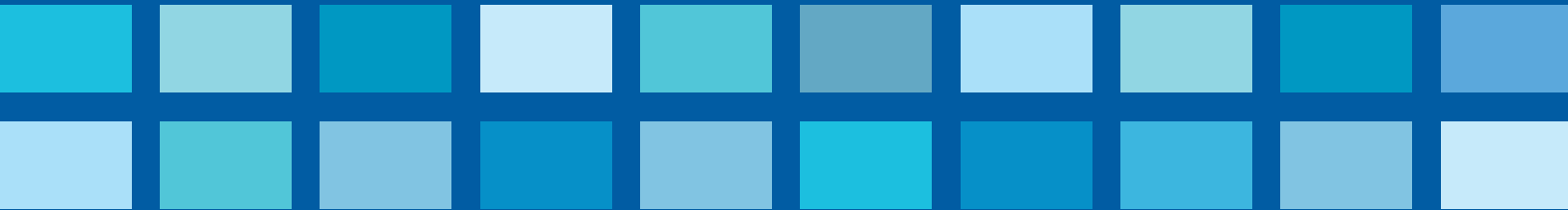




WEG Motors Success Cases

Our essence



50 WEG Motors Success Cases

WEG, that began in 1961 as a small factory of electric motors, has become a leading global supplier of electronic products for the segments of Oil & Gas, Sugar and Ethanol, Mining, Food & Beverages, Construction, Pulp and Paper, Sanitation, and the Steel Industry, among others. The search for excellence has resulted in the diversification of the business, adding products to the electric motors which provide from power generation to using energy more efficiently. This diversification has been a solid foundation for the growth of the company that, for offering more complete solutions, currently serves its customers in a dedicated manner. Even after more than 50 years of history and continued growth, electric motors remain one of WEG's main products. Aligned with the market, WEG develops its portfolio of products always thinking about the special features of each application. A collection of 50 cases has been put together to recall some of the main supplies of WEG electric motors in order to show the successful partnerships between WEG Motors with its customers formed over 50 years of experience and to demonstrate the wide range of products, applications and segments where WEG is present.

The 50 cases celebrate WEG's fiftieth anniversary and attest to the company's experience and presence in several applications.

Enjoy your reading.



Steel Industry



CST - Companhia Siderúrgica de Tubarão

Record supply of motors

WEG registered one of its largest individual supplies comprising 703 low voltage motors for the hot strip rolling mills at CST - Companhia Siderúrgica de Tubarão, located in Serra, in the state of Espírito Santo. The package supplied 340 motors to Toshiba Corporation and 306 motors to the also Japanese multinational,

Sumitomo, and another 57 motors to the Brazilian company Inepar. All the motors which were installed in the optimization of industrial processes and installation of a new production line of hot strip rolling mills at CST were developed with specific features for use in projects in the steel industry.



July, 2001

Usiminas

A wish come true

The steel segment, an important segment of the Brazilian industry on the global scenario, wished to obtain electric motors able to withstand the maximum possible time without the need of maintenance and operate in the harsh conditions found in the hot strip rolling mills. In this step of the production process of steel mills, a steel plate approximately 250 mm thick is reduced to a plate of around 2 mm. A total of 3.52 million metric tons of plates are processed per year. A number of electric motors operate on this line. When a motor stops running it seriously affects the process. At the end of the line, the winding machine gives the product the form of coils which will be processed in the cold strip rolling step until they reach the thickness required by consumers.

Many wishes become needs, both for those who have the wish, and for those who help the wish come true. And sometimes there are innovations and discoveries and not only improvements in the solutions already known and applied.

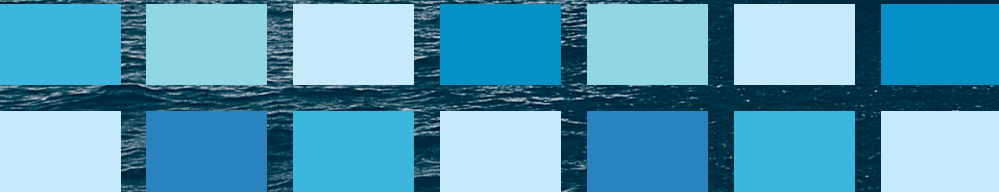
A good example of this is Usiminas who used imported motors that were not adequate for the line. To meet this market need, WEG created a national solution, the Roller Table. "Now we have a motor which is really able to withstand the conditions of the mill," said Pedro Fioravante, Maintenance Engineer at Usiminas. "WEG, besides solving our problem, also met a need of the steel market as a whole," adds Bras Augusto de Oliveira, Electrical Maintenance Engineer at Usiminas.



July, 2005



Oil & Gas



Petrobras

Synergy between WEG and Petrobras

It is to provide the best service and offer the best products that everyone who works at WEG spends their energy every day. The goal is to attend to needs and contribute with different partners in the development of large projects in different areas.

An example is WEG's specialty in providing for the constantly evolving oil industry.

Among the major end customers in this sector is Petróleo Brasileiro S.A. - Petrobras, a leading distributor of oil derivatives in Brazil and that, in March 2003, reached a record volume of 2.043 million barrels of oil equivalent per day (boe/d), joining the group of oil companies that produce more than 2 million boe/d.

WEG is a partner of the leading manufacturers of pumps and compressors that supply to Petrobras such as KSB, Sulzer,

Netzsch, Weir Pumps, Omel, Mark and others, and is an expert when it comes to products for Petrobras. WEG understands the requirements and characteristics of equipment and technology developed in accordance with the Petrobras standards. This enables quick quotes for the manufacturers contracted by the company, whether domestic or foreign. In 2002, the motors supplied by the company having Petrobras as the end customer totaled 34,500 hp. And the goal is to continue investing in research and development of new products to suit the evolution of the company and offer the best solutions.

Daily, Ex-d explosion proof and Ex-n non sparking motors leave the plant to the end customer, Petrobras. All these motors are Cepel/Inmetro certified and carry a standard Petrobras plate.



May, 2003



November, 2005

Petroquímica União, IBT Moldes and Motobombas Schneider

Specific solutions

Petroquímica União from São Paulo and IBT Moldes and Motobombas Schneider (Franklin Electric Group) of Santa Catarina solved problems in their applications by developing their own specific solutions from investments in WELL (WEG Extra Long Life) motors. The challenge that Petroquímica União - PQU, a petrochemical company located in the ABC region of São Paulo between Santo André and Mauá, had to face was to increase plant availability and reduce the failure rate and downtime. In 1999, the company extended its challenge to WEG that has been a partner since the 70s. The two companies then began to develop a more resilient motor that would offer a better performance at the production line by reducing the failure rate. The new motor model is now applied to drive loads in general: pumps, fans, compressors etc. "Since 1999, there has been an evolution in the project that culminated in the launch of the WELL line, with the participation of the Engineering Maintenance of PQU and Sales, Engineering and Technical Services departments of WEG," explains Fernando Fontes, WEG representative for the region. The WELL motor was inspired on the demanding

US IEEE841 standard, a reference in the petrochemical industry. The partnership with PQU, plus the attributes based on WEG know-how, make WELL a top product in electric motors. PQU invested in the replacement of 40 motors, submitting them to tests of durability. In July 2005, the tests were completed successfully and the company decided to replace another 80 motors. "Our policy is to seek improvement in efficiency and reduction of failures and downtime for maintenance of equipment," says Nelson Baldi, PQU Maintenance Manager. "Fortunately, our partnership with WEG worked because we have equipment in operation since 2001 which has not yet broken down. The good results are due to common values and principles of both companies. In solving our problem, WEG ended up creating a new product, a competitive advantage for them and for PQU." Thanks to the good results of the investment, PQU is among the five first companies in the world with the lowest downtime. The world average downtime per year is 130 hours. At PQU, in 2004, this total did not exceed 54 hours. In 2005, the company won the PNQ 2005 - National Quality Award.



Petrobras

Historical Opportunity

“Historical opportunity” were the two words that synthesized the new moment of suppliers of goods and services of the oil industry since the discovery of huge oil reserves in the pre-salt layer off the Brazilian coast. And it could be no different. Petrobras estimates the acquisition of 200 platforms, enough to trigger a wave of investment and expansion throughout the chain.

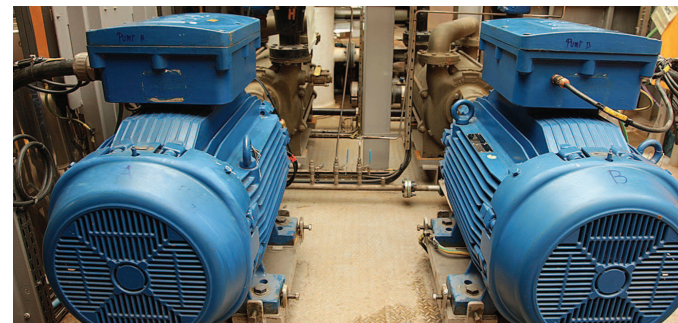
And this is only part of the demand. If it has to go almost seven kilometers deep to reach the pre-salt layer, it still means a great challenge for the domestic industry and one that needs to be met in a short time. It is also true that the first step towards the new technologies got off on a right foot: the P-57 platform, which went into operation in late 2010 in the Jubarte field in the Espírito Santo portion of the Campos Basin, will serve as a model for the units that will operate in the pre-salt of the Santos basin. The complexity of the platform can be exemplified by the script of its construction. The hull of this unit resulted from the conversion of the “Island Accord” tanker at the Keppel FELS shipyard in Singapore between October 2008 and March 2010.

At the same time, the oil and gas processing modules were built at the UTC Engenharia building site, in Niterói, in the state of Rio de Janeiro, and at the Brasfels shipyard, in Angra dos Reis, also in that state, in April 2010. The hull arrived at the Brasfels yard in April of that year, and then the installation of the modules, the interconnection

of all systems and final testing of the unit were completed.

According to Petrobras, the inauguration of the P-57, which occurred in October 2010, marked a new generation of platforms designed and built from the engineering concept that focuses on simplification of projects and standardization of equipment. Based on maximum efficiency, technological innovations directed the whole P-57 project.

During the construction of the vessel, the level of national content was approximately 68%, showing Petrobras' preference for Brazilian suppliers and their competence to overcome engineering challenges. In the long-standing partnership with the company, WEG is one of the national giants present in the P-57. Participating in an international price-taking made by Single Buoy Moorings (SBM), the company that signed the contract for engineering, procurement and construction with Petrobras, WEG was chosen to supply motors, transformers and panels because it offered the best technical and commercial solution. “The collaboration between SBM and WEG was not just a simple partnership, it was an alliance to reach a common goal. The P-57 was a large and complex project with a tight schedule and the two companies stood side by side, keeping good communication between them and with Petrobras,” said Jean-Francois Labrunie, Package Manager at SBM.



October, 2010

Scope of solution supplied to P-57:

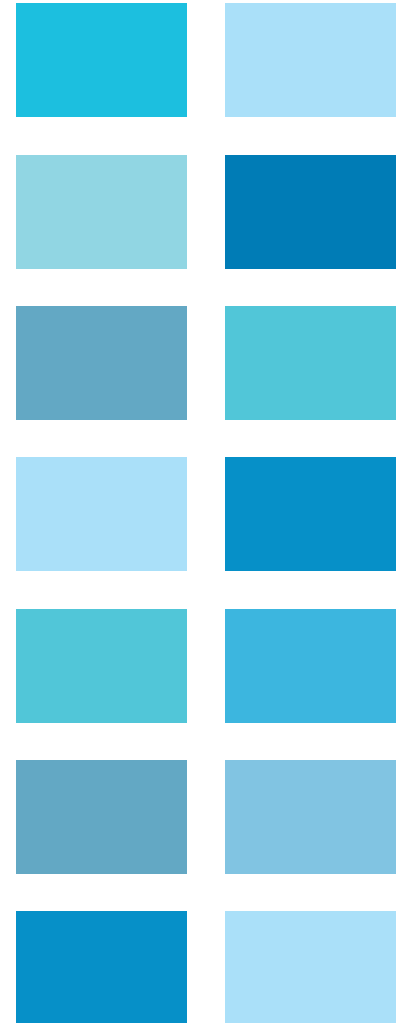
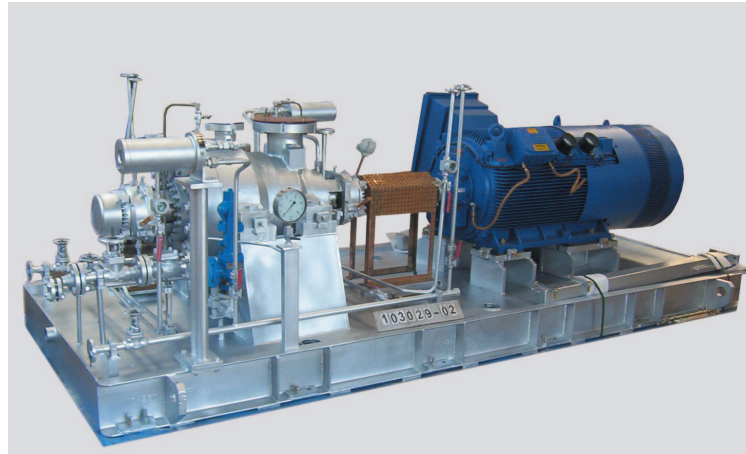
- 39 Medium Voltage Panels
- 136 Low Voltage Panels
- 22 Low Voltage Explosion Proof Panels (Ex-de)
- 8 Medium Voltage Dry Transformers
- 9 Low Voltage Transformers
- 10 Medium Voltage Motors for Pumps
- 4 Medium Voltage Motors for Compressors
- 150 Motors in General / OEMs (LV)
- 1 PMS - Power Management System
- 1 UPS - Uninterruptible Power Supply

Sulzer Pumps

Increased Safety

Sulzer Pumps (one of the largest pump manufacturers in the world) hired WEG Brazil to supply four PTB certified HGF315 motors - Ex-e, to couple to their pumps. The motors were sent to the Sulzer plant in India and then shipped to Taiwan where they were installed at the CPC Corporation (Chinese Petroleum Co.) refinery.

2003



Ecopetrol

Pumpjack

WEG's branch in Colombia provided a package of 55 motors, 5 to 7.5 hp, for Ecopetrol, a state company in the country. The motors operate with pumpjacks in oil wells. Two 250 hp motors for pumping stations were also provided in the same package. This package is important because it highlights WEG's experience in providing for the Oil & Gas segment also in foreign markets.

2006







Mining



Collahuasi Mining Company

Largest frames in the world

In May 2003, WEG produced the largest cast iron frames of the world until then. They were delivered to the Collahuasi mining company in Chile in August 2003 to move a conveyor belt to transport rocks. The final weight of each motor is 15,000 kg, power 2,788 kW and voltage, 2,300 volts. The machines

have an efficiency of 97.5% and operate at 4,700 m above sea level. The diameter of the frames is 1.4 m and they are 2.1 m long. Twenty tons of sand were used to make the mold which required the labor of 42 workers for the casting process.



July, 2003

CBMM

Foolproof Motor

The only Brazilian producer of niobium and present in all market segments, CBMM - Companhia Brasileira de Metalurgia e Mineração, uses WMining motors for use in the mining sector in its plant in Araxá, in the state of Minas Gerais. It all started in October 2005 when CBMM contacted WEG, a long time partner, for what seemed like a normal purchase to replace a motor. "However, the analysis made by the engineers of the WEG Sales department showed that the simple replacement of a normal motor would no longer meet CBMM's needs," explains Sales Analyst Ricardo Formento. It was necessary, therefore, to provide a specific product for that application. "We have a critical, aggressive and extremely humid environment which puts all the resistance of a motor to the

test," says CBMM Control and Maintenance Supervisor, Marcio Teixeira. In contacts with Teixeira, WEG's engineers began working on the specification of the motor that would better suit that case. "CBMM needed a motor that could drive a water pump of the boiler in a warm environment (60°C), with the presence of steam," says Formento. That is, the critical environment referred to by Márcio Teixeira. WEG and CBMM worked together to define the best solution. And it came in the WMining motor launched in 2005. "We bought one of these motors to try it out. The product withstood the severe conditions of operation and is running without downtime or production losses," says Teixeira, concluding that the trend now is to use only WMining motors.



July, 2006



Votorantim

In most severe applications

The first complete cement factory belonging to Votorantim in Santa Catarina is already in operation. Equipped with WEG technology in motors and drives, the unit in Vidal Ramos, in the Vale do Itajaí, 180 kilometers from Florianópolis, cost about US\$198 million and will boost the production of cement, supplying the markets of Santa Catarina and Rio Grande do Sul and relieving the other factories in the region. The plant is part of a major investment made by Votorantim which foresees the construction of other units in the country until 2014.

Business partners since 2005, this is the first time WEG provides the entire distribution system of high and low voltage drives to a Votorantim cement manufacturing unit. It is an integrated supply with the usual synergy between the companies of the WEG group in developing an integrated package to meet customer needs. The package includes transformers for the power substation, medium and high voltage drive panels, low and medium voltage drives and motors to drive crushers, mills, fans and the furnace. The last machine was delivered in January 2011. According to WEG engineer, Rafael Fabro de Almeida, the company worked in synergy with the customer from the specification of the equipment required for the operation of each application individually to the delivery, installation and start-up. "Besides contributing in achieving the planned schedules, we worked so that the customer's return on investment may occur as quickly as possible," he says. "The quality in the service and performance of WEG

products, added to the comprehensive service network in the country also grants the customer the necessary tranquility," continued the engineer. Among the highlights of supply for the plant in Ramos Vidal are the slip ring motors with automatic raising of the brushes (to drive the mills), Master line motors in frames 500 and 560 (more robust thanks to the improvement of technology at WEG's foundry) and, W22 HGF and WMining motors.

Interchangeability of medium voltage motors with other WEG motors already installed at Votorantim units in Brazil reduces the amount of reserve motors required for the reliable operation of the unit considerably. "The medium and low voltage motors are all closed and robust enough to withstand the operating conditions required in cement plants due to the kind of environment where they are installed and the efforts required for severe applications," explains engineer Rafael Almeida. The project coordinator of the work in Vidal Ramos, engineer Clovis Antonio Santana, says that WEG is currently one of the largest partners of Votorantim Cimentos.

"And that tends to remain like this given the good performance of products and services," he announces. According to Santana, the unit built in Santa Catarina is part of the second wave of investments made by Votorantim Cimentos in Brazil. The company already has new projects for the years 2011, 2012 and 2013 for the so-called third wave, and prospects for new investments in sequence, aligned with the evolution of the domestic and international markets.

Scope of supply:

- 07 medium voltage motors (several powers of 8 to 3,500 hp)
- 31 low voltage motors with squirrel cage rotors, HGF WMining and W22 WMining models (different powers, ranging from 2 to 350 hp)
- More than 300 low voltage motors driving equipment from sub suppliers (prerequisite for delivery)
- 01 complete substation including transformers, panels, protection, cables (25 MVA)
- 14 dry transformers (several powers from 300 to 2000 kVA)
- Low voltage distribution panels, low and medium voltage cubicles, soft starters and low and medium voltage frequency inverters

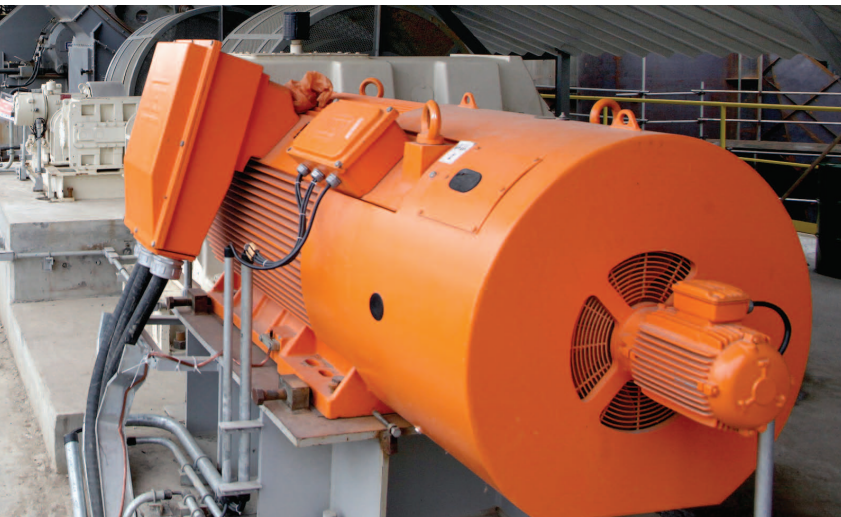


Aggmin Equipment

VSI Crusher

Aggmin is one of the leading Canadian manufacturers and distributors of crushers.

WEG motors for this particular application are manufactured to operate in harsh environments and are suitable for projects in the mining and cement sectors.



July, 2011



1997



Cost x benefit

Prominent in the national lubrication segment, Woerner, a German company that has been in Brazil for nearly 35 years, in partnership with WEG offered one of its customers in the gold mining segment, a complete solution with 16 WMining motors. WEG exclusivity for the segment, the motors can be used from the extraction to the processing of the ore. Applied in lubricating systems, which aim to reduce the friction between the bearings and shafts of mills that process ore to obtain gold, WMining motors drive the pumps that are responsible for the displacement of the lubricant in the lubrication system, under controlled flow, pressure and temperature conditions.

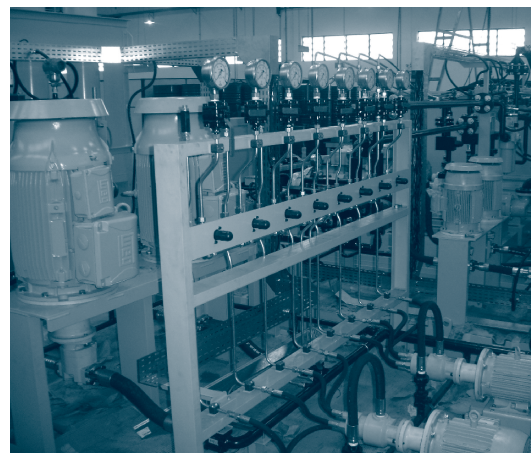
During the project, the mining company can compare the WMining motors with traditional motors because WEG equipment will share space with traditional equipment in two of the four mills of the company.

“Our customer was very pleased to know the WMining line which should provide a better cost x benefit than traditional motors,” said Axel van den Kerckhoff, director at Woerner. The mining company expects there to be a

reduction of downtime for maintenance of motors and costs of spare parts. Among the main characteristics of the WMining motors, the most outstanding are the resistance against high impact shock, more power savings, efficiency levels higher than those of NBR 7094, and the motors are also prepared to operate in harsh environments, providing a longer life to applications. WMining motors allow Woerner to provide their customers better performance in the operation of lubrication systems. Located in Garuva, in the state of Santa Catarina, in addition to the mining sector, Woerner also supplies the steel, cement, pulp and paper, sugar and alcohol, and automotive sectors, among others, and uses WMining motors in most of the lubrication systems supplied to their customers.

Scope of supply:

- 2 Motors - 4 hp
- 4 Motors – 7.5 hp
- 3 Motors - 20 hp
- 2 Motors - 25 hp
- 2 Motors - 50 hp
- 3 Motors - 125 hp



February, 2011

Alcoa

Reliability in Amazon Rainforest

In the heart of the Amazon, west of the state of Pará, Juruti has one of the largest deposits of high quality bauxite in the world. This is where Alcoa, a multinational aluminum industry, has a company that annually produces millions of tons of ore. Because of this high volume, one of the biggest challenges of the Bauxite Mine in Juruti is to balance the production process of storage, without generating unnecessary costs. It was essential to invest in developing a strategic and sustainable project and for that the company relied on WEG's expertise in the mining segment. With a specialized work carried out by the company, it was possible to dimension exactly what the customer needed at the plant. WEG developed the interchangeability project and dimensioning of the stock of electric motors for quick replacement, ensuring the continued maintenance and operation of the plant. For an installed plant of more than 700 motors, WEG defined a supply of 146 motors to ensure operation. The scope involved low and high voltage motors as well as interchangeable gearboxes. The project was conceived using the WMining line which is specific for the mining area. According to Rafael Fonseca Stuchi and Dany de Moraes Venero of the WEG Service Area, this equipment was developed to ensure the availability of the plant through a stock of well sized motors, according to criteria based maintenance (MTBF - Mean Time Between Failures) production (criticality) and logistics. "With a stock of correctly

sized motors, we offer the customer increased reliability and operational availability of immediate replacement in the event of equipment failure in the field, in addition to stored asset optimization eliminating unnecessary costs," explains Stuchi.

Return on Investment

"For Alcoa, this was a customized solution which ensured the optimization of stock and elimination of costs due to a detailed study of the motors installed at the mine in Juruti carried out together with WEG," said Carlos Nelo, Supervisor of Engineering and Reliability at the Alcoa Bauxite Mine in Juruti.

Mine of opportunities

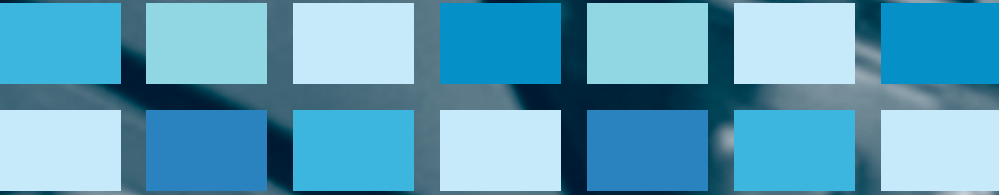
Mining is one of the main segments in which WEG operates, always developing expansion projects and major investments for the sector. In this context, Alcoa is an important customer whose performance is marked by a history of partnership and purchases of WEG products. "WEG has a specific dimensioning methodology and has a technical staff available to resolve customer problems," says Sidney Volpi, from Technical Sales. Rafael Stuchi also indicates the benefits for the team. "This delivery demonstrates all the know-how that WEG has for this type of application in the mining area, in which cost reduction, operational availability and reliability are the focus of the projects developed by the service area," he says.



November, 2010



Food and Beverage



Cargill

Energy savings

In early 2009, Cargill installed two WEG frequency inverters in the motors of the boiler at the unit in Ponta Grossa in the state of Paraná, part of the Complexo Soja (that buys, sells and processes soybeans and other oilseeds). According to Gilmar Weidner from WEG Service, the energy efficiency jobs carried out are bringing the expected results: "The customer has reached his goal which is to save energy monthly, producing with the same quality."

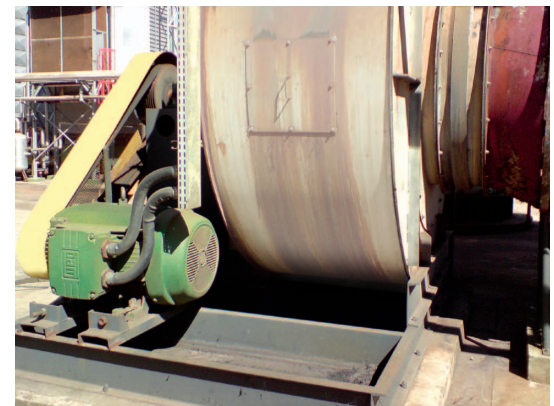
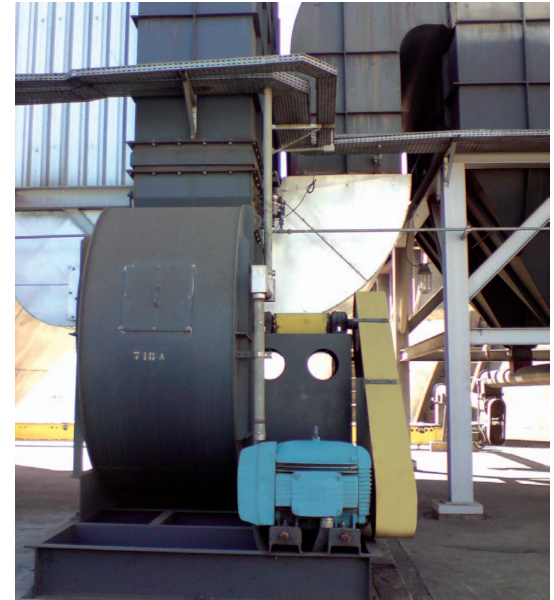
In partnership with Cargill, last year WEG carried out studies and tests to determine the best way to save energy, streamline operations and upgrade the manufacturing facilities through the assessment of energy consumption and application engineering of new products. With in loco verification, opportunities for improvement such as the repowering of the fan motor, installation of a variable frequency drive on the 200 HP and 60 HP fan motors and automation of the system were found. With the inverters, it was possible to eliminate the mechanical damper and also gain in the production process of the equipment.

Energy savings results with 60 hp motor:

- Savings of 37 kWh
- Estimated savings of 144,607 kWh of electricity per year
- Return on investment: 11 months
- Energy savings with motor + frequency inverter: US\$ 12,840.00/year
- Investment with motor + frequency inverter: US\$ 10,830.00

Result of application engineering with 200 hp motor:

- Savings of 48 kWh
- Estimated savings of 509,416 kWh/year
- Return on investment after replacement with W22 Premium 150 hp: 7 months
- Energy savings with motor + frequency inverter: US\$ 37,620.00/year
- Investment with motor + frequency inverter: US\$ 20,680.00



October, 2009

Prompt solution and sure results

As energy consumption grows in the country, the increase in generation capacity requires high long term investments. The result is the increased cost of electricity and threats of shortages which worry the government, consumers and businesses. To encourage economy with reduced production would bring more loss than gain.

The answer is to adopt solutions that save energy without interfering with the production. Motors, which account for almost 70% of the annual energy consumption in industries, are the main focus in successful energy saving projects. Among several projects to reduce energy consumption, Nestlé is replacing old electric motors with energy efficient motors. The replacement project was concentrated on motors which run 20-24 hours/day. The mentor of the project was Gilberto Tonim, manager of Electrical Engineering and Automation at Nestlé Brazil, who counted also on electric projects engineer, Edson Zutin, and specialists in electricity in each unit. "Our goal is to save energy, so we decided to replace obsolete motors, which use more electricity, with energy efficient motors. Energy costs are rising at a level above the price of the motor," says Tonim. "It's not worth buying a standard motor. The difference in the cost of a high-performance motor is small compared to the energy savings generated," he explains. According to Tonim, the project focused on motors that run 90 to 100% of the time because they allow a faster return on investment. "The replacement of an old motor

that works 24 hours with a high performance motor is paid in two years," he says. To kick off the project, Nestlé had the support of CMS Energy, a utility company. CMS funded the purchase of the first 141 motors through an ANEEL resolution that determines that a percentage of the annual operating revenues of a utility companies must be destined to projects and actions for energy saving or energy efficiency. WEG supplied Nestlé with high performance motors and gave full support in the initial survey to define which motors would be replaced and the specification of those which would replace them. Motors, compressors, cooling towers, boilers, pumps, fans and exhaust fans were replaced. According to a survey in European industries, the compressor consumes 25% of the total power, followed by pumps (22%) and fans (16%).

According to Roberto Carlos Contini, WEG Applications and Sales engineer who assisted Nestlé on the occasion, the main advantage of the replacement is energy saving, but there are other advantages. "You replace old motors (about 20 years) with motors with a new design, a service factor 15% higher than the rated power, improved efficiency and environmentally friendly because WEG recycles the old motors and, they still have two years warranty," he summarizes. After the motors are replaced, the next step to save even more is to use frequency inverters. The return on the replacement is proportional to the use of the motor. The more continuous

the operation, the greater the difference in energy saved over the months and the faster the investment pays for itself. Tonim says that the company chose WEG as a supplier because it is present in all Brazil. For Nestlé, this presence in Brazil is a very serious matter: "We have factories scattered all over and with WEG, we have an agent always nearby. Furthermore, they are also present worldwide. When I was in Thailand, I came across some equipment imported from Europe using a WEG motor."

September, 2003

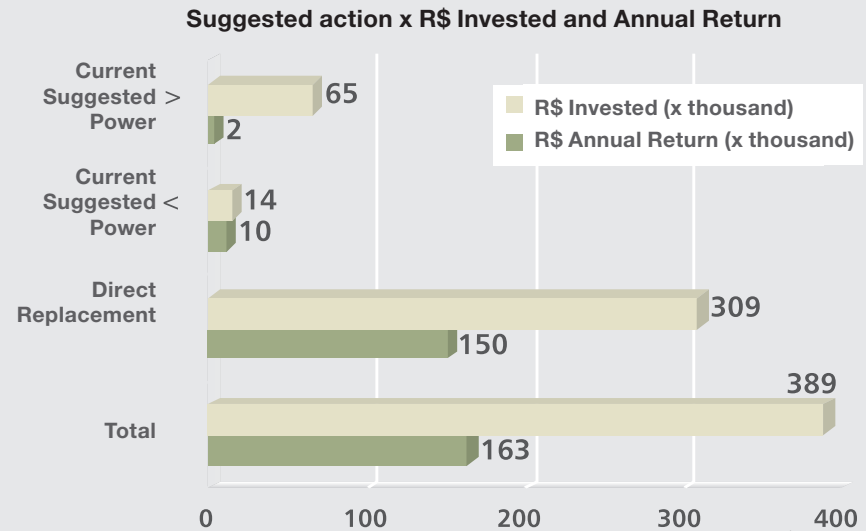


Buaiz Alimentos

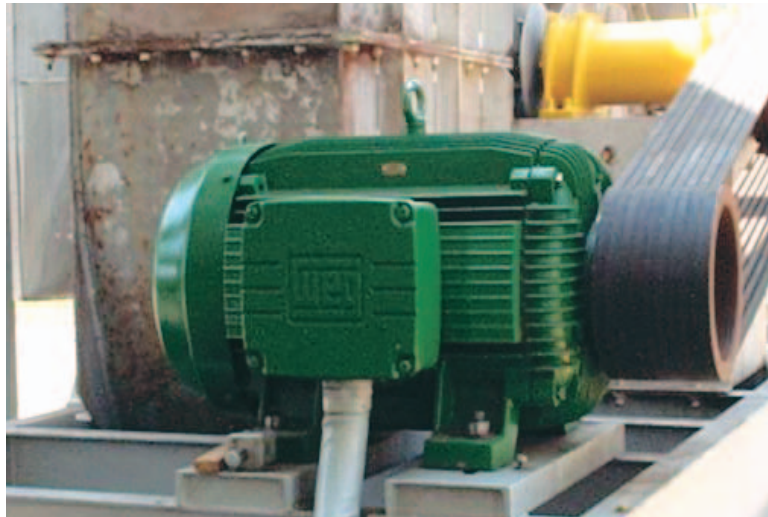
Identifying needs

With the application of the Energy Efficiency methodology by the WEG Service team at Buaiz Alimentos, based in Vitória, in the state of Espírito Santo, the company estimated a savings of US\$ 80 thousand a year on electricity. The work consisted in the diagnostic study of 193 motors of several departments in the company. With this, WEG identified the need to replace 156 motors with High Efficiency models and repower, to a lesser or greater power than the current, another 23.

The results were so good that the evaluation on a test-group on 26 motors showed a savings of energy in kWh/year 7.2% higher than the initial estimate.



October, 2007



Garoto

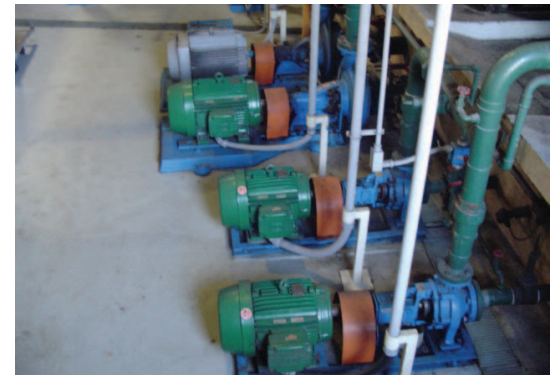
Reliability of plant

During the assessment phase of the motors at Chocolates Garoto, 182 motors were identified with potential to be replaced. After the instantaneous measurements of current in continuous-duty rating, the loads of the motors were evaluated and the company decided that the actions should occur as follows:

- 7 motors were identified for repowering with high efficiency motors
- 28 motors of refineries in Lines 1 and 2 were identified for replacement with 14 high efficiency motors with higher power
- 02 motors of cooling towers of cold water central were evaluated for possibility of being replaced by motors of 12 poles, 8 poles and frequency inverter
- 85 motors were identified for replacement with high efficiency motors of same power
- 20 motors were high efficiency. Most of them were purchased with equipment and would be maintained

The adoption of the proposed solution for the blenders led to a number of benefits and gains, not only with the reduction of energy consumption by improving motor efficiency of the standard motor for a high performance motor, but also:

- Reduction of routine and maintenance costs
- Reduced inventory of parts
- Increased reliability of plant
- Reduction of man-hour to change and restart motors
- Reduction of amount of motors
- Reduction of installed demand (kW)
- Lower cost for acquisition
- Availability of manpower
- Reduction of operation cycle in 1 hour
- New motor in same frame as previous



July, 2009



Sadia

Constant cleaning

The replacement of standard electric motors with high efficiency motors of the WWash line with return on investment through gains in energy efficiency and reduction of maintenance and operation costs represents one of the most more representative actions of Application Engineering and Energy Efficiency for application in industries.

The methodology used by WEG follows these steps:

- Analysis of data and definition of potentially inefficient motors
- Overview of processes
- Diagnosis of operating conditions
- Study of Application Engineering of Measurements for evaluation of results
- Replacement of motors and measurements for evaluation of results

The project was applied on the cutting disc of the meat cutting machine, replacing the standard motor with a high efficiency WWash motor. This motor is suitable for applications where hygiene and cleanliness are essential, having the most complete sealing system, perfectly meeting this application that needs constant cleaning. The motor also has the exclusive WEG NOBAC coating that prevents bacterial proliferation ensuring the quality of the process.

Scope of supply:

- WWash Line High Efficiency Motor, 2 hp, 1770 RPM, DOL starter, 380 V, Pulley/belt coupling.

The replacement of the standard motor with the high efficiency WWash motor provided a 42% reduction in energy consumption, thereby obtaining a return on investment in 1.5 years, besides the gains shown below proving the real feasibility of the application.

- Increase of MTBF (from 20 days now it is already in about 01 year)
- Reduction of maintenance costs and demands
- Availability of maintenance personnel to perform other activities
- Increase of process reliability
- Increase of product quality
- Increase of availability and efficiency of process

Electric motors play a fundamental role in the continuity of processes. Therefore, an adequate study of application engineering and energy efficiency can provide a substantial reduction in overall costs.



November, 2010

Sadia

Energy Efficiency

In pursuit of actions that contribute to energy saving, Sadia, in Dois Vizinhos, in the state of Paraná, replaced the standard type motor of the exhaust system of the Kopper turbine at its poultry food manufacturing plant with a High Efficiency motor.

The economy generated in this application alone resulted in a reduction of 9.4% in power consumption, which represents US\$ 2,360.00 less in Sadia's annual budget (return on investment in 10 months). The replacements in these cases represent one of the most representative actions for use in the industry because the investment is quickly recovered through energy efficiency gains.

Methodology

To select the motors which represent potential savings in the replacement, it is necessary to know the operating characteristics and technical specifications of the equipment, but also implies knowledge of the process in which the equipment will be used. The methodology used by WEG was ordered in five steps to find solutions and opportunities for energy savings:

- Analysis of data and definition of potentially inefficient motors
- Overview of processes
- Diagnosis of operating conditions
- Replacement of motors
- Measurements for evaluation of results



December, 2009

Cocari

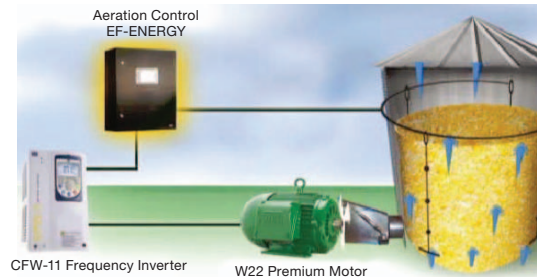
Efficiency in storing grains

The demand for grain in Brazil is growing more and more each day and WEG, together with Agroindustrial Rezende, is following this process of evolution. The company is the first to innovate and develop an energy efficiency solution for aeration of grain storage silos.

The solution was implemented at COCARI - Cooperativa Agrícola do Norte do Paraná, in the state of Paraná, showing potential energy savings as well as the effects on product quality and functionality of the system.

The solution consists in the application of the W22 Premium motor driven by a frequency inverter connected to the ENERGY EF-Aeration controller. The solution does not require the replacement of the thermometry system already present in the silos.

Both Silo 01 and Silo 02 were filled with corn and the energy efficiency solution was applied only in Silo 02. Both silos maintained the same level, aeration time, motor power, specification of ventilators, that is, all the general characteristics, thus enabling a comparison of real earnings between the two silos.



Measurements were taken with the IMS energy analyzer to compare the energy consumption between the two silos.

The application of the solution gave Silo 02 a 90% reduction in energy consumption thereby, a return on investment in 03 months.



February, 2011

Doux Frangosul

Easy cleaning

The food processing industry requires very special care with hygiene. That's why the WEG WWash line of electric motors stands out in this market for it meets the requirements of the food industry as to the need for constant cleaning. Doux Frangosul – part of the Franco-Brazilian group Doux and one of the three largest exporters of poultry in the country - is one of the companies that now relies on this solution at their Poultry Slaughter Unit in Passo Fundo, in the state of Rio Grande do Sul. A total of 24 WWash motors work about 21 hours a day on the automated cutting lines of poultry of the brand Stork.

The solution has fitted perfectly to the environment that, for being extremely wet, needs high pressure cleaning water jets three times a day. The WWash has the most complete sealing system, the W3Seal ® and protection, IP66W in electric motors, preventing water and dirt from entering the motor and ensuring the durability that the application needs. And the coating is done with the exclusive WEG NOBAC ® which has antimicrobial properties. To complete the anti-corrosion package, the shaft and the bolts are stainless steel.

Doux Frangosul celebrates for having chosen WWash motors. "There was an immediate reduction in maintenance costs, with increased motor service life and productivity in the line. Other benefits are energy savings due to the high efficiency motors operating 21h/day, the service factor of 1.15 and special insulation which

reduced burns due to overloads. The motors are also easy to clean", says Junior Biazzi, Maintenance Coordinator at Doux Frangosul. Because the solution solved the problem of constant burning (average of four faults in motors per month) mainly because of the seals, 24 motors were purchased and installed in 2008, replacing an entire line with WWash. "This supply is part of a Doux Frangosul project that seeks to reduce maintenance costs and downtime of the Stork lines, due to the low reliability of conventional motors. Before, it was common to stop the module completely because one motor that burned automatically canceled the process.



March, 2010



Civil Construction



National Theatre of Hungary

Modern scenery

The National Theatre of Hungary in Budapest has WEG equipment in the machinery above and below the main stage. The work is the result of combining multiple technologies. On the outside, the Hungarian National Theatre impresses with its bold architecture and perfect integration into the landscape. But it is inside that its most unique features can be seen. It is fully equipped with computer-controlled drives that allow the many different changes in the scenery.

The electric drive is composed of tubes mounted with integrated guides, a positioning measurement system and a drive and braking unit using WEG brake motors certified by VDE in Germany. The machine is fitted with 48 individual winches fully equipped with WEG motors with a traction capacity of 300 kg and a driving output power of 5.5 kW, and 33 winches to move the scenery with a traction capacity of 400 kg and a driving output power of 7.5 kW.



September, 2003

Gotthard Base Tunnel

Largest railroad tunnel in the world

WEG motors power the ventilation system of the Gotthard Base Tunnel, the biggest railroad tunnel in the world in Switzerland. With 57 kilometers, the tunnel is located between Erstfeld and Biasca, joining to another tunnel in Zurich which connects to Lugano. By 2025, there will be a network of 6,000 km of high speed train lines in Europe. The Alp Transit Project is responsible for bringing the high speed train system to Switzerland.



March, 2004



Middlesbrough Transporter Bridge

Renewal of iconic bridge

Middlesbrough's iconic Transporter Bridge has been given a new lease of life, following replacement of its original electric motor and drive system, which had given nearly 100-years of service, with WEG motors and inverter drives supplied and installed by WEG distributor, Deritend RMB. The replacement system will ensure that the renowned landmark is in tip-top condition for its centenary celebrations next year (2011).

"We are obviously delighted that WEG motors have been chosen for such a high profile project," commented Marek Lukaszczyk, European Marketing Manager for WEG. "Our motors have a deserved reputation for quality and reliability, evidenced by their use in some of the most high profile applications worldwide, including the new 818 m (2,684 ft) high Burj Tower in Dubai – the tallest building in the world, and new road tunnels in Sydney, Madrid and Hong Kong."

The transporter bridge was shut in May 2010 to allow for the replacement of the original electric motors and drive system. The work was undertaken to enhance the bridge's reliability and safety, while ensuring a reduction in the time it is closed for routine maintenance. As an added benefit, the new motor/drive system will enable the bridge to be operated safely in higher wind speeds than previously possible.

The motors supplied and installed by Deritend are 3- off 45 kW 4- pole machines (2 operational, 1 spare) from WEG's W22 high efficiency range. They are equipped with 1024 PPR encoders and are controlled by two WEG CFW-11 inverters. Overall, this package provides fast, precise control with high levels of energy efficiency,

helping to reduce the operating costs of the bridge.

"This project was perfectly suited to Deritend's multi faceted electro-mechanical approach, incorporating everything from design and commissioning to manufacture and site installation." said Deritend Operations Manager Mark Westwood.

"One of the main criteria within the tender document was for the original drive system to remain in place and recognize the heritage status of the site and treat it accordingly. We achieved this by designing a bespoke solution which is built around the existing equipment and the 'old to new' concept is clearly visible."

The mechanical drive solution provided by Deritend has enabled the existing, listed drive to remain in its entirety with only the need to disconnect the coupling bolts on both motor couplings.

Commenting upon the successful completion of the project, Councillor Paul Thompson, Middlesbrough Council's Executive Member for Streetscene Services and Transport, said: "The Transporter is an iconic landmark that is recognized around the world, and of which we are truly proud. "It's fantastic that, nearly 100- years after it first carried people across the river, it is in full working order and looks as good as the day it was opened. "That is in no small part due to the efforts of companies like Deritend whose expertise will ensure it's still up and running in another 100 years. The only working bridge of its kind in England, the Transporter connects Middlesbrough to Port Clarence on the bank of the Tees. It was originally built in 1910 by Sir William Arrol and Co of Glasgow to replace an earlier steam ferry. A Transporter bridge was chosen because the Parliament of the time ruled that the new method of crossing the river had to avoid affecting shipping on the waterway.



December, 2010



HADERA Project

Drinking water

Ensure drinking water for human consumption in the next 22 years. This was the objective of the Hadera Project in Israel, one of the largest desalination plants in the world and located in a strategic region where water is worth gold. Between 2007 and 2008, the country had a period of scarce rain that reinforced the need for investments in the production of drinking water. The region in Israel is arid and the country has developed advanced technologies for water reuse and permanent irrigation through pipeline systems. In the Hadera Project, 100 million m³/year of water will be withdrawn from the Mediterranean to be desalted and then destined mainly for the daily consumption

of about 1.5 million people. WEG participated of this challenge by providing the whole package of electric motors. The package of more than 70 induction motors with powers ranging from 160 to 6000 kW, was supplied to a private high-tech Israeli company focused on desalination plants who has been a WEG customer since 2005. The motors worked in a large combined-cycle thermoelectric power station which optimizes and reuses energy in the desalination process of the electricity generation cycle. One of the differentials of these motors is the operation with frequency inverters varying in rotation according to the requirements of the application and load.



May, 2008

Delhi Metro

Safety in subways

WEG was involved in the Delhi Metro project in India, equipping the ventilation system of the subway stations in the city of Delhi. WEG supplied 44 motors, 29 with power of 37 kW and 15 with power of 200 kW of the Smoke Extraction line to the subway stations through Flakt-Woods UK (supplier of fans and exhaust fans). The Smoke Extraction line was developed for exhaustion of smoke in case of fire, ensuring the motor will operate for a certain period in an environment with temperatures up to 400 degrees Celsius.



March, 2004

Sydney Opera House

WEG present in Sydney

WEG made an important supply among the thousands of products applied in the theater: 11 electric motors of 200 kW, 6 poles, frame 355. The motors drive the exhaust system and air conditioning of the Sydney Opera House. The theater was built in 1973 and is one of the main attractions of the city. The theater is also regarded as a masterpiece of engineering due to its innovative architecture with giant white concrete shells.



1993

Ponte of Leixões

Flow of sea traffic

The Port Administration of Douro and Leixões inaugurated a new movable bridge. WEG participated of the project providing equipment to the now fourth largest bascule bridge in the world. Located in northern Portugal, in Matosinhos, near Porto, the Port of Leixões is one of the most important in Portugal, accounting for 25% of exports and the movement of 15 million tons of goods per year. The new bridge was inaugurated in April 2008 as part of the Strategic Development Plan of Port of Leixões, a project that aims at improvements in port infrastructure. The new bridge replaced the old structure allowing the widening of navigable space in more than 20 meters.

The innovative hydraulic system powered by WEG products facilitates the opening and closing of the bridge, which implies a significant reduction in waiting time at the margins. The bridge has a 92 meter span and enables the navigation channel to widen from 59 to 77.5 meters. This measure represents a major improvement in the flow of traffic by sea, allowing the entry of larger ships in the port. Another advantage of the new bridge is the widening of land routes because, unlike the old structure, the movable bridge allows passage of larger vehicles.

WEG participated of the project providing eight W21 electric motors, 280 and 125 hp. Besides the equipment, the company also developed a special coating for marine environments which was applied to the motors.



April 2008

Designed by Gustavo Cudell Ltda., a company in the field of industrial automation, the new bridge was part of a larger project that aims to reshape and modernize the structure of the Port of Leixões.

The project was completed and delivered to the Port Administration of Douro and Leixões in 2007. The WEG equipment ensures the quality and success of the installation in the structure of Leixões.



Sugar and Ethanol



Ypióca

Modernization of plant

WEG was ahead of the automation project of one of the most modern ethanol plants in the country. Famous throughout the country and abroad for its traditional aguardente (alcoholic liquor distilled from fermented sugar cane), the Ypióca Group is investing in a new market: ethanol.

The company opened a plant in Jaguaruana, in the state of Ceará, on 23 October, 2009, with capacity to produce between 40 and 60 million liters/year of ethanol, about 90 million liters/year of cachaça (another name for aguardente), as well as the possibility of manufacturing neutral alcohol. Fully

automated, the new unit was the result of an investment of around US\$ 39.5 million. It is among the most modern in the world and is strategic to the company. The goal is to supply a third of the market of Ceará with ethanol over the next three to four years and increase the group's revenues by about 20%. Today, Ceará imports 160 million liters/year of ethanol, practically all that is found in fuel pumps in the state. For this new challenge, Ypióca sought solutions from WEG, a partner for more than three decades, with products operating from the planting of the sugar cane (controlling panels of the water

collection and irrigation pumps, for example) to the mills and factories. The motor which drives the mill is an HGF line motor, 500 hp, 690 V.

The defiber, blades 1 and 2, are run by 1,100, 900 and 500HP, 690 V motors. José Paulo dos Santos, Engineering manager of Ypióca says that the competition to choose the supplier was fierce. However, due to the 100% Brazilian technology and after-sales that Ypióca has known for a long time, the decision was to extend the partnership. "WEG has a very good customer service. There is none better in the country," adds dos Santos.



January, 2010

Usina Miriri

Electrification of process

Most sugar and ethanol mills work with steam turbines. However, this technology does not ensure total control of what is being produced. Therefore, plants are electrifying processes, acquiring motors with inverters to drive the mills, increasing power generation and improving the operation as a whole. With the electrification process, the plant consumes less and sells more. An example is Usina Miriri, in the state of Paraíba, which produces sugar and ethanol. The mill had a steam turbine and acquired WEG products to change this system by means of electrification. WEG provided protection cubicles, control panels and automation, generator, transformers, motor control centers, frequency inverters and three-phase high performance electric motors. The equipment is used to generate, distribute and control processes. "We are modernizing the plant, starting to work with a new line that had not been previously explored, which is sugar, and increasing power generation. All this with WEG solutions," says Emanuel Pinheiro de Melo, Industrial Manager of Miriri. Through the electrification of the mill, the customer minimized excessive costs with maintenance. Now, the reduction in steam consumption is redirected to

the boiler. "Then, this steam is sent to the new generator, producing more energy for Miriri that can also sell this product," explains Marcos Hubner, WEG engineer and analyst for the Sugar and Ethanol segment.

The acquisition of the new drives with variable speed provides more control and monitoring which, with the High Efficiency motors, minimizes operating costs by reducing the levels of maintenance and consumption. According to Melo, WEG was chosen for the supply because it is a national company and because they were already known for the quality of their products. "As we have been partners for a long time, we have observed WEG's level of technology grow every day," he says.

The industrial manager at Miriri also praises the technical assistance and after-sales. "Whenever we need to, we can easily contact with representatives in the region and our doubts are clarified." To reach the optimal solution, the WEG team made several technical visits and many business units coordinated by the Energy Business Center were directly involved. The visits generated technical proposals and the whole negotiation took about six months.

Detailed scope:

- Generator 7500 kVA / 13.8 kV
- Generator Output Cubicle
- Generator Surge and Excitation Cubicle
- Generator Neutral Conductor Cubicle
- Control and Protection Panel of Generator
- Motors HGF355 Line, 500 hp, 6 poles, 480 V
- Oil Transformers 750 kVA
- Oil Transformers 1,500 kVA
- Oil Transformers 1,000 kVA
- MV Distribution Cubicle
- LV Distribution Panels
- Motor Control Centers
- Frequency Inverters Model CFW11
- Frequency Inverters Model CFW09
- Approximately 2,300 hp of WEG High Efficiency Motors



August, 2010

Usina Costa Bioenergia

Optimization of plant

“WEG developed all the instrumentation and electrical project, installed the software system and automation management. Communication systems, motors, pressure transmitters, radars, power generators, everything works on the WEG platform,” says Valmir Costa, CEO of Costa Bioenergia. With the complete solutions, except for the mechanical part, the plant was delivered ready for operation. The electrical package, sold in turnkey mode, allows the customer a differential negotiation with the company. In this supply system, WEG defines the criteria of the project on a single base, optimizing the plant. On entering the plant, the sugarcane is raw or burnt and is placed on a metal conveyor belt where it is cleaned by fans using WEG high-powered motors. Then, the sugarcane passes through the chipper which reduces the size of the sugar cane sticks. On the same conveyor, the cane goes through a shredder that opens the plant fibers and ensures the process index called “open cell”. The chopped and shredded cane is removed from the metal conveyor and placed on a rubber conveyor of the same width, but greater speed. After this shredding, the sugarcane passes beneath an electromagnetic device called electromagnet which is used to remove metal impurities which may damage the mills (next step). A WEG motor also drives the spill drum which evenly distributes the sugarcane on the conveyor. At this stage of preparation, WEG developed software that makes the complete control of the progress of the conveyors, rotation of the motors, levels of the Donnelly chutes, downtimes, system

of interlocks and safety. The goal is to meet the need of the plant by combining high performance and efficiency. Through the Energy unit, WEG can decrease the volume of machines in stock at the plant because it designs motors mechanically interchangeable with existing motors. The sugarcane follows on the rubber conveyor and reaches the twin mills, starting the grinding process. At this point, there are vertical boxes called Donnelly chutes where the sugarcane forms a compressed mass to ensure a constant weight at the entrance of the juice separation rollers. The level of sugarcane inside the chute is used to control the speed of the rubber conveyor and, consequently, feed the mill. Complex adjustments of rotation between the drive motors are made to ensure perfect synchronization between them. If the rotation is low, the fibers may pile and the process is interrupted. If the rotation is high, there may be losses in the extraction of the juice from the fiber. In Brazil, a plant usually begins with four mills with the possibility of expanding to two more. This constitutes the so-called six grinding tandems. The juice separated in the four mills is returned to the previous mill in a process called imbibition.

The need for washing occurs because the fiber has little sucrose (less than 3%). After separating the juice and the pulp, the liquid is sent to a tank which feeds the processes of producing sugar and ethanol, while the fiber goes on conveyors to the boiler or the biomass yard to be burned, generating the steam required for the manufacturing process of the plant. All the control

of the 25 motors of the mills and other motor pumps is made by WEG software. Interlocks and advance and stopping strategies were developed to ensure the best form of control in the preparation and extraction. The synchronism of these steps allows the continuous and repetitive extraction in the displacement and speed parameters.

“All this technology allows us to be more efficient, providing a much higher return on investment,” says Valmir Costa, CEO of Costa Bioenergia. “In examining the proposals, it was very easy to work with WEG’s because it was one of the most complete. Sometimes doubts arose and our contact with WEG’s engineering area was always very direct and easy. We already knew about the performance of the products and this supply exceeded our expectations,” said Cícero Furtado, person in charge of Maintenance at Costa Bioenergia.



July, 2010

Usina Trapiche

Increase in productivity

Located in Sirinhaém, in the state of Pernambuco, the Trapiche plant has its own auxiliary power generation and also constantly seeks the development and modernization of processes. For this reason, WEG developed a project that foresees the electrification of three mills and also allows the use of a single motor as a spare in two positions in the preparation of sugarcane. “We chose WEG for what it represents in Brazil and worldwide, for the quality of the equipment and compliance in delivery,” says Eduardo Mota Valença, Industrial Manager of Trapiche. One of the advantages of this supply is the possibility of the customer changing the installation of the motor cooling system. In one position, the heat exchanger is installed on top of the motor, and in another, because of space limitations, it is on the side. The WEG motors used at Trapiche, for processes in general, are of the W22 Plus line. The replacement of the machines is part of a plan to expand the plant that lasts three years. “This first step increased the grinding of the sugarcane without overloading the other equipment. So, we got more capacity while maintaining safety,” says Valença. According to him, the partnership with WEG allows the investment to be made quickly. “Over three years we will buy the equipment to reach the goal of development we want. We make the

disbursements only when we have enough raw materials.”

The industrial manager of Trapiche explains that it is not necessary to replace all the equipment at once since the change is significant and involves a new concept of plant operation. “We are preparing Trapiche for the future and WEG allows us to do this gradually, while having a financial return,” he concludes.

It is also important to point out that the differential of this supply was the customization of a 2000 kW motor for the sugarcane shredder. The space for the equipment is small and for the replacement it was necessary to develop it in the required measurements and with a special heat exchanger. The WEG Engineering team produced the perfect solution for the space available.

Detailed scope:

- Motors HGF355 Line, 550 hp, 6 poles, 690 V
- Motors W22 Line, 100 hp, 6 poles, 690 V
- Drive with Frequency Inverter AFW11M
- Dry Transformers 2,000 kVA, 13,8/0,69 kV
- MV Cubicles - CWMT / Class 15 kV
- Input and Output Cubicle and Cables
- Cubicles for mills 1, 2 and 5
- Motor for Shredder MAI560 Line, 2,000 kW, 6 poles, 6.600 V
- Motors W22 Line, 50 hp, 4 poles, 380 V



August, 2010

Companhia Energética Vale do São Simão

Quality in services

Exclusiveness in services is the most important reason Companhia Energética Vale do São Simão chose WEG as its main supplier of electrical equipment. "We trust the company for the excellence in their equipment and services," says Alexandre Bicalho de Andrade, Director of the Andrade Group, responsible for Cia Energética Vale do São Simão.

Drive panels, distribution cubicles, generator switchboards, 1 to 350 hp motors, transformers (dry and oil) from 112.5 to 2,500 kVA and turbogenerators of 31.25 and 37.50 MVA, were the products installed by WEG to modernize Vale do

São Simão, located in the city of Santa Vitória, in the state of Minas Gerais.

The 1 to 350 hp motors are High Efficiency motors and present extremely advantageous operating costs. The high efficiency ensures a rapid return on investment because the motors provide increased power savings.

With an installed capacity of 2,500,000 tons of sugarcane, the daily production of Companhia Energética Vale do São Simão reaches 22,000 bags of sugar, 600,000 liters of hydrated ethanol and generation of 55 MW / h with exportation of 25 MW / h energy.

Detailed scope:

- Drive Panels
- Frequency Inverter MVW-01
- Distribution Cubicles
- Generator switchboards
- High Efficiency Motors of 1 to 350 hp
- Transformers (dry and oil) of 112.5 to 2,500 kVA
- Turbogenerators: 31,25 and 37.50 MVA
- Motors HGF 400, 550 kW, 6 poles, 690 V
- Motors HGF 315 C, 230 kW, 6 poles, 690 V
- Motors MGI 710, 4000 kW, 6 poles, 13800 V
- Transformer 5,000 kVA (dry)



August, 2010



Usina Santo Antônio

Pioneering project in northeast

The Santo Antônio plant, in the state of Alagoas, was the first in the northeast to operate a completely electrified plant. The investment allowed it to diversify a new business: the generation and supply of electricity. WEG has been supporting the evolution of Santo Antônio since 2001, when the plant began the search for energy efficiency. By the end of 2007, the plant had installed three generators (two of 6.25 and another of 18.75 MVA), automated the process and started the electrification of the mill (two 1,600 hp motors, inverters, transformers, another 900 hp motor with inverter and a transformer). At harvest time in 2007, the seven motors with inverters went into operation to drive the boiler exhaust fans with more energy savings, which paid dividends as they also began operating a substation to export electricity with a 25 MVA transformer.

WEG provided the necessary solution for this transformation of economy into profits. Today, the steam that once drove the mill is transformed into electric energy which, in addition to moving the plant, has its surplus sold, thus becoming the third product of the company, along with ethanol and sugar.

The smart operation of WEG motors with speed variation provided by inverters, reduces power consumption so that there is more energy for sale. For WEG, this supply has become a reference of great importance due to the innovative and pioneering character in the northeast region of the country.

Until then, the Santo Antônio plant was very inefficient in terms of energy. They even had to purchase approximately 1,000,000 kWh monthly

for the production process. The revolution came in 2001. In the first harvest which the plant operated with new generators, it was not necessary to acquire energy (a monthly savings of US\$ 62.5

thousand) and they exported about 6.5 million kW. So, they ended up generating enough resources to, in just one harvest, pay all the investment made at the time.



September, 2007

Grupo Santa Terezinha

WEG Technology in production of sugar and ethanol

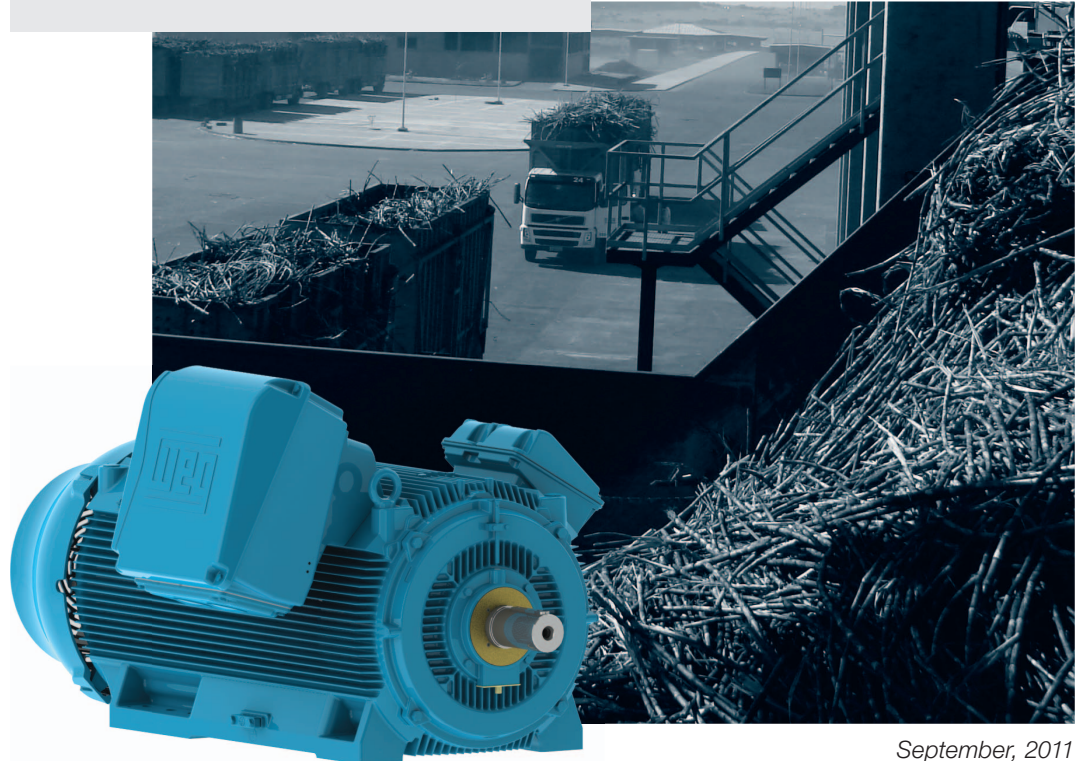
Grupo Santa Terezinha is among the major sugar and ethanol producers in the country. Established in the early 60s and with eight units in the northwest of the state of Paraná, it sought in WEG the solution for a major change in its manufacturing process. In this increasingly demanding market, the Group invested in the electrification of the exhaust fans of boilers 1 and 2 of the plant in Cidade Gaúcha, in the state of Paraná. The turbines of the boilers were replaced with electric motors driven by frequency inverters where the speed variation and control of the process enables energy efficiency and reliability, in addition to reduction of downtime and corrective maintenance. In the old model, the turbines were powered by the steam generated in the process of burning bagasse, with low efficiency and high maintenance, not reaching the standards required by today's sugar and ethanol market.

For some time now, WEG has presented electrification projects and mechanization systems using steam turbines. As Cidade Gaúcha already operated with two similar electrified exhaust fans, now it has four of them with the same characteristics. The plant also acquired a reserve motor that was built to be fully interchangeable with the four systems, giving more reliability to the operation.

The supply to the Santa Terezinha plant was coordinated by the WEG Business Center team, where only one person is responsible for the manufacturing process of all components in the company. This way, the customer profits in terms of safety and more flexibility especially in the flow of commercial information and technical definitions.

Scope of supply:

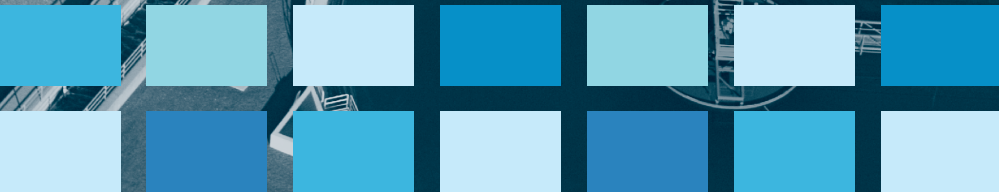
- 2 driving machines with frequency inverter assembled on panel model AFW09 0600T/ 440 V - Regenerative
- 3 three-phase electric motors, model HGF 500 hp, 4 Poles, 440 V
- 1 three-phase dry transformer, 1500 kVA – 13.8 kV / 0.44 kV
- Start-up of equipment



September, 2011



Sanitation



Tupras

Sanitation

WEG products for the water and sanitation segment continue to open borders and conquer markets. WEG has provided two irrigation projects for the Turkish company Tupras through WEG branches in Spain and Japan.

Izmit Project:

- 166 Ex-d and Ex-n motors, 2 and 4 poles, 110 kW

Kirikkale Project:

- 6 HGF315C, HGF355 and HGF500 motors – 1,200 kW
- 29 Ex-n motors, low voltage, powers between 3 and 90 kW



2005

Lost City - The Valley of the Waves Water Park

Largest theme park in South Africa

The wave driving system of the park, works as follows: the water is dammed up to a certain level and then about 40 WEG motors with power ratings from 0.75 kW to 30 kW begin to operate the hydraulic pumps that are responsible for opening the flood gate. The water falls by gravity and produces waves.



1993

Aquasystems

Water purification station

Weg motors equipped the water purification station in Belgium through the company Aquasystems. WEG provided 36 motors, 110 kW, 6 poles, manufactured at the plant in Portugal. The motors are used in surface aerators in the water purification system. These are unique products because Aquasystem provides its aerators to different parts of the world, requiring flexibility in different voltages and frequencies.



2005

Pulp and Paper



Fibra

Reliability from beginning

Fibra, company that resulted of the merger between Nova Aracruz and VCP (Votorantim Celulose e Papel), is currently the largest company of the segment with a production capacity of 5.25 million tons of pulp and 179,000 tons of paper per year.

The company has three plants in Brazil. The unit in Três Lagoas, in the state of Mato Grosso do Sul, is the largest cellulose mill in the country with a single production line which began operations in the first half of 2009, and was equipped with the most advanced technology within the highest standards of environmental management. Practically 100% of the motors of the industrial plant are WEG, totaling about 1,250 units, including High Efficiency motors, medium voltage and large motors, and 47 transformers (up to 80/105 MVA). One of the differentials in this supply by WEG for this project was the commissioning and monitoring of the start-up. As explained by Leandro Avila, Service Supervisor of the WEG Motors unit, the work is to be “the eyes of the customer” in the process of receiving and installation of the equipment at the site. This is because WEG motors and transformers are delivered before the factory is completed. And in the period between delivery and the effective operation, which takes several months, even years, the products are at risk of being exposed to rain, mud and other conditions, which could jeopardize future performance. Therefore, WEG has at least one person in charge at the site, through its technical assistance in the region. These professionals check the conditions of installation and storage of the equipment to

ensure that procedures are adequate. “We make several inspections while the motors are not in operation and we also follow the testing phase to see if they work properly,” said Avila. “With this, WEG ensures reliability since the beginning of the operation,” he adds.

WEG supplied Fibria in the state of Espírito Santo with a motor developed specifically to meet the entire chemical load involved in the process. “The motors used previously did not last 5.000 hours without maintenance. The new motor was made to operate 17,000 hours without stopping,” explains Avila.

Among its features, the equipment has a special coating, a stainless steel shaft and does not require lubrication. The delivery also included the installation verification service to ensure proper operation. “A scratch in the coating exposing the metal is already the doorway corrosion,” says Avila.



September, 2008

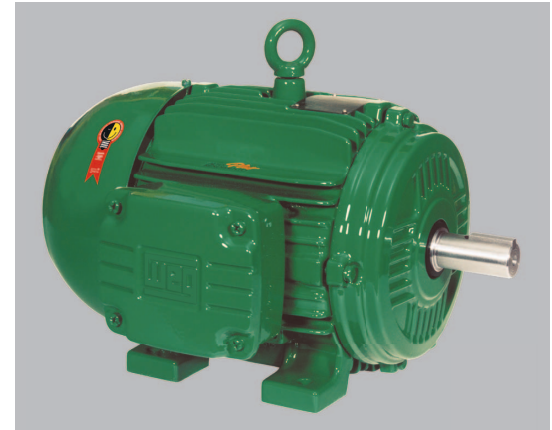
Klabin

Dedicated Project

In September 2008, the market warmed up with the launch of Klabin's MA-1100 Expansion Project. The project, carried out at the Monte Alegre unit in the state of Paraná, represented an investment of US\$ 1.08 billion and increased the production capacity of the unit of 700 thousand tons of paper per year to 1.1 million tons. The main point of the expansion was the new paper machine, the MP 9, considered the most modern in the world for the production of cardboard. WEG supplied the project with 593 High Efficiency motors and over

76 medium and large motors. The partnership between Klabin and WEG was established from the outset.

The motors supplied were manufactured specifically to meet the needs of the customer. As a traditional partner of Klabin, WEG participated in the MA-1100 Project with a significant contribution by supplying electric motors for all plants that were part of the expansion. This included the supply of motors with different technology than that used so far at the Klabin Papéis Monte Alegre industrial unit.

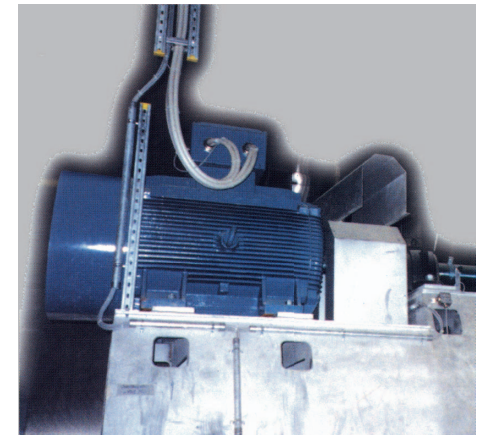
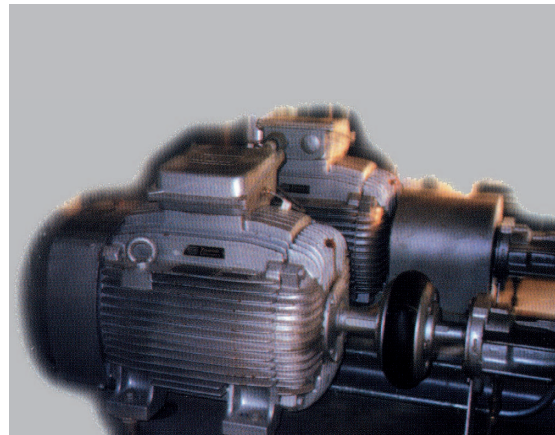


September, 2008

Kronospan in Switzerland

Expansion plan

HS AntriebsSysteme AGO, WEG representative in Switzerland, supplied a package with 30 energy efficient motors with frames 160 to 355 to plan the expansion of Kronospan in Switzerland, one of the largest manufacturers of wood-based products in the world. The motors are used in pumps, fans and worm conveyors and the energy efficient motors ensure a rapid return on investment.



2003

Cocelpa

Feasibility study ensures energy efficiency

A feasibility study was carried out on 28 motors of pumps, fans and filters, with powers 30 to 350 hp running almost 24 hours a day. The result showed that the payback time would be 1 year and 9 months for all motors. It was then decided that a group of seven motors would be replaced in the first stage of implementation, at a total 1600 hp. All motors maintained the same power. Only one was replaced with another of lower power.

Among the motors that were replaced with high efficiency motors, was the pump of the recovery boiler, keeping the power of 250 hp.

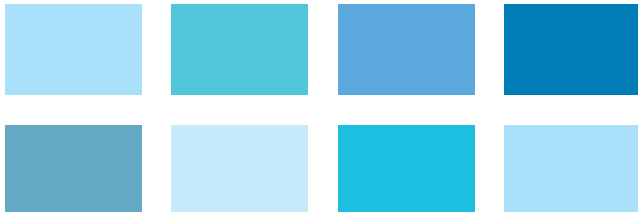
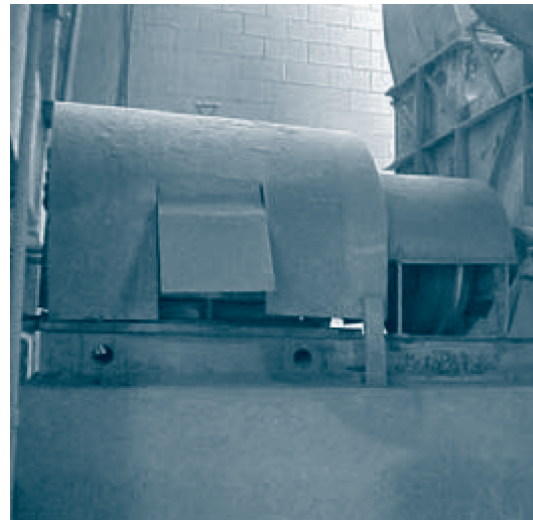
The other motor that was replaced was the one that drives the exhaust fan of the limekiln, with 350 hp.

The changes suggested included the replacement of standard electric induction motors with high efficiency induction motors.

Benefits generated by study of application engineering:

- Optimization of cost X benefits of motors
- Improvement of availability and efficiency of plant by identifying and acting on obsolete motors and those of difficult maintenance
- Assurance of efficiency in appropriate use of energy
- Identification and adaptation of motors with high maintenance costs due to frequent failures because of incorrect specification
- Reduction of maintenance demands
- Dissemination of concept/importance of correct specification of equipment

July, 2009



Trombini

Extra innovation

From a suggestion made by WEG, Trombini Embalagens S.A. is investing in a new motor technology that promises to become a benchmark in the pulp and paper market, due to the excellent results it brings. The paper plant acquired the complete electrical and automation package for the new paper machine unit of Fraiburgo, in the state of Santa Catarina, the MP4, from WEG. And it bet on the idea of replacing traditional induction motors used in such equipment with modern WMagnet motors which are motors with permanent magnet rotors. The MP4 already has a differential because of its speed of operation: 1,000 meters per minute, a feature found in few machines currently operating in the country, and the rewinding machine of 2,500 meters per minute with a regenerative braking system.

Using this type of motor is new not only to Trombini, but to the Brazilian market. "Most packaging paper machines work with induction motors. The use of the WMagnet in this application will be a benchmark for the market," explains Sydney Volpi, sales analyst for the WEG Pulp & Paper segment. And all this readiness for the new has a catarinense (natural of the state of Santa Catarina) DNA from beginning to end, since the machine was designed and built by Hergen, manufacturer of equipment for the paper industry of Rio do Sul in Santa Catarina. "Both vendors are

former Trombini business partners and deposited full confidence in their skills. The integration between the supplier of the machine and the supplier of the drives and automation was very effective from the design phase, ensuring the full accomplishment of the objectives," explains Fernando Volpato, Fraiburgo unit manager at Trombini.

According to Hergen general manager, William Rodrigues dos Santos, this was the largest machine ever produced by the company and will be a benchmark in the papermaking market. The general evaluation of this project was the best possible because all the quality and productivity goals were achieved demonstrating WEG's technical competence in integrated solutions at this level of speed (1,000 meters per minute). Dos Santos believes that there are very likely to be new projects in the future where it will be possible to offer the customer a proposal in partnership with WEG, using motors with permanent magnet rotors. And why invest in what's new, when most follow the traditional model? Although the permanent magnet motors have a higher cost if compared to induction motors, the benefits of this technology justifies this difference. The first benefit is the absence of Joule losses (IR^2) in the rotor, since there is no current therein. Thus, the motor runs at a lower temperature, allowing a considerable improvement in efficiency, resulting

in lower power consumption.

Another advantage of the WMagnet line is that it works with constant torque without forced ventilation, thus eliminating one more maintenance item, releasing an MCC (Motor Control Center) drawer and saving energy that would be consumed by the ventilation motor. The reduction in energy consumption can reach 150,000 kW per year on a machine like Trombini's MP4.

There are other advantages related to the CFW11 frequency inverter that drives the WMagnet, especially in applications that require synchronism and speed. As additional benefits, the WMagnet generates less noise and has more mechanical power in a smaller frame, which means it takes up less space (an expensive item in the market today).

"Because it is a high energy efficiency product and considering that it is not necessary to use forced ventilation, the return on investment is excellent. If we consider the whole drive package, the return takes place in less than two years," estimates Volpi. The machine has been in operation since February 2011 and the result, according to the customer's assessment, could not be better. "We are very satisfied with the supply, including engineering, equipment, software, after sales, etc.

In fact, the performance of WEG systems totally exceeded our expectations," praises Volpato.

October, 2011

Scope of supply:

- AC Motors W22 Plus Line
- AC Motors WMagnet Line
- Drive Panels with Frequency Inverters CFW11Line
- Soft-starters SSW-06
- Panels with PLCs and remote units
- Command and supervision systems (command and engineering stations)
- Cubicles type MTW03
- Dry Transformers
- Software engineering services/ supervision
- Start-up services
- Training services



Veracel

Largest wood chipper in the world

With 220 companies operating in the country and 2 million hectares of planted area for industrial purposes, Brazil currently produces 12.7 million tons of pulp per year and is the fourth largest producer of the product, behind only the United States, China and Canada. And it wants to continue growing. Data from Bracelpa, the Brazilian Association of Pulp and Paper show that over the past 10 years investments in the sector totaled US\$12 billion, with a trend to rise.

To achieve these results, the sector bets on technology and innovation. An example is Veracel Celulose, an integrated agro-industrial project, which covers all stages of pulp production - from planting to the delivery of the final product.

In June 2009, the company, based in Eunápolis, in the state of Bahia, put the wood chipper from line 3, the largest in operation worldwide, into operation, with a capacity of 400 cubic meters of wood per hour.

Supplied by Andritz, a world leader in systems and services for pulp and paper industries, among others, the HHQ-Chipper™ has four WEG high-voltage motors (400 kW, four poles), working in heavy duty to ensure the supply of wood chips to produce pulp and to generate biomass, which is used as an energy source. To increase reliability, WEG created a commissioning and start-up system via smart phone. With this, besides the professional in field having immediate access to all the information he needs, the field

data is automatically transmitted to WEG, which allows more flexibility in solving any problems. With the commissioning of the new line, practically all motors used in the Veracel production process are WEG, one of the deciding factors in choosing the equipment supplier. The installation of the new line of chippers eliminated a bottleneck in the production of chips for the pulp and provided environmental and economic gains for the company, with the generation of surplus energy. It also permitted operational availability of the other two lines, which is important for maintenance.

The chipper is at the beginning of the pulp production process. That's where the trunks of eucalyptus and pine, already peeled, will be transformed into chips of various sizes. That is, the entire log enters and exits the machine and comes out chipped. At this stage powerful motors are required to do the trick. In Veracel's chipper, each of the four WEG motors has the power of 400 kW, about 2,200 hp in total. A small car, for example, has a motor of about 70 hp.

The chips are taken to the digester, where they are cooked at high temperature and pressure with chemicals. From this results the cellulose pulp which will follow to the washers and will be separated from the black liquor. In this step, the pulp, which is brown, can go through bleaching, depending on what it will be used for. Then, it is dried and broken up into bales. And, it is ready to

go to the paper machine at the industry where it was extracted or at another.

Pine, with long fibers, is used for making more resistant paper, like the one for packaging. The eucalyptus, with short fibers, is used to make disposable paper or writing paper.



January 2010

Portucel-Soporcel Group

Largest paper making machine in the world

WEG motors offer up to 30% energy savings in the operation of the largest and most sophisticated paper making machine in the world. This is part of an investment of 550 million euros made by the Portucel-Soporcel Group of Portugal, one of the world's largest in the paper industry. The equipment is 11.1 meters wide and is capable of producing approximately 500,000 tons of paper per year, which amounts to about 80 tons of paper per hour.

Besides being a leader in the pulp and paper industry in Portugal, the Portucel-Soporcel Group also has a significant presence in the global pulp market with about 92% of its sales exported to over 50 countries. In 2010, the company responsible for the production of paper for use in office supplies and graphic reproduction, decided to invest in a new plant and new machinery, increasing its international business to over 1.2 billion euros.

As a partner in this challenge, the company counted on WEG's support with the supply of 650 W21 low-voltage motors and sixteen 6 kV motors with capacitors between 0.37 kW and 2,800 kW to improve the production process of the company. The main factor in choosing WEG for the project was the company's proven experience in manufacturing high quality products, besides the fact of being the only manufacturer of electric motors to operate a branch in Portugal with an extensive industrial support platform in Europe, making it possible, for example, to carry out final testing during

manufacturing.

"Having WEG as a partner in this project ensures real time closeness and support between the supplier and customer, which is always very important," says Antonio Duarte, Director of WEG Euro. "Moreover, as the main motor supplier, we are aware of the demands and realities of the market so, the solution we presented was the most competitive in technical and economic terms."

In addition to saving energy, WEG motors also play an important role in optimizing the operation time in the manufacture of paper, ensuring the continuity of the operation. This can only be achieved thanks to a fully integrated and reliable information system able to monitor plant operations interacting in real time with the various items of production equipment. In this area, the WEG W21 motor range offers a high degree of reliability and low maintenance, contributing substantially to the reduction of maintenance costs.

WEG products also improved the motor start-up mechanism of vacuum pumps, one of the most important operations in the manufacturing process of paper, ensuring the proper functioning of the process.

"The result couldn't be more positive," says Antonio Duarte. "WEG kept to the agreement in all aspects related to the implementation of this project, with benefits to the customer in reducing operational costs and the excellent reliability for which WEG products are renowned in the market."



October 2011





General Applications



Mecaltec

Higher efficiency levels

Imagine combining the latest technology in manufacturing equipment for the foundry industry, which provides a mix of higher quality with more efficiency, with a high efficiency motor. The result is the highest performance in the market. "The results are excellent," says Enrique Gonzalez, director of Mecaltec, which brought to Brazil know-how from Fondarc Technologies, a company based in France, using blenders and cooling-blenders for casting sands. WEG WMagnet motors were installed in these machines with reduced operating cost, improved efficiency and a lifetime about four times that of the average on the market. A pioneering partnership in the sector.

In practice, taking into account the number of hours the motor operates and the cost of kWh, the higher the motor efficiency, the faster is the return to the customer. In the WMagnet, the presence of the permanent magnets causes reduction in losses, allowing the motor to operate at a lower temperature and with higher efficiency. Another important benefit that the WMagnet line offers is the possibility of maintaining the same torque in a smaller frame. There may be cases where there is a reduction of two frame sizes for the same power. This is mainly due to the reduction in temperature of the motor.



November, 2008

Buettner

Lower maintenance cost

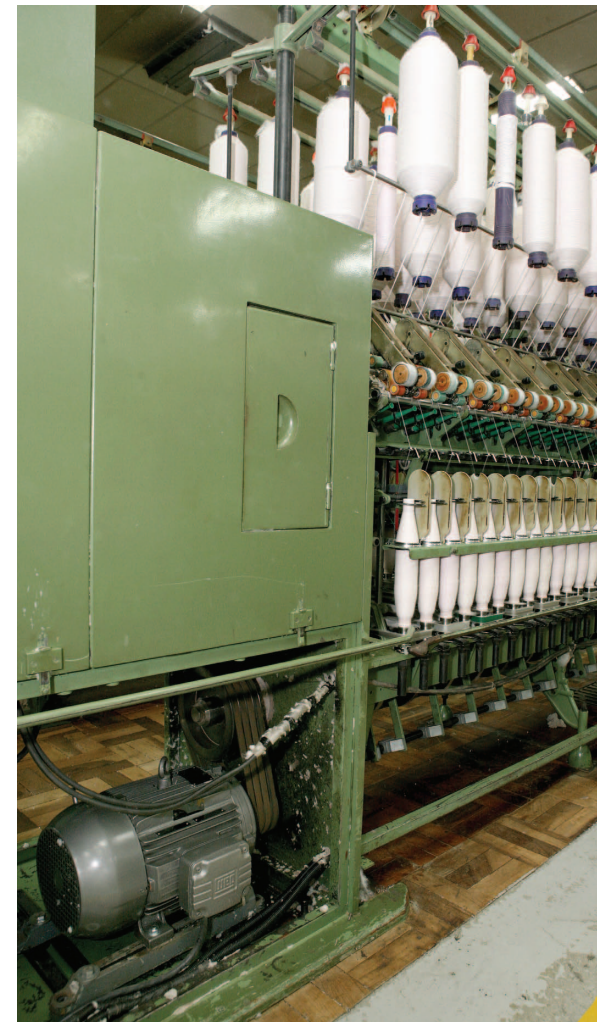
Sometimes, a simple measure provokes results that exceed expectations. That's what happened at Buettner, a company in the state of Santa Catarina that has operated in the textile industry for over 100 years and produces each month more than two million bath towels for about 40 countries. The replacement of the Standard motors in the ring spinning machine with WEG WMagnet motors has increased the performance of the equipment by 80%. The change and optimization of the process has led to a 33% reduction in energy consumption. The result was savings in production costs and consequent gains in revenues.

It is in the ring spinning machines that cotton roving becomes yarn of different thicknesses for specific use and is wound on bobbins. These machines come with a device which determines the gauge of yarn that will be produced. There is

a device with a different diameter for each thickness. Before the replacement, the machine operated with old motors, with two speeds, and the machine had to be stopped every time a gear was replaced. Motors were rated at 17/25 hp and 1180/1765 rpm. Not to mention that each new ring takes one to two hours to be "softened" before spinning starts so, a lot of time was lost in the operation.

WMagnet 20 hp motors (operated only with a frequency inverter parameterized before leaving WEG) that vary speed from zero to 1,800 rpm and are fully automated were installed at Buettner. The advantages of the replacement soon became apparent. In addition to lower maintenance costs (practically zero), the variable speed motor with constant torque and energy savings increased the reliability and performance of the production line.





October, 2009

Teka

Higher productivity and energy savings

The search for more energy efficiency is a major goal at Teka, a leading manufacturer of bed and table linen and towels in Latin America, based in Blumenau, in the state of Santa Catarina. As part of its strategic plan, the company developed two programs for this purpose: the first comprises the replacement of burned motors with other high-efficiency motors and the second, replacement as a result of repowering studies. Thus, when the original motor (rings) of the starching machine burned, the best decision was to search a more efficient alternative. The equipment that was used had brushes that needed to be replaced periodically, and required constant maintenance. Moreover, fixing it would cost 115% of the value of a new and more efficient motor.

After a study made by Eletromecânica Standard, a partner in motor maintenance, together with WEG technicians, Teka chose to install the 15 kW WMagnet Motor Drive System, which allows the variation of rotation. The results were not slow to appear. The replacement allowed the reduction of maintenance costs (almost zero) and hours of downtime, variable speed of the motor with constant torque (which translates into energy savings) and more power in the operation. And assured versatility in speed control, which is critical to the quality of starching, a process previous to weaving fabric. The installation was simple, by automatizing the motor, inverter and machine and mechanical adjustments as the WMagnet is two times smaller than the original motor. While the old

motor weighed about 360 kg, the new motor weighs only 70 kg, which requires less space and makes any maintenance easier.



WEG

Reduction of CO₂ emissions

The way that WEG Equipamentos Elétricos S.A., in Jaraguá do Sul, in the state of Santa Catarina, found to achieve a reduction of 23 tons per year of CO₂ emissions was to be sustainable and reduce greenhouse gas emissions in the atmosphere with rational and efficient use of energy.

With its attention on the preservation of the environment and sustainable economic development, WEG identified the influence caused by energy consumption in production costs. “WEG identified a market need to develop a project focused on energy efficiency, particularly with the current high demand for raw materials,” says the WEG analyst responsible for the project, Rodrigo Augusto Neves.

Installed at WEG’s industrial plant in Jaraguá do Sul, the company decided on the automatization of the “Bag filter at Foundry I,” and followed a significant performance in the process of energy consumption. Due to process variations and demand, WEG detected that some deburring machines were stopped for several hours. This meant that some points of intake of these machines were generating unnecessary consumption. According to Neves, among other applications, the substitution of the traditional system provided more control and more frequency in the cleaning systems, adjusting and controlling the process with pressure on the system.” The benefits range from improvements in the process of compressed air to the gain in system performance. In addition, the useful life of the bag filters increased. This prevents these bag filters from being torn easily and polluting the environment,” he says.

According to Neves, the project is based on the premise that WEG always encourages conscious development, guided by sustainable actions to preserve the environment. He said the company intends to expand its line of studies, creating new products and systems that support environmental conservation, especially to provide other companies with these environmental and sustainable solutions. “Since it was founded, WEG has always focused on being innovative and taking actions aimed at saving energy, with a specific department for customers who are looking for efficient solutions for their systems. The professionals in this department are highly trained and undergo continuous training in search of the best mapping solution for each company,” he concludes.



March, 2011

Oxford Porcelanas

Improvements on productive process

Oxford Porcelanas was established to serve the market with innovative products that surprise consumers. Founded in 1953, the company is located in the city of São Bento do Sul, in the state of Santa Catarina. Specializing in ceramics, it is the national leader and the largest Brazilian exporter of the segment. Currently, Oxford is working on finding solutions that provide more competitiveness through the upgrade of its manufacturing facilities and it is aware that the electric motors are significant components in projects aimed at improving energy efficiency. Because of this, Oxford decided to evaluate its facilities and the potential energy savings that could be achieved in the production process. An energetic diagnosis of the electric motors used in the Ball Mills was made in the pre-project stage. These mills are used for grinding materials and are an essential part of the manufacturing process of ceramics and porcelain. Data obtained from measurements with electronic analyzers show that standard type induction motors in the mills have low efficiency and high electricity consumption. The evaluations of the equipment in duty rating not only enable tracing the load curve of the motor, but also to know the starting conditions, torque, and inertia and characteristics of driven loads. With this information, it is possible to analyze the performance and dimensioning of the motors as well as the efficiency and energy consumption. The results showed the need for greater energy efficiency and potential improvements in the production process.

The solution to achieve the best results in the mills in efficiency gains and in the process is to use motors with the best possible performance and with variable speed drive. The high-efficiency motors are those designed to provide the same useful power as the conventional motors, but with a reduced consumption of electricity. Because they have approximately 20% more copper, the temperature of operation is low and therefore, the losses are reduced. The correct specification of energy efficient motors provides a better operating performance and a better use of energy. If the permanent magnet rotor is considered, the highest existing efficiency in terms of national industrial motors is obtained.

The best evident solution was to modernize the drive of the ball mill to achieve a greater energy rate per batch produced. This modernization was not limited to the simple replacement with a more efficient motor, but also enabled improvements in equipment operation as a whole. The decision to choose motors with higher efficiency, low operating costs and increased reliability is based on financial criteria of return on investment and also gains in competitiveness, energy savings and process improvement.

For Oxford, the project is important to promote opportunities for improvement and also comply with its policy of environmental responsibility by reducing energy consumption and avoiding waste.

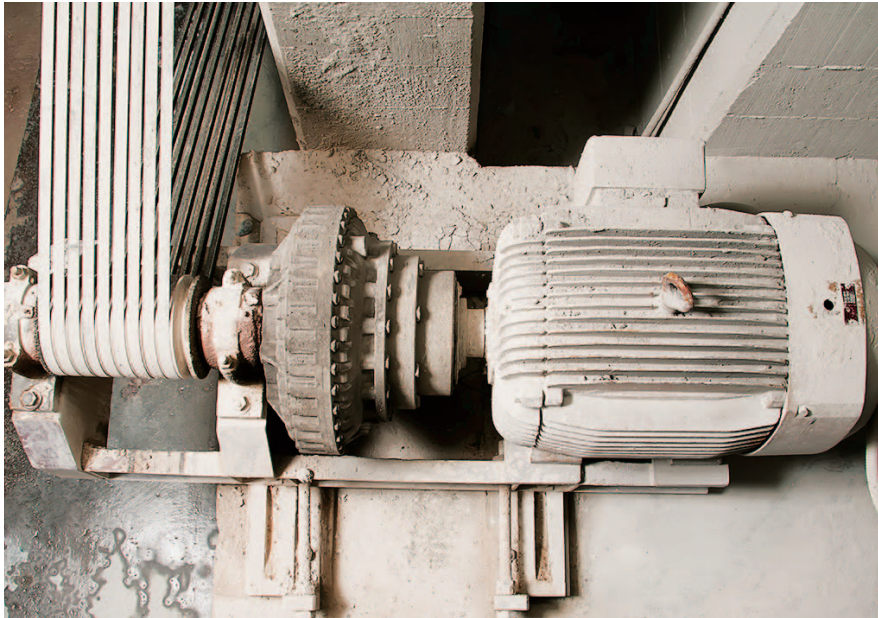
The economy with the implementation of the project and replacement of motors confirmed

the planned expectations, highlighting the improvement in the process condition of the equipment. Speed variation allowed the establishment of a new working configuration at the mill, reducing the 8 hour period to 7 hours for each cycle, that is, the equipment consumes less power and performs the operation in less time. This speed control also betters the management of the quality of the process. The speed reduction to very low values is only possible due to a unique characteristic of the permanent magnet motor which is that it can maintain constant torque without the need for external ventilation. The benefit of speed variation obtained by the inverter also allowed to eliminate the need for hydraulic coupling because the inverter does the soft-start and constant torque thereby, protecting the whole system and showing significant benefits in reduced maintenance costs.

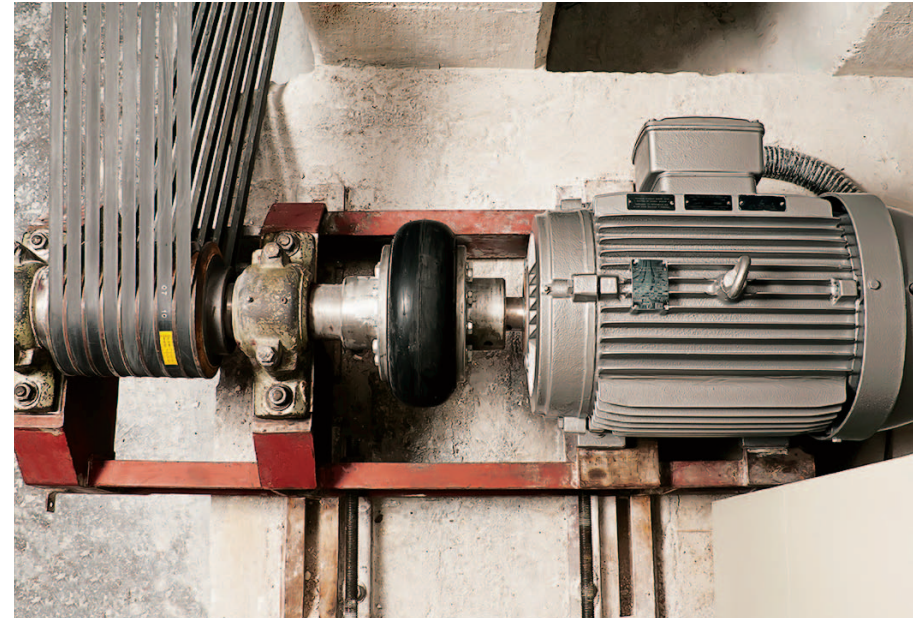
The financial analysis of the project showed that the annual energy savings is US\$ 3,288.00. As the investment to implement the solution was of US\$ 7,902.00, the return on investment is achieved within 2 years and 4 months.

With this solution, about 7.38 tons of CO₂ will not be issued into the atmosphere. This corresponds to what 37 native trees can absorb!

“The rational use of the energy matrix at Oxford is always cause for much attention because it represents a significant percentage in our cost of production, so, we are always in tune with the market to find new solutions that promote energy efficiency. WEG has been a great



Before



After

May, 2010

partner, always presenting products which, besides the unquestionable quality, also provide energy savings. Proof of this is the study and installation of the WMagnet line motors in our process of preparing liquid mass. All the work is done with indicators that allow safe decision making,” says Lucélio Henning, Maintenance Coordinator at the São Bento do Sul unit of Oxford Porcelanas, in the state of Santa Catarina.





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