they look to the future to determine how their businesses may evolve, there is much to evaluate. With so many different styles of potato products, there are a wide gamut of potato production facilities around the world. Production and needs vary from regional processors to global, mega-processors. Future decisions will be as diverse as the operations themselves.

ANALYTICAL EFFICIENCIES

More customers are becoming aware of the overall analysis of plant line operations. Processors may choose to embrace gathering of analytical data. The more data that is gathered, the more in-depth decisions may be possible to increase plant efficiencies. The goals may be straightforward or more elaborate. The first step is to determine what types of improvements are necessary and to ascertain how to quantify the various objectives. The collection of any data should be backed by a concrete purpose. Gathering of data is futile without a comprehensive plan. Mega-processors have the capability to analyze the solid nature of the potatoes, water use, starch loss, cut quality, and multiple comparables to increase cut quality, evaluate sharpness and life of different knife blades, and determine cost analysis across the production line. As a processor grows in volume, the customer may choose to invest with the help of a line builder to increase electronic sensors and gather analytics at each step of the line. Analysis of data to determine an upgrade in technology may be simple or more complex. For example, in the case of a number of kettle chip processors who performed a side-by-side comparison for kettle fill times between the Urschel standard 8-station head versus the MicroAdjustable SL14-station head. Calculations

based on number of batches and fill times were easily achieved. Further cost analysis and comparison of maintenance procedures and time yielded upgrading to a newer technology – the 14-station head – as a logical next step to improve the line. Upgrading technology in one area of the line, may lead to changing out of other stations. For example, standard chippers updating to the SL14 slicing head, in some cases, purchased larger capacity downstream equipment, such as fryers.

TECHNOLOGY IN PROCESSING

Upgrading technology to improve the quality of the end-product is a consideration. Processors are currently incorporating PEF (Pulse Electric Field) Processing. This process replaces or reduces the need to blanch or to preheat treat. Pulsing electric waves move through the cell walls of potatoes. These waves perforate the cell membrane to create microscopic holes to release sugar and amino acid. This reduces acrylamide and lowers oil content. Effectively softening the potato reduces impact during the cutting process to promote increased knife life and decrease costs. Conditioning the potato increases product permeability resulting in less product breakage and more in-spec product.

USE OF SCRAP

Cost efficiencies are linked to a number of variables. Items on a spreadsheet, such as cost of oil and potatoes. The type of potato being processed. The type of potato sold for chips/crisps is more expensive than the type sold for fries. Could this change in the future? Fry producers repurpose scrap into a multitude of other value-added potato products. Building on these products will continue to deliver strong profits in subsequent years. The Comitrol® Processor series line by Urschel will remain a popular option for the further reduction of potatoes. With several different models from which to choose, products may be reduced to coarse or fine purees. The line focuses on particle size reduction. A reduction head in a fixed position works with a high-speed impeller that precisely and incrementally shears the product to a specified target size.

VALUABLE OPERATOR RESOURCES

Labor and skill level is an ongoing topic. The necessity to manufacture operator friendly capital machinery. Equipment operating at the push of a button with uninterrupted capability and limited downtime will remain preferred. Parts on cutting machinery are manufactured for quick, simple changeovers with built-in features, such as handles. This trend will continue. Simplifying the ability to run a line, limiting personnel and the skill level required, and manufacturing longer



Processors realize the benefits of comparison analytics to increase line efficiencies. Taking advantage of newer technology could decrease costs and improve end-product.



Parts on cutting machinery are manufactured for quick, simple changeovers, with built-in features, such as handles. This trend will continue.

running machines with even more durable components is essential as time goes on. Other items like trolleys and types of stands will continue to be designed to expedite routine maintenance. Urschel will continue to supply operator resources to assist lines with time-saving efficiencies.

CRUCIAL KNIFE TECHNOLOGY

In processing potatoes, inevitably foreign material in the form of rocks or sand, occur. New equipment is available to assist in filtering out foreign materials, but choosing the proper knife is an important factor. Knives will continue to play a crucial role in future cutting machinery. Urschel is constantly evaluating and testing new materials and exploring new manufacturing methods. Designing functional bevels and geometries unique to suit specific cutting applications will continue to be at the forefront. From low-cost knives to heavy-duty specialty knives, alloys are carefully chosen, and manufacturing methods are carefully aligned because details matter. Quality and creation of knives proceed in parallel. Overlooking details, such as the fact that all stainless-steel knives and carbon knives must be fully detectable by metal detectors, could be detrimental to a processing line. Food processors should evaluate and analyze available knives. Cut quality, wear-and-tear, and in-spec product may vary depending on knife choice. Numerous knives may exist to enhance production. Partnering with processors around the world

enables Urschel greater insight into the knives necessary for the processors of today and tomorrow. In-house capabilities remain strong with on-site metallurgy, engineering, and foundries working as a team to create new knives for future cutting applications.

EXPANDING OPERATING PRINCIPLES

The cutting machinery designs of today have a firm foundation of excellence in engineering and craftsmanship. Moving forward, the main operating principles will remain constant, however, increased capabilities will continue to evolve. Capabilities will expand related to cut sizes and cut shapes. Shapes are intertwined with the increased manufacturing of specialty knives. The demand for new shapes has been on the rise and will continue to do so. Increased growth in cutting parts and built-in feeding methods will occur. This growth will offer food processors ease of operation specific to their product requirements and time-saving efficiencies. As more and more products enter the marketplace, food processors seek solutions as to the most. The DiversaCut® line has expanded. Additional models now offer belt-fed discharge options for controlled exiting into totes. The large DiversaCut 2110A® Dicer can now be purchased with this feature. The Sprint 2® Dicer also offers a belt-fed discharge.

PAST-PRESENT-FUTURE

Everchanging, advancements in potato processing will continue to keep up with consumer-driven expectations. Processors are realizing the benefits of comparison analytics to increase line efficiencies. Taking advantage of newer technology could decrease costs and improve end-product. Time and labor savings is set to increase as more ergonomic elements continue to be designed. Manufacturing companies will continue to expand on resources available to operators. Broadening development of knife technology, including alloys and blade edges, will emerge to align with specific cutting applications. Improvements in cutting machine design will build on existing sound operating principles to increase capabilities in volume and cut shapes. ■





Advanced Smarter Slicing Solutions

Successful processors work smarter by choosing advanced slicing solutions found in the MicroAdjustable® SL-14 Cutting Head.

Available with and without quick-clamping technology, the SL-14 readily replaces the Model CC standard 8-station head offering 14 stations for nearly double the capacity.

▶ View videos and learn more at www.urschel.com.



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machinery throughout the world.



THEY
analyze
IT ALL

The food sorting industry has made incredible developments over the past decades, and today many sorting stages of potato processing are fully automated.

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ome of the main drivers for investments in sorting technology were increased productivity of processing facilities, shortage of labor, cost saving or reducing the impact of human error.

DIGITAL REVOLUTION IN POTATO PROCESSING

The big drive happening in other manufacturing industries for "BIG DATA" has pushed many sorting companies to explore new ways of how to add value for their customers. So, it comes as no surprise that these companies are now focusing a majority of their R&D resources on how to better utilize data captured by sorting equipment and adding devices that can gather and provide even more data to control and optimize the process. Insort is one of the pioneers in the field of inline data provision and utilizing that data to monitor and change process control parameters. Being the only company in the potato processing industry that can provide inline dry matter measurement (Inline FoodLab 4.0) integrated in end of line sorting equipment is just one example of how Insort is contributing to this data revolution.

SHERLOCK FOOD ANALYSER

Many years of development in house and in collaboration with customers in the field have shaped Insort's brand new redesigned 2nd generation Sherlock Food Analyser. This compact monitoring and process control system is the perfect completion of our product portfolio for the potato processing industry. Core of the Sherlock Food Analyser is the familiar and very powerful Chemical Imaging Technology – CIT®. Combined with the latest generation 4K high resolution color camera and Multi Sensor Fusion Sherlock Food Analyser has all the tools on board to provide most valuable inline and at line process control and product quality data. Deployed at multiple stages of the process, inline real time data generated is utilized to increase efficiency, product quality, maximize yield, reduce food waste and save valuable resources like water, energy and oil.

INLINE FOODLAB 4.0

In addition to all the design and hardware changes implemented in the new generation Sherlock Food Analyser Insort is also introducing Inline FoodLab 4.0. Created for the monitoring and process control system these new software features have also been made available to all of Insort's sorting platforms. Combining top of the line sorting solutions with inline process control and product quality data. Inline FoodLab 4.0 generates data in real time and provides it to customers SCADA system via industry standard OPC UA data transfer protocols and tools.

WHY POTATO PROCESSING IS A MAIN FOCUS

Potato processing is arguably one of the most automated industry in food processing. The volume of today's French fry processing lines exceeds 150,000 pounds of potatoes being processed every hour. Some of the big production facilities in the industry have multiple of these lines feeding the tirelessly growing demand for French fries and other potato products all over the globe. Without automation and big investments in sorting equipment, like Insort's Sherlock Separator whole potato sorter and Sherlock Hybrid frozen finished product sorter, it would have never been possible to grow the industry and processing capacities with such a rapid pace. Similar to what the automotive industry is to the global technology landscape, potato processing is a huge driver of innovation in food processing. High volumes and a lot of capital for investments have been a great breeding ground for innovation.

WHY DATA IS THE KEY TO SUCCESS

Most processing facilities are already equipped with enough sorting to create a very food safe and high-quality product. After years of optimizing product quality to meet the expectations of the consumers the tables have eventually turned. The biggest advantage that processing facilities can now generate to separate from competition is efficiency. For many years data has been utilized to back decisions made by raw procurement and processing. Due to the increased complexity of the process and the high volumes of product being processed, old fashioned data generating methods have become increasingly unreliable and inefficient for decision making. This is why we made it our mission to change how data is generated throughout the process and how it can be best utilized to add value.

CHANGING RAW RECEIVING AND GROWER PAYMENT

Old fashioned raw receiving data generation has been very labor intensive and slow. It still is a going practice to determine how the raw material will be utilized in the process and how much the growers will receive for their crops. The margin for error on both is very high because it is based on a statistically insignificant amount of data that is also being generated with subjective measurements by people. Implementing the Sherlock Food Analyser with Inline FoodLab 4.0 in a raw receiving lab not only increases the amount of data that can be generated in the same time but also the quality and reliability of this data. Highly accurate Chemical Imaging Technology - CIT® combined with 4K high resolution RGB camera technology generates data based on spectral information and color information at the same time. These optical sensors can process and classify products much faster and determine product quality

inline
FOODLAB 4.0



sherlock
food analyser



Implementing the Sherlock Food Analyser with Inline FoodLab 4.0, in a raw receiving lab, not only increases the amount of data that can be generated at the same time, but also the quality and reliability of this data.



Dry matter chart displaying mean and standard deviation

characteristics such as size, shape, scab, rot, surface defects and specific gravity in real time. More reliable data is a benefit for both processors and growers. The processors will be able to make better decisions on how to store and

process the raw materials coming in which has a positive impact on yield

and processing efficiency. The grower receives a much more detailed feedback about the quality of his product, which can be used for future improvements on the grower side. Electing and utilizing raw material in the best way has been best practice for many years but automating the data generating process is what brings raw receiving analysis to the next level.

PEEL SCANNER AND PEELER CONTROL

Many people in the industry are familiar with the concept of automatically adjusting the steam peeling process based on objective inline measurements. Unfortunately, the equipment used in the pioneer phase was equipped with technology that was not capable of delivering accurate and reliable data at all times in this harsh environment and on the everchanging product conditions. Some of the early devices worked very well for about 2-3 months of the season but as soon as raw material changed measurements started to drift and human intervention, in the form of recalibration and adjustments, was needed again. Insort Peel Scanner + Peeler Control utilizes Chemical Imaging Technology - CIT® to identify the chemical signature of Peel. This powerful sensor technology combined with extensive R&D efforts were the foundation of Insort's industry standard setting Peel Scanner. From early harvest to late storage the Peel Scanner delivers reliable data and control of the peeling process. The inhouse developed Peeler Control allows fine tuning of the control parameters like target peel value or peel

time limits by the customer. Whether your target is to reduce food waste and improve yield or to maximize utilization of re peeler Peel Scanner + Peeler Control on Sherlock Food Analyser and Sherlock Separator will improve your process.

FROM POTATO TO FRENCH FRIES

The biggest efficiency and ROI throughout the process can be gained when applying data driven decision making to control the process stages that turn cut fresh potatoes into French Fries. Starting with blanching, knowing as much as possible about the quality and uniformity of the product is essential. The better processors understand your raw material, the easier it is to change process parameters to create the best possible finished product. After blanching the dryer is the next big variable in the process that can be utilized to improve efficiency and boost product quality and texture. The more data gathering points you can create at these stages of the process, the better the understanding of raw product condition and process variables will become. The most essential position at this stage of the process for inline real time data gathering is the fryer. Sherlock Food Analyser and Inline FoodLab 4.0 provides valuable information about solids and color in line in real time. Fat and sugar concentration measurement as well as batter coating are just a few examples of valuable process information that will be available in the near future.

KNOW WHAT GOES IN THE BAG

In order to ensure that all the efforts put in at the different stages of the process are paying off a final critical control point at the end of the line for quality is imperative. Sherlock Food Analyser or Sherlock Hybrid, end of line frozen sorter, with Inline FoodLab 4.0 guarantee that the finished product in the bag meets the high demands of the customers and consumers. Providing data on product length, shape, surface defects, frying color, sugar ends and solids. All necessary quality parameters are provided inline and in real time. No more relying on labor intensive hand measurements taken every 20-30 minutes, providing customers with a guarantee based on representative data and large sample sizes instead.

EXCITING FUTURE

Even though the global pandemic has slowed down the growth of many industries and has had tremendous impact on the global economy, we all can look at the future of the potato industry very optimistically. With a slow but steady return to normal behaviors and a majority of people eager to get their life and habits back to where they were before, demand for potato products is picking up again. Most big players in the industry are starting to invest heavily again and the growing markets in Asia and South America are still providing a lot of room for future growth and expansions. All of this will put even more focus on sustainable and efficient processing and therefore an even bigger push towards more automated data-based decision making from beginning to end of the process. **Insort – Sherlock Food Analyser and Inline FoodLab 4.0 – WE analyze THEM ALL! ■**

Sherlock Hybrid-Sorter combined combined with Inline FOODLAB 4.0



It's all about **POTATO**



POTATO PROCESSING INTERNATIONAL

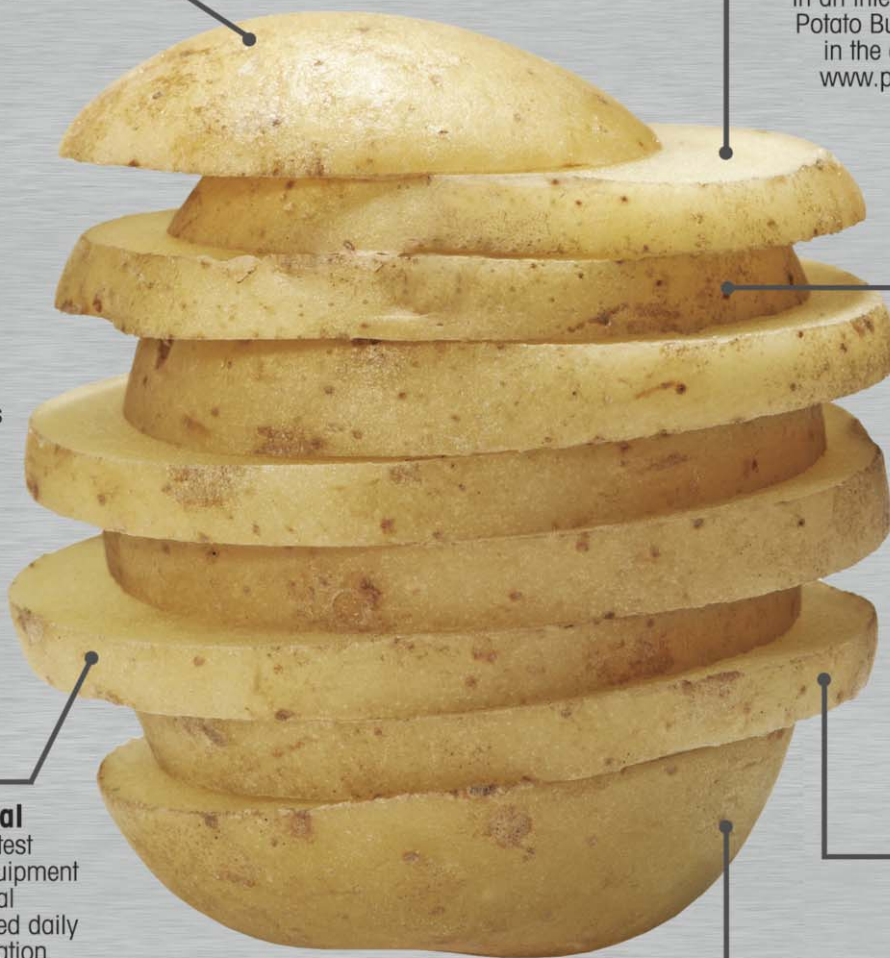
Potato Processing International has been serving the global potato processing industry for 25 years and is regarded as a must-have information source for potato processors, equipments and ingredients manufacturers, as well as players in storage, retail and foodservice.

This business-to-business magazine is published six times per year and continuously strives to be the most comprehensive publication, containing in-depth articles, expert views from some of the most respected companies in the industry, exclusive interviews, as well as news and trends.



POTATO BUSINESS Portal

From breaking news to the latest innovations in processing equipment and potato products, the portal potatobusiness.com is updated daily with the most relevant information for all players in the potato processing and storage industries. Regarded as a trusted source of information, the website also contains exclusive blog articles and white papers on various current topics that concern the potato universe.



POTATO BUSINESS DIGITAL

Tailored specifically to meet the needs of the busy professionals in the potato industry, Potato Business Digital is the first industry standardized digital magazine for tablets and mobile phones. This quarterly online publication presents exclusive articles on various processing topics, as well as information on ingredients, food safety and storage innovation, in an interactive and dynamic form. Potato Business Digital is available in the click-to-read format on the www.potatobusiness.com portal.



POTATO BUSINESS Weekly Newsletter

The latest news, exclusive articles and interviews are delivered directly to your inbox with our weekly newsletter service, containing pertinent information from trusted sources, as well as industry insights and updates.



E-BLAST

- Custom e-blasts using specific segments of our e-database, depending on the client's needs, with measured results.
- Special e-blast covering major worldwide trade fairs.



SPECIAL PROJECTS

- May - Potato Business Dossier 1
- November - Potato Business Dossier 2



A **COMPLETE** COMMUNICATION **PLATFORM**



Discussing Innovation in Packaging

I sat down with Shana Marais, senior manager, Public Relations for the Association for Packaging and Processing Technologies (PMMI), to discuss innovation in packaging, the lot and how it applies to a potato factory seen in the future, among others.

By Dan Orehov



What are the main steps relating to equipment for packaging of raw and processed potatoes?

Typically, potatoes are sorted by size and quality before they enter the packaging process by large industrial

weigher/sorters. The sorted portions are packed in their respective packages before transport to case packers or balers. From that stage, bulk raw potatoes are collected in large paper bags, burlap or plastic mesh sacks for distribution either directly to wholesale or retail and then to food processors. In the past decade, consumers have embraced an increased variety of potatoes, raising the need for smaller packages of raw potatoes including trays made of paperboard or plastic.

What are some of the state of the art, bestselling machines in this segment?

Once the potato is processed, vertical/form/fill/seal packaging machines are the equipment of choice for packaging processed potatoes like potato chips, as well as in retail packaging of French fries. They are fast and efficient, packaging dozens of packages per minute. These machines allow processors to automate and customize the entire forming, filling and sealing process.

Please discuss waste during the packaging process and what manufacturers and processors can do to minimize it. How does this connect with a sustainable strategy in the long run?

One way manufacturers and processors are finding to reduce packaging waste for produce is by changing to flexible packaging materials. These, with their lower production requirements in terms of water, energy, and raw products, produce less waste. They are also lighter, cutting down on transportation emissions. Upcycling, also known as creative reuse, is the process of transforming by-products, waste materials, and useless or unwanted products into new materials or products of better quality.

What can you tell us about saving energy/water/other resources when speaking about today's packaging equipment?

Sensors are the number one tool or potential retrofit to obtain a complete picture of a packaging machine's sustainable profile. Improved online sensors are needed to monitor scrap levels, alert for predictive and preventative maintenance, track quality control, measure yield, track energy and water used, and monitor temperature, time and pressure.

Do you agree that Industry 4.0 and IIoT are the future of the packaging industry?

Absolutely, especially as packaging machinery companies continue to embrace automation in their packaging lines to achieve higher efficiency and productivity. Companies in the packaging industry leverage smart manufacturing to maintain competitive advantage and meet their pressing business needs. The evolution of Artificial Intelligence (AI) and the expanding IIoT environment have run parallel to the increased penetration of robotics in the packaging machinery market. Collaborative robots (cobots) continue to emerge as a true Human-Machine Interface (HMI) on factory floors. Cobots are designed to be safer for humans to work in close proximity, compared to traditional industrial robots where safety is assured by its isolation from human contact.

What about food safety issues that can be eliminated by using state of the art packaging equipment?

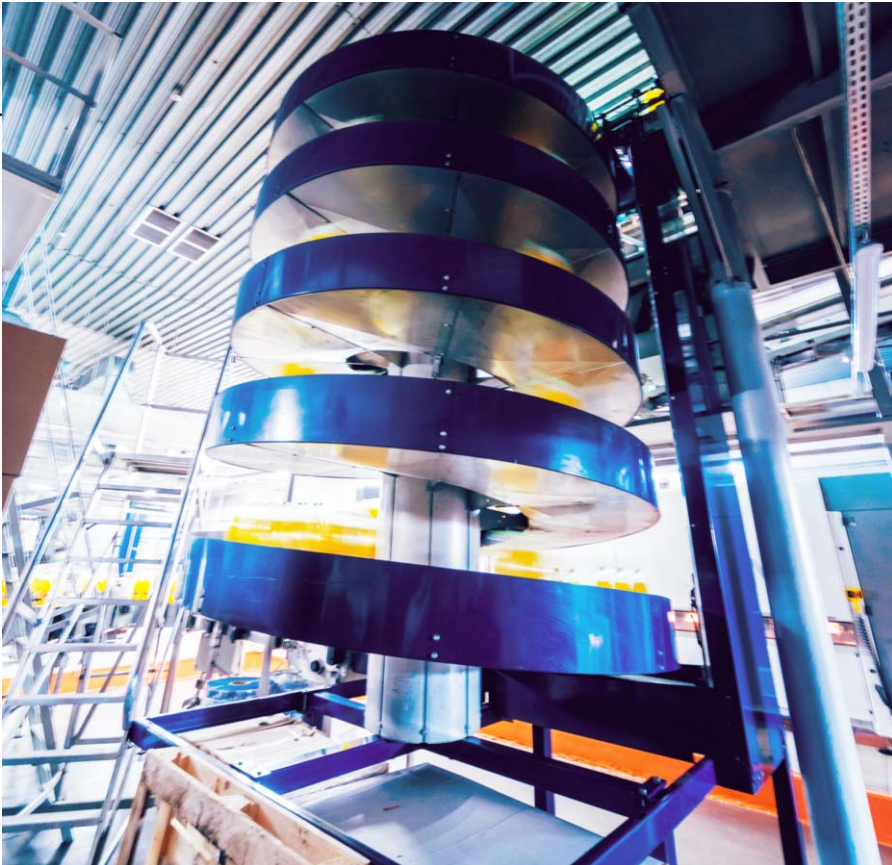
The Food Safety Modernization Act (FSMA) outlines that manufacturers must identify hazards, define preventative controls to eliminate or reduce the hazards, determine process parameters for these controls and then implement and continue to monitor the process. Monitoring ensures corrective actions are taken to verify the system is working properly. Preventive controls for physical hazards often include metal detectors and X-ray detection systems designed for food products. New advances in X-ray inspection technologies are helping the food industry identify contaminants during manufacturing. Such technologies include sensors that are capable of detecting ultra-small, non-metallic contaminants. The meat industry, for example, can reduce the risk of bone making its way into the final product, especially poultry processors that must combat a higher threat of this occurrence due to the thinness of the rib and fan bones. Upgraded X-ray systems produce higher-quality images and can find contaminants within products with overlapping pieces, such as fries, frozen vegetables or chicken nuggets.

Please comment on the current market conditions and the impact COVID-19 has had for your packaging members.

The full impact of COVID-19 on the packaging machinery market was not nearly as pessimistic as initial projections indicated in the first half of 2020, according to PMMI's 2021 World Packaging Machinery Report. The market quickly recovered and only experienced a slight bump in the road. A return to revenue growth is forecast for 2021 as well as the remaining years of the forecast period, through 2024. The virus and its impact on the

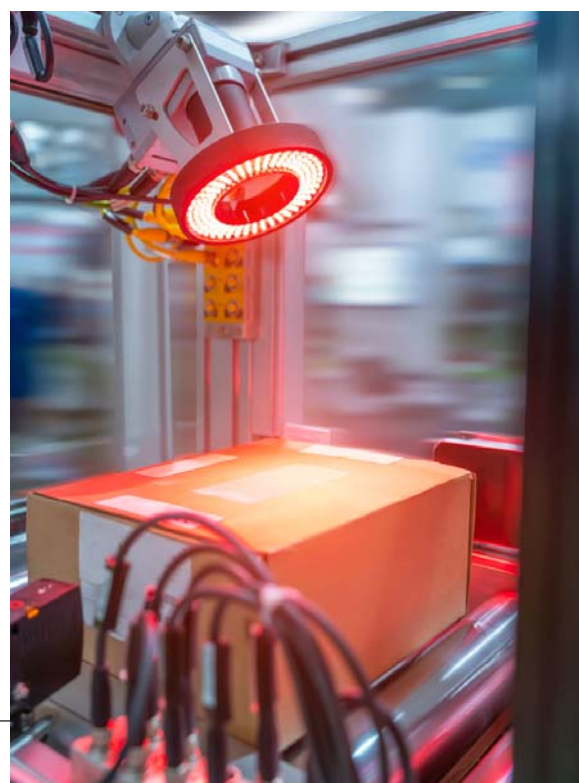


The evolution of Artificial Intelligence (AI) and the expanding IIoT environment have run parallel to the increased penetration of robotics in the packaging machinery market.



How do you believe the second half of 2021 will impact the packaging and manufacturing businesses?

The COVID-19 pandemic created a unique opportunity for manufacturers to connect directly with their consumers as the prevalence of online shopping exploded, according to PMMI's 2020 Secondary Packaging White Paper. With more consumers shopping online and more manufacturers and retailers engaging in direct to consumer (DTC) shipping, those operations that carefully align their packaging strategy with the sentiments and concerns of their consumers can strengthen their brand image. In many manufacturing plants around the country, automation plans are accelerating to accommodate the new operating demands for worker safety and hygiene. CPGs now need to accommodate a greater number of products and formats, creating a SKU crunch that has placed additional pressure on packaging. In addition to this increased production, packaging operations must also contend with unfamiliar and modified materials in the quest to meet the demand for greater levels of sustainability. Package security and durability are more important than ever with DTC shipping models and online shopping on the rise. To respond to these challenges, brand manufacturers have sought to increase their overall levels of automation and integration in packaging and are actively seeking out faster, more flexible machinery. OEMs and suppliers have an opportunity to work closely with manufacturers to understand their packaging needs and assist in making recommendations for continued automation, integration, and machinery additions to better accommodate faster production schedules and more diverse channel distribution. New technologies, solutions and education addressing the changing landscape of produce packaging are abundant at PACK EXPO Connects, a digital platform produced by PMMI Media Group. ■



2021

until 2024
are years
expected to
bring strong
CAGRs,
according to
researchers.

markets will be closely monitored and the forecasts will be updated accordingly. Anecdotally, most PMMI members reported 2020 as a successful year but remain cautious that a good portion of that business was existing order fulfillment.

If you can elaborate - what was the strategy they used to overcome these challenges and maintain a good relation with customers?

It's common practice now for OEMs to integrate these technologies in new generations of equipment. However, even with the technical capability available, there remains significant resistance to the adoption of remote access technologies by CPGs. As with all new technologies, there is concern about the effects that remote access could have on the performance of the line, and the reticence of IT divisions within the companies, as the technology leverages connection to the plant floor and enterprise networks. With Covid-19 affecting all businesses' ability to operate and the limitations imposed by social distancing, remote access adoption increased significantly between April and June 2020, the first three months of traveling restrictions in the US. During these past months remote access has been one of the main options available to keep production lines up and running.

Please discuss how maintenance and training programs were performed last year, with COVID-19 restrictions imposed on most areas?

Maintenance and training benefitted greatly from the willingness to embrace remote technologies. In instances where training was needed, but areas were in lock down, video trainings became the norm. Routine maintenance and/or trouble shooting also saw an increase in video and remote use.



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Connecting to an Intelligent Sorter

Potato processors of the future will be able to use data acquired from their lines to improve efficiency, sustainability, and profitability. **Global Product Manager Digital at TOMRA Food, Jeffry Steemans**, explains how, and gives examples of this already coming true.

"T

he factory of the future will have only two employees, a man and a dog. The man will be there to feed the dog. The dog will be there to keep the man from touching the equipment." Those provocative words might have seemed fanciful

when they were written by Warren G. Bennis, the internationally-respected organizational consultant and leadership studies pioneer, in 1991 - but now it is far easier to visualize them coming true. Indeed, Bennis' prediction aligns with three trends that TOMRA Food customers often mention during conversations:

- 1) Every euro or dollar counts, and food processors search for even the smallest profitability gains from their production lines.
- 2) Food quality and production targets become higher every year, while optimizing and controlling the quality of a food production line requires frequent sampling, classification, data analysis and constant fine-tuning of machine settings, which is increasingly complex and time-sensitive.
- 3) Most production plants have a mix of very old machines, recent machines and new machines - and the plant team has to make these work together, to produce increasing quality and increasing volumes at decreasing costs.

To help fulfil all these objectives, machines will become more intelligent and self-optimizing - but despite what Bennis said about the dog being there to stop the man from touching the equipment, machines will still need human input. Just as a self-driving car still requires a driver and a self-flying plane still needs a pilot, a food processing machine still needs an operator. So how much of the future can we clearly see in 2021? What does it mean for a food production plant to use big data, Industry 4.0, and the Internet of Things? Let's take a brief look at the methods, systems, and technologies that will become increasingly commonplace in the future, some of which are emerging.

CONNECTED SORTERS BECOME AN INTELLIGENCE CENTER

At TOMRA Food, we go beyond creating a food sorter that takes the optimal sorting decision: we add live data and information to the equation so that the plant's staff can improve their efficiency as a team and in their individual jobs. This means the food sorter is no longer just an isolated piece of machinery that sorts; it's also an intelligence center for the whole production line. This makes operations easier and more efficient in so many ways: quality management, process engineering and optimization, machine maintenance, and purchasing crops from growers. At the heart of this intelligence center is the TOMRA Insight subscription-based service, a recent innovation already delivering significant commercial

gains and which will become even more valuable as its capabilities expand in the future. TOMRA Insight turns sorting machines into connected devices that generate valuable process data, transforming sorting from an operational process into a strategic management tool. This data is gathered in near real-time, stored securely in the cloud, and can be accessed from anywhere (and across plants) via web-based desktop and mobile devices. Acting on this data pays off in many ways. Downtime is reduced by monitoring machine health in near real-time, supporting the management of predictive and condition-based maintenance and preventing unscheduled machine shutdowns. Throughput is maximized by evaluating throughput variations to optimize sorting equipment. Operating costs are reduced by identifying gaps in production and analyzing potential root causes. And sorting to target quality is enhanced by having accurate material-composition data that enables decisions to be based on more detailed information.

NINE EXAMPLES OF HOW DATA REALLY HELPS

Imagine a processor receives a 20-ton batch of potatoes from a grower and puts them onto the processing line. What can the processor's team do with the data and information that is shown in TOMRA Insight? Here are nine great examples.

- 1) Two minutes after the production line starts, the purchasing manager checks the TOMRA Insight quality report and sees that there is an 84% good product and 16% defects being kicked out. Suppose this is not in line with the agreed quality. In that case, the purchasing manager can work together with the grower to identify which defects were found (brown spots, rot, pieces of plastic or metal cans, etc.) and how to improve the quality of the next batches.
- 2) The quality manager checks the charts with the incoming defect flow and ejected defect flows. If they are consistent and stable, he is assured that his packaged product's quality will be within the customer's quality specifications. When TOMRA Insight shows a sudden peak in defect detections, the quality manager can quickly check the accept stream quality. This will reduce the amount of rework, customer quality complaints and call-backs.
- 3) The plant manager, suspecting that some of his TOMRA sorting machines are overloaded, checks the TOMRA Insight load report and sees that there are indeed frequent overload peaks. Now he can give objective data to the finance manager to get approval for a higher capacity machine.
- 4) The plant manager trusts his night shift team but is reassured each morning when he sees that the TOMRA Insight night shift report confirms the team did a great job: they produced the agreed quantities at the agreed quality level.
- 5) The process manager discovers in the TOMRA Insight load report that when he optimizes the sorter's infeed, he can squeeze one more ton of



The ability of the potato processing lines of the future to access specialist support, no matter where in the world they are located and what time of day or night it is, will be a huge practical advantage.



**TOMRA
Insight turns
sorting
machines into
connected
devices that
generate
valuable
process data,
transforming
sorting from
an operational
process into
a strategic
management
tool.**

potatoes per hour over the sorter without impacting the sorting quality.

6) The regional operations manager calls his plant managers and process engineers together to share best practices: the TOMRA Insight reports show that one of the plants produces significantly more with a better yield. This information leads to the implementation of their ideas at other plants.

7) The IT manager needs to set up a SCADA (supervisory control and data acquisition) system and a MES (manufacturing execution system). With TOMRA Insight, he has a 'sandbox' environment to explore and experiment with and can select the most relevant information to integrate into his international corporate IT system. In contrast, selected users can access TOMRA Insight in parallel for all the other information. The IT manager has a review with TOMRA every quarter to discuss the new functionalities that have been released for TOMRA Insight, to evaluate whether he would like to integrate these.

8) The shift manager calls TOMRA because the team needs to set up the sorters for a new type of crop from a new supplier, and his expert operator is at home. In an immediate response, the TOMRA Service engineer, sitting in his home office, uses his laptop computer to set up a secured connection to the sorter and helps the shift manager set up a new program. Within an hour, the sorter is ready for the new crop.

9) A maintenance manager in Sao Paulo, finding that he has a problem that he cannot fix, calls the TOMRA helpdesk. In response to this request, a TOMRA service engineer activates TOMRA Visual Assist on his laptop and sets up a secured connection to the camera in the maintenance engineer's smartphone. This enables the service engineer to see what the maintenance manager sees, helping him quickly solve it. Within half an hour, the sorter is ready, and production can resume.

REMOTE ASSISTANCE AND AUGMENTED REALITY

The ability of the potato processing lines of the future to access specialist support, no matter

where in the world they are located and what time of day or night it is, will be a huge practical advantage. And in this respect, too, a recently-launched technology shows us how this can work. By using TOMRA Visual Assist, a field service engineer can provide customers with advice just as if they were standing in front of their machine. This ability to solve problems remotely will result in more uptime and better machine performance and reduce the need for in-person visits. TOMRA Visual Assist is very easy to use and requires no equipment other than a mobile phone with a camera. When a potato processor requests support through a message, email, or phone call, the field service engineer sends an invitation to initiate the session. When the app opens, it seamlessly links through to a call with the TOMRA expert best suited to help with the specific challenge the processing line faces – someone who knows the line's application and the mapping profiles of their sorting technologies. The customer and service engineer communicate through voice and video, with the engineer directing the customer to point their mobile phone camera at what they need to see. If necessary, the factory and the service engineer can also share documents via TOMRA Visual Assist or annotate images to explain and clarify directions. More futuristic still, this technology also enables the use of advanced tools such as Smart Glasses, which provide an augmented reality remote intervention that leaves the technician or engineer on-site with their hands-free to operate with maximum safety.

PLANS FOR A TOMRA MACHINE MONITORING CENTER

These emerging technologies give us a good idea of what to expect in the future. And like so many technologies, they're evolving. The TOMRA Insight data platform, for example, is becoming more powerful all the time because its functionalities and features are reviewed and updated every three weeks in response to customers' needs and priorities. And the importance of remote assistance is reflected in TOMRA's plans to create a Machine Monitoring Center, a data operations center where experts will monitor all connected TOMRA equipment globally – and more than just providing machine users with reactive advice, it will also offer proactive services. Support will be available for equipment monitoring, operational data analytics, business intelligence, and data science. There are other exciting ideas and innovations in the pipeline at TOMRA which I'm not yet at liberty to talk about. Still, there is one thing I can say: knowledge really is power, and through fact-based decision-making, the factory of the future will be able to improve operating efficiencies, reduce food waste, enhance sustainability, precisely meet market demands, and increase profitability. It's a future to look forward to! ■



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All About Connectivity



The challenges we face due to the COVID-19 pandemic have led to new ways of cooperating with clients. A need to work efficiently and smart has always been important, but now, when travelling is a challenge, we are forced to find new remote support and communication solutions. “In a way, the pandemic has brought us even closer to our clients”, says **Sales Manager Fredrik Rönnberg** at **Rosenqvists Food Technologies**.

P

lanning and implementing a project for a new processing line today requires more active planning together through online meetings. More frequent touchpoints together in the project team leads to

active follow-up and clear allocation of tasks between us and the client's team on site. It is a win for us and a win for our clients. It is not easy to be a reliable partner when working from a distance, but we believe this way of working is here to stay.

SUCCESS DESPITE THE PANDEMIC

During 2020, we succeeded in starting up a completely new processing line for potato chips without setting a foot at the site. Before COVID-19, we never considered this an option. To succeed with a remote start-up, we are dependent on an active and supportive team from our clients. Luckily, our customers have been fantastic to cooperate with. The project teams at Rosenqvists have spent more hours in online meetings, working through remote tools such as Teamviewer and our recently launched R-CONNECT. These tools have given our process engineers and project leaders the ability to follow progress live and to assist with the right questions, testing and settings for all systems.

Thanks to the connectivity tools of today, we can troubleshoot and upgrade programming, test crucial sensors, change settings for motors and adjust temperature profiles in our frying systems. The R-CONNECT vpn module is a great chance to easily assist our clients whenever they need help. Through this module, we can get insights in the way the operators run our processing line and we are able to guide them in a cost-efficient way. "I strongly believe in a more frequent and productive dialogue with our clients thanks to tools like R-CONNECT", continues Rönnerberg.

MAKING LIFE EASY FOR THE OPERATORS

The control systems become more and more sophisticated. All sensors, motors, valves and data points offer endless parameters and settings to monitor for an operator. The challenge for us at Rosenqvists Food Technologies is to make the operators job as easy as possible. We need to highlight the right information and simplify both view and operation of the control panel (HMI) in best possible ways. With our frying systems for potato chips, our clients can produce a wide range of different products; classic chips,

batch-style chips, potato sticks, different thickness, various raw material characteristics and different production throughputs. They all require their own specific settings in terms of movement of product, water usage for cutting and washing, water temperature for blanching, temperature profiles and times for frying. Our objective is to make it easy for the operator, by selecting a recipe for the product they want to produce, during a shift. During start-up of a new processing line, we support our clients to develop these settings into recipes needed for the various products they want to produce. After this, we provide the operators with training towards handling of recipes and changing settings, which gives an easy-to-use guide for the operators. Then, of course, Rosenqvists also have built in supporting functionality for example our versatile frying system supports operation with an Automatic Set-point Temperature Adjustment (ASTA) in short. Using this tool enables the operators to keep the desired temperature profile in the fryer. If operators face challenges, our process engineers can easily connect through R-CONNECT and provide support.

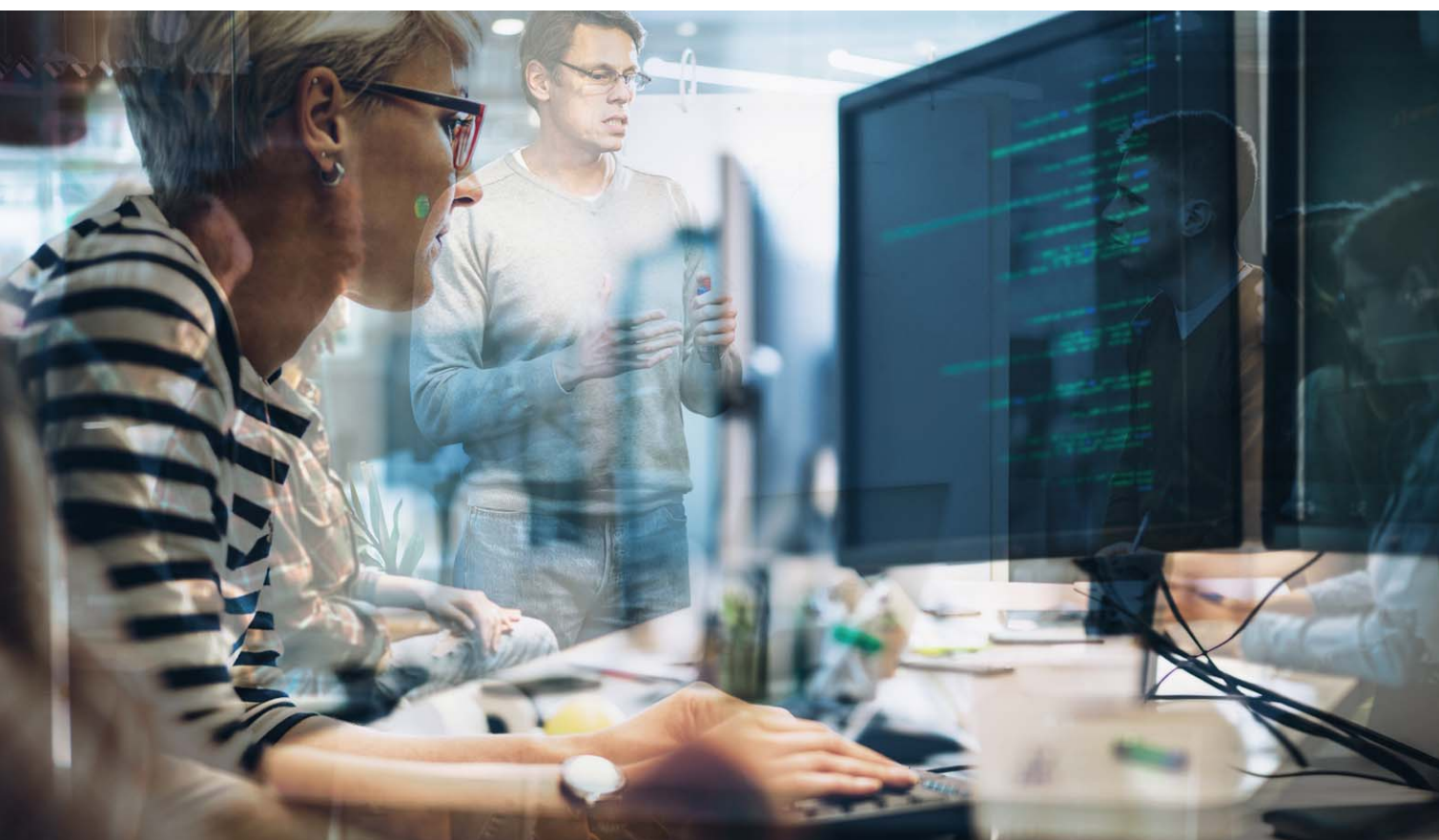
BEING ABLE TO ADJUST

A special area for development and improvement during last year has been our seasoning systems from Rosenqvists Food Technologies. The Seabase seasoning design has been smart, stable and cost efficient for many years. Still, managing required Catch-tests, monitoring and recipe development for the perfect application of seasoning has been a bit complex for our operators. With our latest control program, running the Seabase seasoning system is easier than ever. Catch test to measure flow of product and seasoning is a simple step-by-step guide. Adjusting application rate is a quick two click routine on the control panel. A reliable monitoring system with flow sensors and weighing scales offers reliable alarms when the application is off target. We know from experience that customers can save significant costs if they can apply seasoning in a stable way without waste.

Integration of new data points will be more important in the future. One example of this is the integration of NIR analysis we can offer today. Thanks to a good partnership with Perkin-Elmer (Perten), it is a quick and easy action to integrate accurate moisture and fat levels monitoring of the final product into the control system. We know, from experience, that fat and moisture are two crucial parameters when managing your blanching and frying systems. Therefore, it makes us happy to be able to present accurate information continuously to the operator. There is no



I strongly believe in a more frequent and productive dialogue with our clients thanks to tools like R-CONNECT.



2020

was when Rosenqvists succeeded in starting up a completely new processing line for potato chips without setting foot on the site.

excuse anymore to react too late when realizing moisture levels getting low and the risk of Acrylamide build-up is apparent.

AN EXCITING FUTURE

The processes of producing a frozen French Fry or a potato chip are the same today as they were 40-50 years ago. During these years, important improvements have been introduced such as multi-flow frying systems, 3-step washing systems, multi-turbulent blanching, pulse electric field technology, possibility of defatting products and other. Alternatives to frying in vegetable oil can today offer options, such as hot air expansion or salt roasting. Rosenqvists, as well as other suppliers, can certainly offer more versatile processing solutions which are safe and easy to use and secures a satisfactory level of food safety. Thanks to this evolution, new innovative products are launched to meet consumers interest in new products. We can see the interest in new raw materials, re-discovering traditional organic ingredients and a continued focus on health aspects. But the question how we will produce a French fry or potato chip forty years from now is a tough one? "The honest answer is that I don't know", says Rönnerberg. "We work in a very exciting industry and we will see what the next steps will be. We will most probably see more usage of large data collections and automatic systems supporting our clients to optimize processing operations



and maintenance. I believe we can do more to lower cost, monitoring and maintaining product quality and save both energy and water. In the end, our job is to make it easy and efficient to use our processing equipment." ■



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