FOCUS

INTERVIEW CHARLES BANKS
Co-founder of foodpeople, a UK-based global food trends and ideas agency, Charles Banks sources information from all over the world, processes it and concocts delicious forecasts of how and what we will be eating in the future.

STAPLE FOOD AROUND THE WORLD
Wheat, rice, maize and pulses are the staple food for a large majority of the world’s population. Some facts about regional preferences, production and food security concerns from Bühler experts worldwide.

SAKHI FOOD PRODUCTS, INDIA
Sakhi’s state-of-the-art rice milling made its flagship Master Brand rice the epitome of quality in Birbhum district.

DONGA ONE CORPORATION, KOREA
The Korean milling heavyweight strives for a high standard of craftsmanship in flour milling and sets an example for Asia.

VOIT, GERMANY
A typical supplier’s supplier, VOIT produces high-quality die cast parts for the automobile industry.

NEW BAGGING UNIT
DECONTAMINATING MAIZE
MEASURING PARTICLES ONLINE
Dear Reader,

Anybody who has ever travelled to distant countries knows that differences in cuisine are among the most distinguishing features of cultures. Conversely, familiar cooking smells tell us we have arrived home again. The countless varieties of culinary arts bear witness to the astounding innovative power of the human imagination.

At Bühler, we consider it our job to accommodate these variations not just through inventive technology, but also by building up local and regional expertise on consumption habits, processing techniques, and sales and distribution patterns. Through our country offices and national branches, we have intimate knowledge of our customers’ markets because we are part of those markets ourselves, both geographically and culturally.

The topic of this issue is “Food Around the World” (see the cover story, p. 6). Whether you are in the business of rice husking, flour milling, or any other of the innumerable forms of food processing, Bühler has the technical know-how, the cultural awareness, and the market knowledge to help optimize your plants and processes. Our partners value the sound advice we can offer because we know their business as well as the consumers they are targeting.

We hope you will enjoy your reading.

Calvin Grieder, CEO

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Cover: Christoph Langehenke, CEO of VOIT. Photo: Raffael Waldner
CHANGE IN THE EXECUTIVE BOARD

Samuel Schär will take over from Achim Klotz as member of the Executive Board and head of the Advanced Materials division in the course of the first semester of 2013. The 37-year-old Schär holds a degree in physics from the Swiss University of Technology in Lausanne (EPFL) and joined the company in March 2002. Beginning in the Business Development function of the Nanotechnology business unit, he accumulated management experience and know-how in the fields of development and market-relevant technologies. In 2009, he was appointed overall head of the Grinding & Dispersion and Nanotechnology business units. His entrepreneurial track record and his diverse skills enable Samuel Schär to continue the successful development of the Advanced Materials division of Bühler Group.

MAES SA JOINS BÜHLER GROUP

With the acquisition of Alsatian-based Maes SA, specialized in products and services for the grain milling industry, Bühler strengthens its service position in the French-speaking markets and expands in the fields of installation, customer service, maintenance, overhauls and roll reconditioning. The machinery of this family-operated company includes equipment for remachining grinding rolls of roller mills as well as for manufacturing and retensioning plansifter sieves. Maes SA has already been an important distribution partner of Bühler for France and other French-speaking markets in North and West Africa up to now, including after-sales service. Operations will continue to be headed by the existing management.

BÜHLER UK AWARDED SERVICEMARK

Bühler Ltd., the sales and service organization of Bühler Group in Great Britain, has been successfully awarded the ServiceMark accreditation, another proof of Bühler’s continuing commitment to service improvement. The accreditation process consists of self-diagnosis, customer satisfaction measurement and independent assessment and requires meeting the Customer Service standards as set by the Institute of Customer Service. This award demonstrates that Bühler is able to offer the highest levels of after sales service ranging from service contracts to complete machine refurbishments, training, consultancy and breakdown call outs.
NEWS

A strong performance in North America, as well as rising shares in the Chinese and Middle East/Africa market, together with strategic acquisitions balanced out an otherwise challenging fiscal 2012 for Bühler with disappointing figures in Europe. Of the divisions, Grain Processing and Food Processing attracted more orders, whereas the orders received by the Advanced Materials division were consolidated at the record level of the previous years. In total Bühler’s order intake increased by 5 percent to CHF 2345 million, and turnover (sales revenue) rose by 13 percent to CHF 2409 million.

With innovation its core growth engine, Bühler spent more than 4 percentage points of turnover on research and development, exceeding CHF 100 million. Due to acquisitions and a strengthening of the Customer Service organization, the group-wide payroll rose for the first time above the mark of 10,000 employees.

NEW GRAIN LOGISTICS TRAINING CENTER IN BEILNGRIES

Bühler Grain Logistics opened a state-of-the-art training and technology center in Beilngries that provides the appropriate framework for high-quality education and training of customers and employees. 270 square meters provide ample space for machines for grain cleaning as well as conveying and dedusting technology. In addition to the intensive education of its employees, Bühler will especially open the doors for its customers. The current training courses can be found on www.buhlergroup.com/global/en/services/training-courses.htm. Or, if you wish, please contact us directly at gl.service@buhlergroup.com.

BÜHLER GROWING WITH CONSTANT NET PROFIT

A strong performance in North America, as well as rising shares in the Chinese and Middle East/Africa market, together with strategic acquisitions balanced out an otherwise challenging fiscal 2012 for Bühler with disappointing figures in Europe. Of the divisions, Grain Processing and Food Processing attracted more orders, whereas the orders received by the Advanced Materials division were consolidated at the record level of the previous years. In total Bühler’s order intake increased by 5 percent to CHF 2345 million, and turnover (sales revenue) rose by 13 percent to CHF 2409 million.

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FOOD TRENDS MENU

STARTERS
MEGA TREND (NON-FOOD)

**Aging**
Most societies face a ticking demographic time bomb.

**Singletons**
More people are living (and eating) alone.

**Hectic households**
30-second microwave rice. Who's got time for that these days?

**Cynical consumers**
Many consumers now believe that companies are guilty until proven innocent.

**Localism**
A strong counter-trend to globalization.

**Connectivity**
Everything is increasingly connected to everything else.

**Personalization**
I want it my way. OK.

**BRIC consumption**
The rising buying power and changing consumption habits of consumers in Brazil, Russia, India and China.

MAINS
THE MAIN FOOD TRENDS

**Food inflation**
Food is about to get a whole lot more expensive.

**Value for money**
Value more than price.

**Provenance**
Who made it, when, where and how?

**Speed and convenience**
A need that will never die, some always want it faster, now.

**Indulgence and treats**
Because you're worth it.

**Authenticity**
Realness. You can't fake it.

**Regional cuisines**
Because we love the stimulus of variety from around the globe.

**All-day grazing**
We just can't stop eating. But why?

**Comfort food**
Food makes people feel happy.
Charles Banks, director of a food trends and ideas agency, thinks that food producers and retailers have to change constantly to stay on top of their game.

By Marc Engelhardt
Diagram: Why are trends important?

Banks: Things are moving much quicker than ever before. Only five years ago or so, trends took time to move around the world. But now with Twitter and Facebook and other social platforms, everything changes very quickly.

Say I was a pasta producer looking for new opportunities – what would you tell me?

Explore tradition, history, authenticity and provenance of your product in Italy. After that, go to a cosmopolitan city in the world with a large Italian influence, say New York, to understand how pasta in a modern and contemporary context is evolving. We at the foodpeople would be planning the itinerary and identify the most appropriate restaurants, markets, chefs or supermarkets to go to.

Which global trends are currently shaping the world of food?

Many parts of the world are in recession. Consumers feel uneasy, so they connect with historic reference points, perhaps food their parents might have cooked, or brands and flavors from their childhood. It’s food to make oneself feel settled and comfortable again whilst there is an unsettling world outside. The result we’re seeing at the moment is comfort food and comfort flavors with a level of modernity, a little twist or a little surprise.

Which regions are the most influential?

In the UK and in France, we see some influence from the US, for example gourmet hot dogs or gourmet burgers. Then we have emerging cuisines: we see Peruvian food, and Brazilian influences around the world. So far, we’ve only seen a fraction of the ingredient innovation yet to come out of South America. Many chefs want to go to South America to learn. That is not to say necessarily that we expect to see South American convenience meals or South American restaurants. But there are some new ingredient reference points and different cooking and preservation techniques that chefs are currently excited about. And this will sooner or later affect the whole food industry.

Countries like Brazil are also emerging as new food consumers.

Historically, emerging economies like Brazil, India or China did not have a developed middle class. But now there is growth and wealth, which is changing food consumption patterns around the world. Basically, they are eating things they’ve never eaten before, which is putting pressure on the supply chain globally. Prices in the developed world for certain cereals, for red meat and some white meats are increasing. And particularly global brand owners might be looking at local taste palettes and tailor products to make them more suitable to those markets.

Globally, people have less and less time to eat – what does that mean in terms of trends?

The biggest trend of all is convenience. We think that we are working more, for example because the smartphone brings work into our home environment. Even if you’re part of a nuclear family, you may well be eating at different times. You have counter trends like more frugal, natural food coming from Scandinavia. These influence the big trends. So we’re probably looking for higher levels of taste and flavor delivery in convenience products. We want things fuller in taste, and also healthier.

Let’s look at specific products. Which trends do you see in pasta?

Italians have been a bit slower to catch up in terms of modernizing what they are doing, but there is a huge amount happening now. Just the other day I was looking at little convenience pasta pots that are designed for
serving in the street as an on-the-go product. Two years ago, there was a single pasta pot supplier, now there are already quite some. That’s one example how pasta is coming into the modern world of street food in order to satisfy consumer needs when they’re on the go.

What’s happening in flour?
One of the key things is that there is a huge growth in lifestyle food intolerance – people who are intolerant or simply feel better for not consuming wheat, for example. It doesn’t mean that they have a diagnosed intolerance to wheat; some consumers just opt out of the consumption of wheat for one or two days a week. So there’s an opportunity for businesses and brands in developing products to fit that need, as in Quinoa flour and other varieties of gluten-free flours.

How about rice?
There’s huge proliferation of rice varieties for different uses and occasions, especially when you look at the premium end. At the same time, rice is getting more expensive than it used to be, due to weather patterns and also as consumer habits change around the world. That will increase pressure on the supply chain.

And finally: chocolate?
There is a lot of innovation in chocolate: chocolate with popping candy, chocolate with melting middles or with elegant wrapping to make it look beautiful. Chocolate is one of the products which is often the first to adopt trends, for example when we saw chocolate being fused with savory flavors, such as chili, salt or herbs.

What general trends do you see for a company like Bühler, producing machines for the food industry?
The biggest challenge for a machine manufacturer must be balancing efficiency with flexibility. I work a lot with manufacturers and retailers who want to do more things on their production lines, and more efficiently. So they change covers between different products or use different ceiling heads. And the equipment always needs to be as fast and slick as possible. To be able to do as many production formats or shapes of packaging on one production line would be fantastic. I think that’s the holy grail. And there’s food safety of course: Consumers simply expect big brands and retailers to have the highest possible levels of food safety.

“The biggest challenge is to balance efficiency with flexibility. Manufacturers and retailers want to do more on their production lines, and more efficiently.”

Charles Banks (38) used to be a chef before he and a colleague seven years ago founded the foodpeople, a global food trends and ideas agency based in England. Global as well as medium sized companies work with the foodpeople to aggregate information based on a network of food scouts in 33 different countries, a global menu analysis as well as social trends on the Internet. The trends ideally lead to the innovation of certain products. www.thefoodpeople.co.uk
Share in global production of staple foods in 2011:

<table>
<thead>
<tr>
<th>Country</th>
<th>Wheat (%)</th>
<th>Rice (%)</th>
<th>Maize (%)</th>
<th>Pulses (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>China</td>
<td>17.9</td>
<td>30.8</td>
<td>23.8</td>
<td>6.8</td>
</tr>
<tr>
<td>India</td>
<td>14.3</td>
<td>21.1</td>
<td>26.2</td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td>9.4</td>
<td></td>
<td>32.3</td>
<td>4.4</td>
</tr>
<tr>
<td>Russia</td>
<td>5.9</td>
<td></td>
<td></td>
<td>22.8</td>
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<tr>
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<td>Bangladesh</td>
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<td>Vietnam</td>
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<tr>
<td>Thailand</td>
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<td></td>
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<td>Brazil</td>
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<td>8.3</td>
<td>5.1</td>
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<td>Argentina</td>
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<td>Mexico</td>
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<td>7.8</td>
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<tr>
<td>Canada</td>
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<td>5.7</td>
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<tr>
<td>Australia</td>
<td></td>
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</tbody>
</table>

All data from Food Balance Sheets FAO.

STAPLE FOOD AROUND THE WORLD

The diet of a staggering majority of the world population, almost 6 billion people, relies on wheat, rice, maize or pulses. Assuring a steady supply of these staple foods all over the world – while minimizing post-harvest wastage, improving hygiene, and maximizing nutritional value – is a paramount contribution to global food security. Bühler experts from different units and different corners of the world share their insights into the challenges and technological solutions.
WHEAT

Wheat is a staple food around the globe, yet it is consumed in very diverse forms from country to country. **China** is the **leading producer and consumer** of wheat products, mainly noodles, and **India comes second** with wheat flour as the main ingredient for chapatti flatbreads. **One third** of the global wheat production is used for **animal feed**.

Global wheat for food use (2009)

**Wheat – staple food for 3 billion people**

- **Bread**
  - white bread
  - whole grain bread
  - flatbreads (chapatti, naan, roti)

- **Pastry**
  - biscuits
  - cakes

- **Pasta**
  - Italian pasta
  - Asian noodles
  - fresh
  - instant

**Spotlight: Diversity in Wheat Milling**

“In all major markets, Bühler has locally-based milling experts who understand the market needs and can develop adequate technology to meet the market and customer demands. Consequently, flour mills around the globe differ significantly from each other – even if they use the same kind of process equipment, such as roller mills and plansifters.”

Martin Schlauri,
Managing Director, Grain Milling
Much of the global rice harvest is consumed where it is grown. This is due to market structures, but also to policy: Because rice is a staple food, many governments exert control by maintaining reserves for food security and restricting paddy or husked rice exports to protect domestic processing. Only 5 to 6 percent of global rice output is traded internationally. Since rice requires 2 to 3 times more water than other cereals, many countries equate the rice trade to trading of water.

Global milled rice for food use (2009)

Rice – staple food for 2 billion people

- **Cooked rice**
  - sticky rice
  - loose rice
  - risotto
  - rice porridge or pudding
  - glutinous rice cakes (mochi)

- **Flour**
  - rice noodles
  - rice bread
  - pancakes (dosai)
  - dumplings (siopao)

- **Puffed rice**

**Spotlight:**

**Post-harvest food wastage**

“By reducing post-harvest losses, supply could be increased by 20 to 30 percent without increasing land cultivation or spending on seed, fertilizer, irrigation and plant protection. Post-harvest waste occurs mainly during bulk cleaning of paddy, drying, storage and transportation. In Asia and Africa, high waste is due to: Lack of cleaning and drying prior to storage; spillage and theft during transport; inadequate storage resulting in spoilage, infestation, and quality loss; lack of bulk transport facilities; and use of sun drying instead of modern drying equipment, allowing parasites to eat or damage the crop.”

Sujit Pande, Global Product Manager, Rice Milling
Faust: Maize as a staple food is found mainly in sub-Saharan Africa and Central America. In Africa, maize is processed to flour (mealie-meal) and cooked to a mealie-pap. In Central and South America, maize is processed to tortilla (Mexico, Central America) or arepa (Venezuela, Colombia). Most maize, however, is processed into animal feed.

Global maize for food use (2009)

Maize – staple food for 700 million people

<table>
<thead>
<tr>
<th>用途</th>
<th>相关产品</th>
</tr>
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<tbody>
<tr>
<td>Flour</td>
<td>mealie-meal, mealie-pap, instant maize, tortilla flour, arepa flour</td>
</tr>
<tr>
<td>Cornmeal</td>
<td>grits, polenta</td>
</tr>
<tr>
<td>Cereals</td>
<td>corn flakes</td>
</tr>
<tr>
<td>Starch</td>
<td></td>
</tr>
<tr>
<td>Oil</td>
<td></td>
</tr>
<tr>
<td>Syrup</td>
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Spotlight: Technology for different processing techniques

"Products for human consumption in particular require precise and reliable cleaning, degermination, grinding and sifting to reach the desired specifications and quality. Process techniques vary considerably between native and pre-cooked maize products. Furthermore, processing whole grain products such as tortilla flour or refined maize flour like mealie-meal requires various techniques that we have specifically developed for the purpose."

Martin Schlauri, Managing Director, Grain Milling
PULSES

As a major component of traditional meals and snacks, pulses are an important and cheap source of protein, but also dietary fiber, starch, minerals, and vitamins – especially for India’s large vegetarian population. Pulses typically contain 20 to 25 percent protein. Antioxidants are very high in many bean types. Because they are highly drought-resistant and can bind atmospheric nitrogen, pulses serve as a rotational crop and enrich the soil.

Global pulses for food use (2009)

- India 34%
- Brazil 8%
- Egypt 1%
- Mexico 3%
- Bangladesh 2%
- Myanmar 2%
- Other 50%

Pulse consumer products

- Lentils
  - whole
  - dal
  - soup
  - salad
  - flour
  - papadam
- Chickpeas
  - whole
  - curry
  - soup
  - salad
  - purée
  - houmous
  - gram flour
  - pancake
  - flatbread
  - pakora
- Dried beans
- Dried peas

Spotlight: Food safety and hygiene

“Proper aspiration systems ensure dust-free and hygienic plants. Bühler solutions for pulse processing are designed to prevent cross-contaminations and ensure food safety. Automation in Bühler plants reduces manual handling of product and prevents contamination through human touch, while optimized processes prevent excessive pre-conditioning and preserve the nutritional value of pulses while increasing yield.”

Surojit Basu,
Product Manager Pulses, Spices & Sesame
TRENDS IN GLOBAL FOOD CONSUMPTION

ANIMAL FEED

Two thirds of the global maize, more than 80 percent of the soybean and one third of the wheat production is processed into animal feed. Surveys have seen a rise of meat consumption globally, with developing countries catching up – Latin America’s estimated increase in the period 2010–2015: 11 percent – and developed countries further increasing their annual meat intake – North America believed to add further 5.5 percent. Concerns over animal feed hygiene have increased, as only safe feed ensures safe animal products.

Spotlight: Feed and food shortage

“Wheat used as animal feed is usually lower-grade wheat. The complex reasons for food shortages include climate factors, speculation on the commodity markets, but also losses along the transportation and processing chain. Bühler’s latest development, an industry-first new pellet mill with 30 percent less energy consumption in the production of animal feed pellets, significantly reduces waste of unhygienized product compared to competitor solutions.”

Stefan Hoh, Product Manager Feed, Feed & Biomass

FORTIFICATION

Flour fortification, especially with iron and folic acid, is crucial worldwide, particularly for children and pregnant mothers. In 75 countries, wheat flour fortification is now legally required. Also, 30 percent of the flour produced in industrial mills globally is fortified. The combined population of the mandatory and the voluntary countries is more than 2 billion.

Spotlight: Higher nutritional value

“Our projects to ‘industrialize’ village mills producing atta flour in India and to develop small, compact, transportable and low-priced corn mill in sub-Saharan Africa can bring fortified flour to where it is needed, while reducing transport and therefore spoilage of crops. Our instant maize project in Africa is an excellent example of fortification, since the cooking process is reduced to a few minutes and therefore added vitamins will stay biologically active.”

Peter Böhn, Head Nutrition Solutions
With a state-of-the-art Bühler rice milling line, Birbhum-based Sakhi Food Products is set to become a national player in the future.
SEEDS OF CHANGE

Within six months of operations, Sakhi Food Products’ Bühler rice mill has brought about a string of changes in the rural district of Birbhum in West Bengal, India.

By Swat Prasad  Photos by Muralidharan Dasarathi
In January this year, Sanjay Kumar, the 37-year old promoter of Sakhi Food Products, received news that empty bags of his flagship Master brand rice were being bought from villages in Birbhum (an underdeveloped district of West Bengal) and repackaged with raw rice.

Though he is now taking action against this misuse, at first this imitation took Kumar by surprise. Raw rice is typically priced higher than the parboiled rice sold by Sakhi Food. Counterfeit sales proves that Master brand has become synonymous with high quality in Birbhum. While adjoining Bardhaman (the most advanced district in West Bengal) has several state-of-the-art rice mills, the Sakhi Foods mill is the first in Birbhum. That’s because almost 40 percent of Birbhum’s population lives below the poverty line (people consuming items less than INR 26/USD 0.48 per day). For traditional millers, technological investments meant higher costs, which in turn meant costlier rice for the poor.

But things are now about to change with this Bühler rice mill, set up in September 2012. Several traditional rice millers in Birbhum are in talks with Bühler and its competitors to set up contemporary mills. “Though our costs are much higher than traditional mills, our high-quality parboiled rice has changed preferences of consumers in the region,” says Kumar.

In December 2009, when Kumar decided to diversify his father’s 40-year-old stone mining business into rice milling, he chose Bühler for its superior technology and strong presence in India. Bühler, in turn, helped Kumar understand the rice business and to concentrate on the rice-rich belt of Birbhum.

“I Today, we are milling 120 tons per day (tpd), out of which head rice accounts for 70 tpd,” says Kumar. He plans to increase production to 160 tpd by April 2013 through process improvements.
The next step would be to increase capacity and take Master rice beyond the 150-kilometer radius in which it is being currently sold. Kumar wants to increase this radius to 250 kilometers by May-June this year, and to nearly 1,000 kilometers by 2015. “By 2020, we wish to be national players,” he says. That’s when Kumar plans a diversification into refining rice bran.

This technologically advanced rice mill is also fetching a better price for paddy farmers. But the real change will come when purchasing powers increase. Kumar is hopeful that the Indian government’s recently launched Direct Benefits Transfer (DBT) programme will bring about that change.

Under this scheme, several benefits, including subsidies for food, will be remitted directly to the bank accounts of the beneficiaries. The current food subsidy scheme is fraught with governance and oversight issues. The DBT programme will improve transparency in the system. “With more money in their hands, poor people will want to purchase better quality rice,” says Kumar.

But what about competition from traditional millers who are setting up modern mills? “Competition is always good. It will grow the market and create more jobs,” Kumar believes.

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"Our high-quality parboiled rice has changed preferences of consumers in the region."
Sanjay Kumar,
Promoter of Sakhi Food Products

Sakhi Food Products
- Rice mill capacity: 160 tpd
- Location: Rampurhat, Birbhum
- Investment: INR 120 million (USD 2.23 million)
- Expected turnover in first year: INR 350 million (USD 6.52 million)
- Employees: 100 (unskilled: 60)
The state-of-the-art production facility in Dangjin will reach full capacity later this year when the last of the five projected lines will be installed in September.
A MODEL FOR ASIAN FLOUR MILLERS

South Korea’s DongA One Corporation recently established the first fully automated flour milling complex in Asia in response to constantly increasing customer requirements. The Dangjin factory uses state-of-the-art technology, including the WinCos production control software and innovative roller mills for higher flour consistency, yields and plant efficiency.

By Young-gyo Kim   Photos by Hans Sautter
It is a misty morning in Dangjin, 120 kilometers south of the South Korean capital Seoul, but the bustling port city on the west coast is far from sleepy. Dangjin is home to one of the most advanced flour milling plants in the world. Run by the DongA One Corporation, it is working overtime to boost production and efficiency. DongA One Corporation’s CEO Rhee Chang Shik is full of energy. He heads a growing company that was one of the country’s first flour millers – and the expanding state-of-the-art complex in the coastal city is the jewel in its crown.

It is the first flour mill in Asia with a fully automated milling process, and it uses Bühler’s production control system WinCos. The full automation of the facilities allowed employees in the Dangjin factory to control all processes automatically, from production of flour to wheat warehousing and from packaging to loading final products for shipment.

Rising standards
DongA One prides itself on its role in rebuilding the South Korean economy following the 1950–1953 Korean War. It was one of the first flour millers in the country, and nearly 60 years on, the South Korean firm has emerged as a model for other Asian flour millers to follow. It takes particular pride in this cutting-edge factory. In 2004, DongA One set up a task force dedicated to developing plans for new production facilities in Dangjin, which is one of the top five trade ports in South Korea.

“The plan was to achieve a high standard of craftsmanship in flour milling, rather than simply to build another mill,” says Rhee Chang Shik. “Demand for quality and food safety was rising, and we wanted to go above and beyond what was seen as possible at the time. The transformation was necessary because rising incomes in South Korea caused requirements to grow across the board.”

Bühler was involved in the planning stage from the very beginning. Working in close partnership with Bühler, DongA One broke ground on Dangjin factory in 2009, embracing state-of-the-art technologies while devising strategies to win buyers in South Korea’s highly segmented flour market. Bühler’s new generation of roller mills facilitated improved consistency in products, with the factory now delivering the highest possible yields of flour from wheat and boosting efficiency in the production process.

Korean powerhouse
The whole complex is spotless and gleaming. With the air replacement system that operates in the entire factory, DongA One implements the strictest standards of hygiene and blocks any outside contaminant effectively. The system supplies clean air of 540,000 to 600,000 cubic meters of clean air per hour (air volume). Meanwhile, Bühler’s WinCos system allows inventories to be kept to a bare minimum and offers a favorable price-to-performance ratio.

Work is still underway to expand the complex, and when completed in September this year, the Dangjin factory will produce 6,750 tons of flour a week and 27,000 tons a month, compared to the current 4,200 tons a week and 16,800 tons a month. It will have five production lines, labeled A through E. The A and B lines will grind 350 tons of hard wheat and 350 tons of multi-purpose wheat
per day, while the C line will produce 450 tons of soft wheat per day. The D and E lines will grind 36 tons of organic wheat and 36 tons of whole wheat per day, respectively.

Completion of the expansion will coincide with DongA One’s 60th anniversary this September – a fitting tribute to a company that, in partnership with Bühler, has constantly looked to evolve and improve. The Korean powerhouse, which currently holds a whopping 40 percent of South Korea’s business-to-business flour market, says it is aiming for 1 trillion won (USD 917 million) in revenue by 2015. It also plans to expand its presence in overseas markets, especially in neighboring China, seeking to boost to the ratio of overseas sales to total sales to 30 percent by 2015 from the current 10 percent.

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DongA One Corporation

- By September 2013, the Dangjin complex will produce 6,750 tons of flour per week, i.e. 27,000 tons per month.
- DongA One Corporation accounts for 40% of the Korean B2B flour market.
- The company will celebrate its 60th anniversary this year.
- Its five Dangjin production lines will process 1,222 tons of wheat daily.
- Bühler cambers the rolls of its mills, as required by customers. In the subsequent camber tests, its rolls are checked to one thousandth of a millimeter.
“The plan was to achieve a high standard of craftsmanship in flour milling.”

Rhee Chang Shik, CEO, DongA One Corporation

Rhee Chang Shik is the energetic CEO of DongA One Corporation, a pioneer in the Korean flour milling industry and a model for other Asian companies.
TOP SUPPLIER TO TOP CUSTOMERS

Aluminum is light and stable and can be formed into a myriad of shapes. For this reason, it is also a highly popular engineering material in the automotive industry, for example for making gears. Leading manufacturers such as ZF Friedrichshafen buy some of the gear components they need from vendors, for example from the VOIT company in St. Ingbert, Germany. VOIT, in turn, has relied for years on Bühler die casting technology.

By Klaus Pfenning  Photos by Raffael Waldner

Without the slightest jolt, the big flashy car changes to fourth, fifth, then sixth gear. Eight-gear power transmissions supplied by ZF are considered the ultimate in automotive engineering. Premium carmakers such as Audi or BMW incorporate them in their cars, as well as luxury brands such as Bentley or Aston Martin. The required components are manufactured by the aluminum die casting process. In this process, molten aluminum with a temperature of 700 degrees Celsius is forced under high pressure and with high velocity into permanent dies made of hot-work steel. VOIT, a family-owned company with some 1,800 employees worldwide, is a specialist in this technically very demanding field, in which extremely tight manufacturing tolerances are specified when it comes to making gears.

The Saarland-based company has been a key supplier to ZF for many years, supplying over 1.5 million intermediate plates, piston rings, and pots per year. When BMW started equipping all model series with ZF gear transmissions some time ago, the Munich-based carmaker was giving an indirect signal for launching the highest capital investment ever made in VOIT’s history. Within a mere six months, a 4,000-square-meter manufacturing hall was constructed for tens of millions, equipped with six Bühler die casting machines of the same type. A seventh machine will be added in the second quarter of this year.

“Six months – a sensationally short time for construction and start-up,” says Managing Director Christoph Langehenke. This accomplishment is “not least owed to the huge efforts and commitment of Bühler, from project engineering through start-up.” Both companies have worked together since the nineties, and since 2008 Langehenke has ordered 14 machines from the Swiss
Technology Group. Four of them are located at the company’s Polish site of Nowa Sól; VOIT operates further production facilities in France and Mexico. “Bühler’s track record in serving us has been outstanding,” he explains, having formerly worked as a mechanical engineer with an Original Equipment Manufacturer in the automotive industry.

He says that the machines are exceptionally modern and very rugged, and that they boast numerous features and excellent control systems. He is just as satisfied with the online diagnostics, remote monitoring via the Internet, and service. The die casting systems were designed in a joint project with Reis Robotics, a German automation specialist. Among other equipment, Bühler supplied the heating and cooling units, the sprayers, and the furnace. The group of six machines has been designed to allow each system to manufacture every product destined for ZF. “Supplying and starting up six casting systems at a time is something quite special, even in an industrialized country such as Germany,” adds Hartmut Schmidt, Bühler’s Die Casting unit manager in its branch office in Mannheim, which looked after the project. In the new hall up to 2.3 million parts are to be produced annually – exclusively for the joltless eight-gear power train of ZF Friedrichshafen.

Christoph Langehenke is VOIT’s Managing Director.

VOIT
has been a classical “supplier to a supplier” of the automotive industry for over 65 years.

• VOIT’s customers include ZF Friedrichshafen and a number of other industry giants such as Bosch, Continental, Behr, or Brose.

• Among other components, the company supplies housings for windshield wipers and ABS motors, chassis parts and stampings for seats.

• VOIT manufactures a total of some 140 million components annually, not only by the aluminum die casting process, but also by cold- and hot-forming.

• They are incorporated in more than 250 models of 40 car brands worldwide.

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The fully automatic bagging of flours, premixes, or granular products requires impeccable operating reliability. In this respect, the Bühler Maia bagging unit MWPG sets new standards.

By Thomas Ziolko

The team who developed the Maia bagging unit MWPG had an ambitious vision: They wanted to offer demanding customers in the grain processing industry a bagging unit for packing bags ranging from 20 to 65 liters and boasting top operating reliability, a maximum bagging capacity per hour, and an unrivaled level of sanitation — while ensuring maximum flexibility and minimum energy consumption.

This strategy was systematically pursued in the business plan, the conceptual studies, and the design phase. Today, the new bagging unit has met with enthusiastic response from the first test customers. Two roads led to success: First, sub-processes were systematically optimized and matched. In addition, system components were chosen which reduce the operating costs thanks to their innovative technology.

Reliable bagging
Even before the product is filled into the bags, the bag grip automatically corrects the bag position. In order to obtain a perfect filling, powdered products are optimally compacted with a patented filling screw instead of the regular mechanical bag shakers. This innovation minimizes the risk of bag ruptures. With high operating reliability and the use of energy-efficient servomotors, the efficiency of the bagging line has been significantly improved: Longer uptime without losses and, overall, also a longer lifecycle can be achieved. Naturally, this results in measurably lower operating costs.

Universal and flexible application
The Maia bagging unit allows powdered, free-flowing and friable products to be bagged. It is suitable for a wide range of packing materials such as paper, plastic film, and woven polypropylene, with bags holding between 20 and 65 liters. For high bagging volumes, Maia is also available as a two-spout bagging unit. When bagging powdered products, this enables the bagging capacity to be increased to as many as 15 bags per minute, or for free-flowing products to 20 bags per minute. Four different installation versions for feeding and discharging the bags make it easy to adjust to different installation situations.

Unique design, impeccable sanitation
Low-dust filling and compacting is a high priority in the list of requirements of the people in charge of bagging finished products. The new Maia bagging unit satisfies them with its dust-tight bag spout featuring an integrated aspiration system. The machine’s design also supports this effort: Its enclosed housing and the easiest possible access for maintenance and cleaning contribute significantly to an impeccable level of sanitation.

This user-friendly bagging unit is an eye-catcher, not only thanks to its colored 15-inch touch screen, which allows the process parameters to be optimally selected according to the specific product. With its unsurpassed flexibility, innovative design and minimal energy consumption, it blends seamlessly with the other “New Art of Milling” system components.
ONE-STOP SORTING SOLUTION FOR CONTAMINATED MAIZE

Due to aflatoxin contamination of the 2012 maize harvest, many Italian producers were left with large quantities of unusable maize. Bühler quickly reacted with a decontaminating solution that minimizes waste without compromising on safety.

With too much rainfall in summer, followed by drought conditions, the climate put an immense stress on maize plants. The result: a strong infestation with the aspergillus fungus, which produces a highly toxic and carcinogenic substance called aflatoxin. Existing sorting technologies could not remove contaminated kernels efficiently, so Italian Bühler customers turned to the specialists in Uzwil in September for a solution to their predicament.

While fully contaminated maize can be detected easily through discolorations on the surface, the real challenge lay in sorting the contaminated kernels that do not show any visual indication of infestation. Bühler rose to this challenge by offering a full solution including proprietary optical and density-cleaning technologies.

Food safety and profitability

First, the maize is coarsely cleaned according to size. Then the low-density particles such as hulls and dust are removed and the kernels sorted according to bulk weight – in this case, the lightest category can be supposed to be highly contaminated and is rejected. Finally, a SORTEX optical sorter with multiple viewing technologies is able to optically examine the kernels and reject those with anomalies. Kernels are checked for fungal infestation at a throughput of 20 tons per hour.

Bühler’s solution to reduce aflatoxin in maize has been implemented in record time and is now running in a pilot plant in northern Italy. It will soon enable customers to empty their silos, comply with the strict legal limits and be profitable.
ONLINE MEASUREMENT OF PARTICLE SIZE DISTRIBUTION

Bühler is relying on smart process fine-tuning in grain milling: Its unit for measuring the particle size distribution using the Online PSM (Particle Size Measurement) MYTA guarantees production traceability and improves plant efficiency.

A uniform size of flour and semolina particles is important for ensuring a consistent quality in the downstream processing of grain products in bakeries or pasta production lines. With its Online PSM technology, Bühler is now once again setting new standards. This automated measurement system is installed in the gravity spouting of grain mills and monitors the particle size distribution across a range of 10 to 5,000 microns during the ongoing process.

Sampling plus measurement and evaluation of the particle size distribution is performed in real time. The integrated sampler continuously feeds a representative product quantity to the optical unit. The measurement results are calculated by the local electronic system and transmitted to the master process control system. Trend graphs and numerical particle size distributions document the quality and ensure complete traceability.

Fine-tuning throughout

Online PSM is already in service as a pilot system in a number of grain mills. It is proving to be a dependable measurement system for online monitoring of the particle size distribution of flour and semolina. It detects oversize particles after grinding – for example as a result of a sieve rupture – or checks the quality of durum semolina.

Online PSM thus helps stabilize the entire grinding process. The results match those obtained by the traditional sieve analysis method. But the great benefit of online measurement is that operating trouble is quickly detected, allowing any departures from the target value to be responded to without delay. The need for manual sampling has been eliminated. The measurement results are thus representative, consistent, and independent of any particular person. Not least, the new sensor also optimizes the efficiency of a plant: Scrap batches are prevented and the extraction rate of accept production with the correct particle size distribution is optimized.

The Online PSM (Particle Size Measurement) system is installed on the gravity spouting. The sampler (right) continuously feeds a representative product quantity to the sensor with laser diffraction and digital camera (left).
UFA operates a comprehensive energy management system ranging from stairway lighting control for cutting energy consumption (5 MWh/a) to refurbishment of entire plants. This has allowed carbon emissions of all UFA facilities to be reduced by 500 metric tons (t) since 2008 – while boosting its output by 10 percent. The improved energy efficiency in the four UFA factories is the result of different measures, which were taken in close collaboration with the Bühler Feed & Biomass business unit.

In all four UFA facilities, heating oil or natural gas as the energy carriers are not used directly for steam generation, but transformed into electric power by combined heat and power generation (cogeneration). Using the energy stored in the fuel for generating electricity improves the fuel utilization rate by a factor of about three. The energy potential contained in the heating oil or natural gas is thus utilized almost to the physically possible limit. A second Group-wide measure taken is the systematic utilization of the exhaust heat emitted from the air compressors to preheat the boiler feedwater or to operate hot-air heat exchangers. In conjunction with additional heat recovery measures, UFA was able to save a total of about 880 MWh thermal energy alone by systematically utilizing exhaust heat in 2011.

LESS ENERGY FOR BETTER PERFORMANCE

UFA Group (Union des Fédérations Agricoles) with its annual output of 600,000 metric tons is Switzerland’s largest animal feed producer. In order to minimize its energy consumption, UFA is continuously retrofitting its four facilities with innovative technologies.

In all four UFA facilities, heating oil or natural gas as the energy carriers are not used directly for steam generation, but transformed into electric power by combined heat and power generation (cogeneration). Using the energy stored in the fuel for generating electricity improves the fuel utilization rate by a factor of about three. The energy potential contained in the heating oil or natural gas is thus utilized almost to the physically possible limit. A second Group-wide measure taken is the systematic utilization of the exhaust heat emitted from the air compressors to preheat the boiler feedwater or to operate hot-air heat exchangers. In conjunction with additional heat recovery measures, UFA was able to save a total of about 880 MWh thermal energy alone by systematically utilizing exhaust heat in 2011.

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## Measures taken in the four UFA plants

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<tr>
<th>Plant/capacity</th>
<th>Year of construction/ expansion</th>
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| Herzogenbuchsee 350,000 t/year | 2001/2002/2012 | ▪ Multistage grinding using two-pass crushing mills and vertical-rotor hammer mills  
▪ Utilization of the exhaust heat of air compressors and blowers for drying flakes and the thermal systems  
▪ Smart air compressor control and pressure band reduction  
▪ Use of Kubex T9 pellet mills  
▪ Planned: Use of differential-pressure controllers on large dust collection filters | 30 % energy  
120 MWh natural gas/year  
0.5 GWh electricity/year  
20–30 % energy  
Reduction of purge air requirement |
| St. Margrethen 90,000 t/year | 2006/2007 | ▪ Post-grinding system with preliminary screening ahead of vertical-rotor hammer mills  
▪ Frequency converter for adjusting the grinding texture  
▪ Utilization of the exhaust heat of air compressors and flash steam (condensate separator) for preheating the feedwater  
▪ Planned: Use of differential-pressure controllers on large dust collection filters | 160 MWh/year thanks to 100 % fuel utilization  
Reduction of purge air requirement  
Reduction of starting current  
30 % energy |
| Puidoux 70,000 t/year | 1993/2010 | ▪ Capstone C65 micro-gas-turbine for generating electric power, utilization of the exhaust gases for heating the feedwater and building heating water as well as the residual heat for drying the thermal systems  
▪ Low-pressure-purged dust collection filters with differential-pressure controllers for the pellet coolers, purge-air blowers with frequency converters for supplying the required compressed air to the filters  
▪ Cooler fans with frequency converters  
▪ Planned: Multistage grinding using two-pass crushing mills and vertical-rotor hammer mills | 160 MWh/year thanks to 100 % fuel utilization  
Reduction of purge air requirement  
Reduction of starting current  
30 % energy |
| Sursee 85,000 t/year | 1965/2007 | ▪ Multistage grinding using two-pass crushing mills and vertical-rotor hammer mills | 30 % energy |

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**Solutions**: 35
In many parts of the world, the harvest contains around 30 percent moisture, depending on the type of grain. Drying grain is thus a key step in the milling process. Due to continuous research and development, Bühler has significantly improved drying technologies.

To achieve perfect food quality, the conservation of the product is a key issue. In addition to rigorous hygiene during processing and storing, a perfect drying process that does not strain the grain while reaching the perfect moisture level is essential. For this, one has to proceed gently and, most importantly, cost efficient. The energy consumption of a dryer is a major cost factor. The goal of any innovation in the drying sector therefore has to be to minimize energy consumption.

Innovative Technology
With the dryer Schmidt-Seeger Eco Dry Bühler offers its customers an efficient and especially energy-saving solution. Due to the novel arrangement of the supply and exhaust air ducts, combined with the product flow separation, the drying process has been revolutionized and the energy efficiency of the dryer dramatically increased. The innovative design of the ducts rows provides an absolutely uniform distribution of the airflow. It features a high absorption of moisture in the dryer exhaust air combined with an efficient heat insulation of the grain column. Less air has to be heated and delivered and operating costs can be reduced. The thermal pressure on the grain is minimized by half.

To tap the full energy savings potential in maize drying and save an extra 20 percent, the Schmidt-Seeger Eco Cool can be added to the line. During the process the pre-dried, non-cooled material with a moisture content of 17 percent leaves the dryer and enters the cooler. During the cooling process, the moisture is expelled together with the stored heat. Due to subsequent ventilation, the product ultimately loses any residual moisture. The size of the cooling zone is variable and can be adjusted to the respective raw material. Next to energy efficiency, flexibility also helps to optimize the drying process.
Buying a dryer – what is important for customers?

More important than the initial purchase price of the dryer are the energy costs over the years. They take up a high percentage of the operating costs and are usually higher than the initial investment. For example, air heating claimed around 92 percent of the running costs. My advice: make sure to buy an energy-saving device.

How efficient are Bühler dryers?

With the dryers Schmidt-Seeger Eco Dry and Schmidt-Seeger Eco Cool we offer our customers an energy efficient solution. Compared to the competition, our products consume less energy. Due to the efficient design, our customers can save around EUR 75,000 per year, depending on the dryer’s size and the annual runtime.

“Check the annual energy costs!”

Diagram spoke with Robert Wieseckl, Product Manager Dryer Technology, Bühler Grain Logistics.
LONGER MACHINE LIFE AND OPTIMIZED PERFORMANCE

Bühler’s innovative GNC-Ox-tempered indent-type jackets increase the life cycle of your machinery and save money.

The basis of an optimal grain processing is a thorough and especially gentle cleaning of the raw materials. For the sorting of impurities, for seed processing and conditioning of various industrial products, different types of machines can be used.

The Schmidt-Seeger Ultratrieur™ is a Bühler machine that separates grain and other granular products by length, offering the best possible cleaning efficiency. Now, its quality has been improved even further. By nitrocarburizing, the enrichment of the surface of a work piece during the GNC-Ox process, a wear- and corrosion-resistant surface layer is produced. Especially with heavily contaminated grain and oats, this surface offers enormous benefits.

Excellent operational reliability

Due to the tempered material, the life of the indent-type-jacket is doubled, and machine failure, for example due to the wear of the indent-type jacket, can be avoided. Meanwhile, the tempered indent-type jackets, which are optionally available and may be retrofitted, help to maintain the accuracy of the sorting process.

Since 1995, over 1,300 Schmidt-Seeger Ultratrieurs™ have been manufactured and delivered to our clients. Using the new method, now it will now be possible to revolutionize the cleaning process fundamentally. Thanks to the tempered material, the life of the machinery may be increased significantly and cost savings of up to 75 percent achieved.

Enhanced jacket layers give the Schmidt-Seeger Ultratrieur™ more durability for cleaning and separating.
GROWING THE CRANBERRY BUSINESS WITH BÜHLER

Considered one of the fastest developing food markets, cranberry exports have soared in recent years. Badger State Fruit Processing has now expanded its business, supported by Bühler.

Wisconsin, also nicknamed “the badger state”, is the top cranberry producing state in the US, turning out more than half of the world’s supply. Butch Gardner owns Badger State Fruit Processing, Wisconsin’s largest independent grower. For years, he has trucked the tiny berries in and out of processing plants. “In 1992, we started with two and a half acres, and we’ve grown to 1,100 acres of cranberry beds,” explains sixty-year-old Gardner, a former trucker and dairy farmer. It was just last November that he decided to take Badger State Fruit Processing to another level by ordering a state-of-the-art dryer from Bühler.

Choosing the right dryer
“We listened to the customer’s needs to understand how we could help Badger State become vertically integrated,” says Bühler Aeroglide Market Manager Dave Reynolds. Gardner opted for the AeroDry™ multi-stage dryer, in the knowledge that industry big shots Ocean Spray and Mariani Packing Company also trusted in it. “Customers prefer the AeroDry™ because it offers operating flexibility,” adds Reynolds. “Process air temperature, humidity, airflow rate and retention time can be independently controlled for each stage.” This is critical since cranberries have different characteristics at each stage of processing, requiring unique handling conditions. First, they are wet and sticky, later, dry and tacky.

Badger State Fruit Processing started out growing cranberries and freezing them for area processors. Now, it will be able to do the processing on its own. Gardner will create two products. Half of the juice from the crushed cranberries will be used to make concentrate that can be sold to private store brands or companies like Pepsi or Old Orchard. The other half of the juice and remaining skin will be infused to make a sweet and dry cranberry raisin that can be used in a variety of products such as cereals and salads.

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Cellino Invests In Quality

Pastificio Cellino proudly produces Sardinian pasta. For process know-how and technology they recurrently turn to Bühler. Now, a new short goods pasta line was implemented in record time thanks to professional project management.

The pasta branch of Gruppo Cellino, whose core business is milling, is a fairly young enterprise – but a highly successful and dynamic one. Starting out in 2001 with two Bühler lines, Pastificio Cellino expanded over the course of the last ten years to a production capacity of 90,000 tons of pasta per year. After three Bühler lines and two lines from another manufacturer in a new production hall, for their latest addition in 2012, Cellino chose Bühler again.

Bühler sales manager Michele Di Paolo recalls the talks with Cellino a year ago in spring: “Cellino had very clear specifications but only had limited space due to the previous two lines in the production hall.” Gianni Tatti, plant manager at Cellino, had set his eyes on the Polymatik™ press system: “It is extremely flexible, allows fast recipe changes and virtually never requires cleaning. It features the best hygiene, easy operation and handling. This all saves time and increases production.”

Custom-made solution

However, the two-screw version Tatti had dreamed of exceeded the available space. In the end the highest capacity within smallest space was realized with a single screw 3250 kg/h Polymatik™ press and a 2.5 m belt dryer.
Passionate dedication from the teams of both companies made this solution a reality in under six months.

“It was a technical challenge,” admits Bühler project engineer Daniela Herzberg, “but the team play and support both from within Bühler and from the customer were outstanding.” Fitting the whole line – Polymatik™ press, dryer and cooler – required high-precision planning. “Early October, when we started testing the line, already the first batch of pasta was perfect quality,” says Herzberg with pride. And Juraj Bartanus, Bühler product manager, adds: “We even recorded the line commissioning for a video on YouTube, making this project memorable for all involved.”

The exceptional relationship between Gruppo Cellino and Bühler goes back several generations. Most of its milling equipment is from Bühler: starting at terminals, silos, mills and finishing with pasta lines. Tatti is very satisfied with his new short goods pasta line and convinced it will provide him a long-term advantage in production.
Indonesia with its 240 million people is an important market for Bühler. The staple food is rice, but wheat flour demand is also rising dramatically due to popular, low priced instant noodles and an emerging demand for bread. Now, with a new office and service center in Jakarta, Bühler moves closer to the customer and offers products from all business units in Indonesia.

PT Bühler Indonesia became operational on 1st January 2012, taking over staff from long-term Bühler-agent Jabar Mulia. Since then, new Managing Director Tomas Soleman has been busy hiring and training new Bühler employees. “We have a nice mix of senior and junior staff, recruited directly from the Swiss German University and other universities in Jakarta. To speed up the know-how transfer, many of our new colleagues have been sent to our Bühler offices in Singapore, China and Switzerland for trainings of one week to one year – and have been allocated a mentor. We share our decades of experience of listening to the customers with the young.” Soleman knows most of the customers personally, having worked with Jabar Mulia in Bühler customer relations for the last 26 years. He adds with a smile: “When I was working for Jabar Mulia, my ’body’ belonged to the agent, but my heart already was Bühler.”

Today, the team consists of 44 people in the fields of sales, mechanical and electrical service, automation, installation, design engineering and administration. The office is located in Sampoerna Strategic Square in Jakarta’s Business District. “Additionally, we have a service station in the south of Jakarta and are in the process of setting up an application center to cater for the Indonesian chocolate and coffee industry,” explains Soleman.
QUALITY OF BAKED GOODS

The one-week course on “Quality of Baked Goods” is held in Bühler’s Bakery Innovation Center in Uzwil (Switzerland). This new bakery course focuses on imparting in-depth knowledge in the fields of bread production and especially flour quality.

Questions treated include: What does flour quality mean? How can it be improved? And what characteristic figures exist for defining flour quality? These and other questions are discussed and answered in the one-week intensive course. The aim is to develop a better understanding of the raw materials most frequently used in bakeries and to become familiar with the relevant laboratory analysis and flour optimizing methods. In addition, various flours are evaluated during the course in the Bakery Innovation Center.

You will find the detailed course program at www.buhlergroup.com/bic-training
The complete course offerings of all our divisions and business units are available at www.buhlergroup.com/training-courses
Course dates: September 16–20, 2013
Target group: flour millers (management, production, R&D, procurement, analysis, sales)
Language: English

OVERVIEW OF INTERNATIONAL TRADE SHOWS FROM MAY THROUGH SEPTEMBER 2013

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You can find more information at www.buhlergroup.com/events.

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