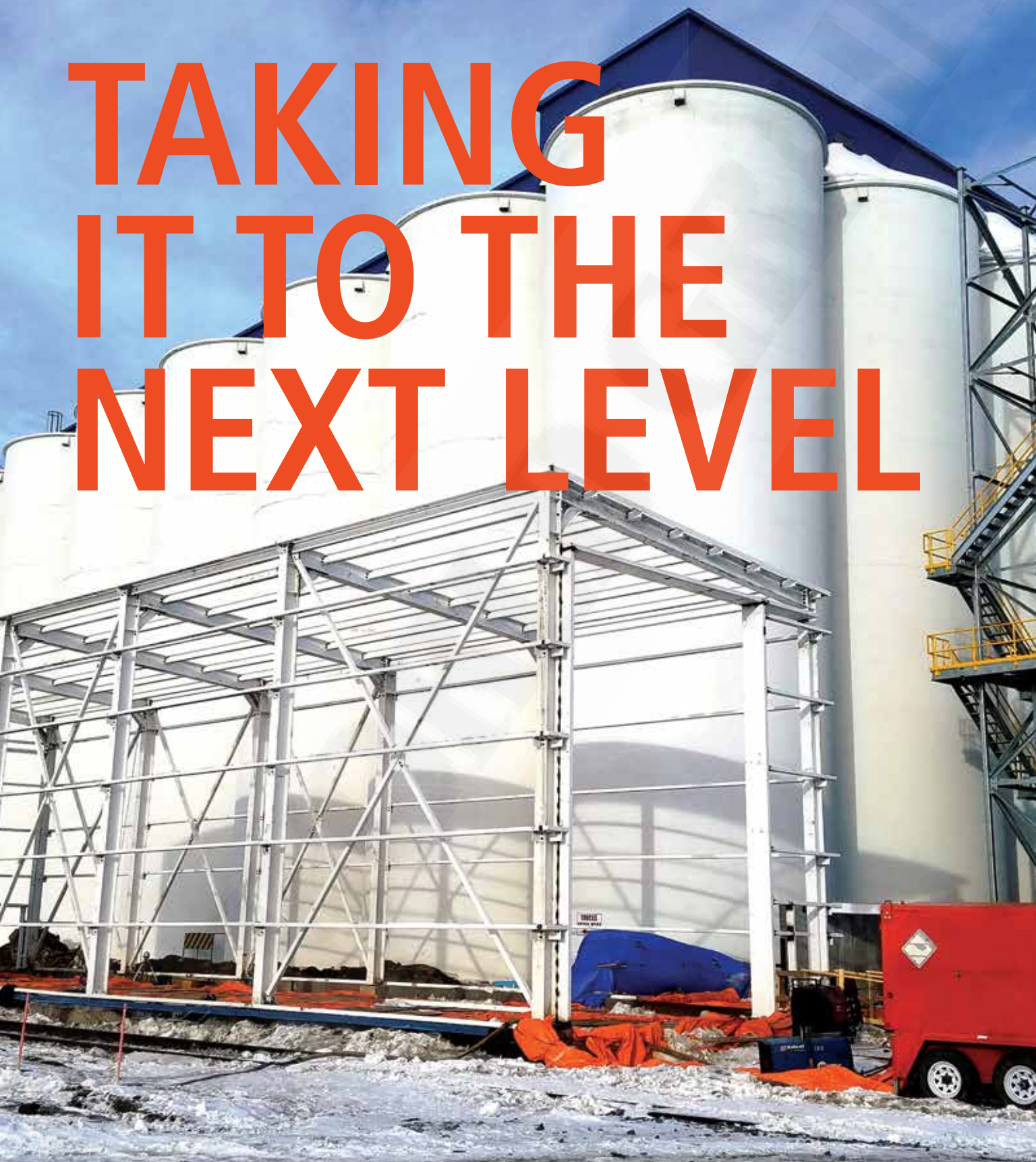


TAKING IT TO THE NEXT LEVEL





by L. Joshua Sosland

North Dakota Mill's new milling unit is one of the largest ever built in the United States

For years, the North Dakota Mill and Elevator Association has stood out in the milling industry for its steady and large investments to update and expand its milling capacity. The modernization era at the Grand Forks, North Dakota, U.S.-based company reached a new apex in 2016 with the completion of the G mill, the facility's eighth milling unit.

Built at a cost of \$38.7 million and equipped principally by Ocrim S.p.A., Cremona, Italy, the G mill has daily capacity of 11,500 cwts and is one of the largest single milling units ever built in the United States. With the addition, the North Dakota Mill took a quantum jump extending its lead as the largest flour mill in the United States, at 49,500 cwts. The second and third largest U.S. mills have daily capacity of 31,000 cwts and 28,000 cwts, respectively.

Vance Taylor, president and general manager of the mill, said the latest expansion and early additions have matched up well with expanded demand. Beginning in 2014, demand from North Dakota Mill customers exceeded the company's production capacity.

"Growth has been key to our success in almost every market segment," Taylor said. "Since 2000 we've added spring wheat, durum and whole wheat milling capacity mainly driven by increasing demand from existing customers. We have been able to fill new capacity fairly quickly as it has been built."

The G mill represents the culmination of a series of major and more modest projects at the company over the last several years, Taylor said. While the North Dakota Mill has been operating at the same location at Grand Forks for 95 years, none of the company's current capacity is even 20 years old.

"We have kept pace with milling technology improvements," Taylor said. "Our oldest milling units were built in 2000. We're not only the largest mill in the United States but also one of the most technologically advanced."

Capacity installed or modernized during this period includes:

A mill 8,000 cwts spring wheat (added in 2001)

B mill 8,000 cwts swing (spring and durum) (2001)

The North Dakota Mill and Elevator has been operating since 1922, but nearly all the company's capacity has been built or reinstalled since 2000. The company's new G mill has 11,500 cwts of daily milling capacity. Photos by Josh Sosland.

C mill 4,000 cwts spring wheat (2005)
D mill 2,000 cwts spring (2007)
E mill 1,000 cwts swing (whole wheat and spring) (2008)
G mill 11,500cwts spring (2016)
K mill 11,500 cwts spring (2011-13)
W mill 4,000 cwts whole wheat (2006)

Taylor said all the additions have emanated from a strategic planning process conducted in consultation with Dennis J. Elbert, the retired dean of the North Dakota State University business school. The projects, including several that did not add milling capacity, have “touched every area of the plant,” Taylor said.

Examples of projects include the addition of a 40,000-square-foot pack flour warehouse in 2005 for \$3.5 million. More recently a new family flour packaging line was installed at a cost of about \$1 million.



The executive team of the North Dakota Mill and Elevator Association includes, from left, Mike Jones, transportation and logistics manager; Steve Sannes, sales manager; Bob Sombke, quality assurance and tech services manager; Jeff Bertsch, grain procurement manager; Vance Taylor, president and general manager; Ed Barchenger, controller and financial manager; and Chris Lemoine, production operations manager.

“We also rebuilt and reflowed the K mill in fiscal years 2011, 2012 and 2013 in three different phases, taking the mill to 11,500 cwts from a 8,000-cwt spring wheat mill,” Taylor said. “The total combined cost of the K mill projects

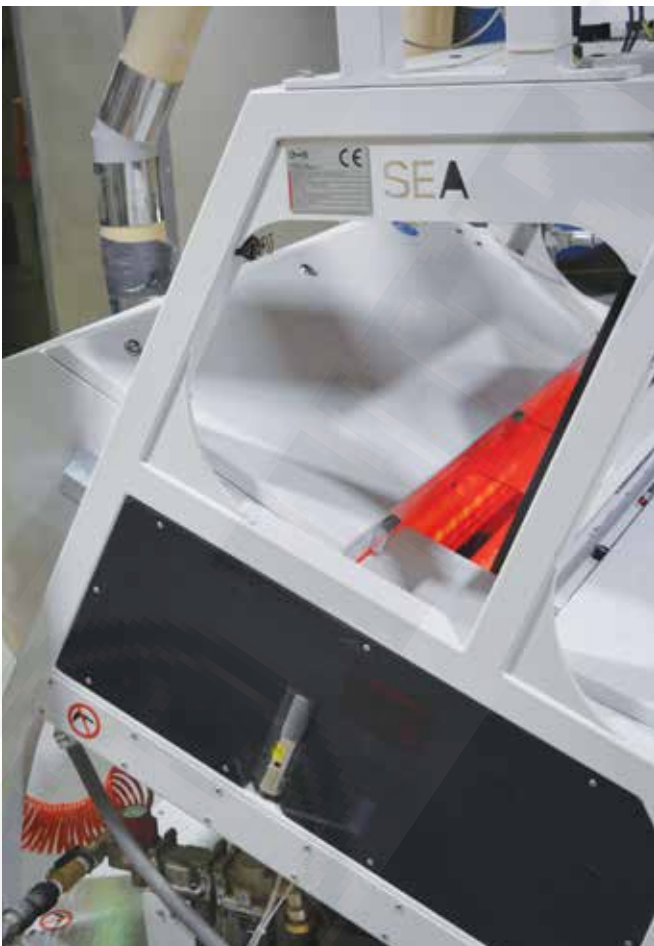
was about \$8.5 million.”

Yet another project, executed in 2015 and 2016, upgraded electric power distribution across the entire plant.

“We replaced all of the power distribution equipment feeding each mill from our



"We're not only the largest mill in the United States but also one of the most technologically advanced."
— Vance Taylor, president and general manager



main transformer to strengthen infrastructure and prepare for the G mill," Taylor said. He noted that electricity is the company's fourth greatest cost, after wheat, transportation and labor.

The planning process led to a decision not to add grain storage capacity in tandem with the G mill addition. Instead, the company is investing \$9.3 million in new high speed rail and truck unloading capability.

The decision to build a new 11,500-cwt mill was made at a time the overall U.S. flour market flattened, and the lack of growth has continued. The broader situation is not lost on executives at North Dakota Mill.

"It's definitely something we're aware of and take into consideration when planning capital projects," Taylor said.

Taylor acknowledged that North Dakota Mill's growing sales have not been matched across the industry.

"Overall the demand for milled wheat products has been relatively flat the last few years, but in specific markets we've seen good demand, and have been able to grow the business," he said. "Customers appreciate the increased absorption and strength they get when they buy spring wheat flours providing stronger doughs, able to carry more ingredients. Because of our access to high quality North Dakota spring wheat and durum, which is some of the best wheat grown in the world, we believe we can provide superior quality flour, deliver it with a high level of customer service and expect to continue to grow."

SINGLE LOCATION

The company is unusual among the larger U.S. milling companies in that it operates only one milling location in the United States. Even though most new milling capacity has been added in destination (flour user) rather than origin (wheat growing) locations in recent years, Taylor noted that North Dakota has continued to grow profitably.

"Our North Dakota location is an advantage because we ship long distances, adding a few days of age to our flour, and we feel that the additional oxidation improves baking characteristics," he said. "Our customers understand that."

"Operating from a single location is a different business model than is typical, but we also feel it facilitates better communication and increased control over everything we do, helping to provide a higher level of customer service and higher quality, more consistent flour."

Significant investments have been made around sanitation and quality control over the last several years at North Dakota Mill and Elevator, Taylor said.

"We were one of the early adopters of the ISO-9000," he said. "This past year we completed the FSSC 22000 certification process."

Managed by an independent foundation, the FSSC 22000 (Food Safety System Certification) is described as providing

Top: The mill features five Ocrim double high roll stands and 22 single high roll stands.

Bottom: A Cimbría SEA Chrome color sorter is used in the G mill.



a “framework for effectively managing food safety and quality responsibilities.” The certification is meant to satisfy requirements of regulators, customers and consumers.

Part of the company’s sanitation investment has been the operation on site of a microbial laboratory.

“We do micro testing in our own lab every day to maintain counts that are as low as possible,” Taylor said.

The new G mill is highly automated, using one operator per shift. In fact, the entire North Dakota Mill is highly automated. The company’s eight milling units run with just five operators.

While bulk business accounts for the largest part of North Dakota Mill flour sales, the company packages about 30% of flour production mostly in 50- and 100-pound bags. The company also has invested in niche businesses. For example, a smaller project in 2016 was the installation of a new packaging line for 5- and 10-pound retail bags. With increases in distribution of the company’s Dakota Maid brand, family flour sales have grown over the years and account for about 2% of the mill’s total production.

Sales of flour from organic wheat have grown significantly over the last 15 years, though perhaps not as much as the company targeted. Currently accounting for about 1.5% of sales, total organic flour sales are up about 50% over this period.

“We have good demand in the organic area, but growth has been somewhat tempered by limited availability of organic grain in the state,” Taylor said. “That seems to be improving. A driving

factor is low prices on the conventional side. Farmers are looking at other options, and more of them seem interested in organic wheat.”

The North Dakota Mill is unique within the milling industry in that it is government owned — by the state of North Dakota.

“We are a for-profit entity, but just as important we’re here to provide a benefit to North Dakota farmers,” Taylor said. “On average, about half of profits are invested and half go to state.”

Currently, 5% of annual profits are dedicated to supporting the state’s ag products utilization fund. The fund provides seed capital for start-ups and new ideas for existing companies related to agriculture. Half of the remaining dollars go to the state’s general fund, leaving 47.5% of profits as retained earnings to be reinvested in the North Dakota Mill.

Even during a time when skepticism toward government involvement in business is as intense as ever, the North Dakota Mill remains popular in the state government viewed as a “long-term success story,”

“The mill provides benefits to the state and particularly to farmers,” he said. “We get good support in the state government from both sides of the aisle.”

The mill’s popularity in North Dakota may be furthered by the one-way nature of the funding — back to the state’s coffers.

“We receive no financial assistance from the state,” Taylor said. “The G mill was paid for with retained earnings.”

CONSTRUCTION TIMELINE

Work on the G mill began in June 2015 with 228 piles driven 150 feet into the

Left: Spouting on the third floor of the G mill. Right: Vance Taylor, president and general manager of the North Dakota Mill and Elevator Association. The building was designed to accommodate a second milling unit the same size as the G mill.

ground to establish foundation support for the new mill and wheat cleaning buildings. Concrete pile caps and the ground floor were poured in late August 2015.

The prodigious scope of the expansion and prospective expansion may not be fully captured by the size of the addition. Taylor said the slipforming of the two buildings, done at the same time, was one of the largest industrial slipform projects ever completed in the United States. The project encompasses two buildings — a 10-story-cleaning house and the 7-story, 11,500-cwt flour mill. Covering a total of 75,000 square feet, the buildings were designed to accommodate a second mill of the same size. So, if this addition were completed in the future, the 23,000-cwt mill on a stand-alone basis itself would be the 12th largest flour mill in the United States, not including the other 38,000 cwt of daily capacity operating at the Grand Forks complex.

While the scope of the capacity addition is exceptional, Taylor said North Dakota Mill cut no corners for the sake of a bit more capacity.

“For example, we used a lot of stainless steel to construct this mill,” he said. “Lift lines, pneumatic cyclones and spouting are all stainless. Nearly every piece of equipment has a stainless steel lining.”

Similarly, he said the selection of Ocrim once again as an equipment sup-



Kiel Rasmuson, a miller at North Dakota Mill and Elevator, in the control room of the G mill. With the unit's completion, three millers and nine other employees have been added to the North Dakota Mill workforce.

plier is consistent with the company's commitment to quality.

"Ocrim has been a great partner through several projects over the years at the state mill," he said. "They work well with us to supply a mill that fits our needs. Their equipment performs well for us over long periods of time. For every capital project we consider all options for potential equipment suppliers. We have been very pleased with the performance of the Ocrim equipment."

Vigen Construction was engaged to build the building and install equipment. Fusion Electric handled the electrical installation while VAA Consulting Engineers and Planners oversaw design of the new buildings. All told, 25 sub-contractors and suppliers helped bring the new mill to a reality.

Installed at the G mill are 5 double high roll stands and 22 single high roll stands.

Five eight-section sifters and a single six-section flour re-bolt sifter were made by Great Western Manufacturing Co., Leavenworth, Kansas, U.S.

"We like the durability and performance of the Great Western sifters," Taylor said.

The mill features nine brand dusters, nine purifiers, and three Vibro Finishers.

A Bühler, Inc. on-line scale system monitors mill performance and is installed in all the North Dakota Mill milling units, Taylor

said. The G mill also features a Bühler moisture control system.

Nine bulk loadout bins have an aggregate storage capacity of about 20,000 cwts of flour.

While the G mill addition includes a new cleaning house and flour mill, the company took a different approach

when it came to the grain side of the equation. No additional storage capacity was added to the 4 million bushels of storage capacity currently present on the site. With the addition completed, the North Dakota Mill grinds as much as 108,000 bushels a day or 3 million bushels per month, well over 30 mil-

lion bushels over the course of a year.

“We’re evaluating the addition of some amount of grain storage in the future, currently we are adding a new high speed unloading pit for rail and trucks,” Taylor said. “We receive wheat direct off the farm and from elevators, both by truck and by rail. The increased efficiency provided by our new grain unloading pit will allow us to unload the additional grain needed to feed the G mill.”

As part of the project, 4,000 feet of rail track has been laid, raising the total at the Grand Forks complex to 4 miles. The unloading system will add 40,000 bushels per hour of unloading capacity for rail or truck. In the future, the company may unload unit trains of spring wheat, originated from western parts of the state.

Before the addition of the G mill, the North Dakota Mill was running over six days per week. The mix of operations has changed since the addition, but the G mill is running “about six days” since it began operations, Taylor said.

“On average each mill is shut down eight hours per week for maintenance, the new mill is performing very well,” he said.

Now in his 17th year heading the North Dakota Mill, Taylor said his tenure at the company has been helped by a team of associates, most of whom have been at the North Dakota Mill even longer.

“It’s true that one of the key reasons for our success is our dedicated state mill employees,” he said. “There is a high level of education and great work ethic in North Dakota. The average employee has been here longer than 25 years.”

Asked about his plans for the future, Taylor said he has no plans to slow down.

“I enjoy working with the team here at the North Dakota Mill, it’s a great industry with great customers and suppliers,” he said. **WG**

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