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GBE BECOMES INDUSTRY

WITH THE MASS PRODUCTION OF TRANSFORMERS, CUSTOMISATION IS STILL A STRATEGIC STRENGTH, AS IS CUSTOMER CARE AND COST COMPETITIVENESS

Over the years, GBE has continued to grow despite the uncertain progress of global economy. We now have agents and distributors not only in Europe, but in all the continents. Over time, we have evolved based on the requirements and requests of our customers, promoting and creating a customised product: we are specialised in special transformers. In the last two years in Europe, the new eco-design directive EU No. 548/2014, has standardised, as well as bound, the performance of transformers, drastically reducing the variety of electrical characteristics to be guaranteed, so that a historic turning point has arrived for GBE. Our company now mass produces, but even in this context, customisation is still our strong point. Production is programmed with the support of a new management system which plans the minimum quantity manufactured by type in the different weeks of the year based on the statistics of historical requests and on the commitment of acquired jobs. This means that some products are no longer produced individually and allows a drastic reduction in transformer preparation time, and above all, eliminates indirect times.

This revolution has impacted all departments: from the procurement department to the final testing. The materials are purchased in quantities five times higher than before at a better price, which benefits the competitiveness of the offer to the end customer; the materials warehouse not only works on a just in time basis to reduce the financial costs to a minimum, but also benefits from improved internal logistics; design is freed from bureaucracy and the preparation of reams of paper; the sales department can rely on products available in record time, guaranteeing delivery reliability and above all, with the ability even to meet “emergency” requests from our most loyal customers. Lastly, the two major benefits: transformer in stock with a new outlook which foresees a continual turnover of stock to cut down the financial exposure to a minimum, greater margins on finished products and maximum price competitiveness. We have become an industry, but this does not mean that the characteristics which have defined us until now, namely contact with the customer, first response, the desire to do more than requested and above all, the execution of constructive details on the basis of specific requests, have been relegated to the background.



RESULTS ON THE RISE: GBE RENEWS ITSELF

2017 was an interesting year: in the first few months, there was a slight slowdown in investments in electricity grids, but this changed in the latter half of the year. The final results compared to 2016 have been confirmed and the gross operating margin improved not only for the resin division, but above all for oil production, in distribution, in special oils and in power. There was no lack of internal investments, especially following the reorganisation

based on a new industrial vision. The unification of the offices into a single headquarters at the main site is also worth mentioning. This improved our customer care capability, allowing us more flexibility in managing special requests and the company to be more dynamic as a whole. However, these characteristics are nothing new, they are what have always set us apart.



BOOSTING THE POWER TRANSFORMERS DIVISION

SIGNIFICANT EXPANSION PLAN IN THE PRODUCTION AREA

GBE which in recent years, has set itself apart with its growing production diversification, together with an increasingly industrial vision, has recently acquired a new building site for power transformers next to the main facility. The goal is to invest in boosting production of this type of product, thus fully satisfying the demands of our consolidated customers in new markets, both in Europe and worldwide.

The facility, where distribution and special transformers are currently assembled, will, therefore, be integrated with a new production area dedicated exclusively to power transformers, with an area of about 2000 square metres, 12m in height and with a 100-ton overhead crane capacity.

The power division in the short term will be



14MVA, 24kV

A NEW PRODUCTION AREA DEDICATED EXCLUSIVELY TO POWER TRANSFORMERS WILL BE ADDED TO THE FACILITY, WITH AN AREA OF ABOUT 2000 SQUARE METRES, 12 METRES IN HEIGHT AND WITH A 100-TON OVERHEAD CRANE CAPACITY

located on two sites nearby with a new process layout. Optimisation of time and greater process control will be ensured with areas and suitable equipment for the new expectations, plus the modernisation of all the plants: from drying the active part in the oven to filling the transformer in the autoclave, and the final inspection in a new testing room equipped with modern instrumentation. At the same time, the need to test a larger number of increasingly powerful machines has led GBE to acquire a power inverter.

This allows us to carry out balanced tests on the transformers being tested with a frequency range from 15 to 150Hz and with a timely reactive power compensation.

The new testing area will also have another use: in recent years, GBE has specialised in the production of bigger reactors and, thanks to a greater inverter reactive compensation, it will be possible to test reactors with a high X/R ratio. New investments to continue to guarantee increasingly high-quality standards.

GBE REFERENCES WORLDWIDE



01 | 40MVA, 145KV



02 | 31.5MVA, 145KV



03 | 20MVA, 72KV



04 | 25MVA, 145KV

THE NEW CHALLENGE FOR PHOTOVOLTAIC PLANTS

STORAGE BATTERY: ENERGY STORAGE



Energy Storage, intended as the capability of storing self-produced energy is the next challenge for photovoltaic systems. In some countries, renewable energy plants which do not guarantee continuous, stable production have started to incorporate dedicated storage systems. These are nothing more than batteries connected to the grid using transformers. Whenever there is a decrease in voltage and loss of power, they immediately intervene to restore nominal conditions by supplying the energy they have accumulated. Over the last few years, investments in creating these stations have grown, as well as the power at stake thanks to incentives. Recent statistics have shown that in countries with a higher awareness of renewable energy, an energy storage system is envisaged for every photovoltaic installation.

GBE has of date supplied over 140 resin and oil-filled transformers for photovoltaic application to different European countries, especially in northern Europe. The power is varied and was particularly significant in 2017. The energy at stake is by no means negligible, as we recently supplied six 2500kVA transformers for a total power of 20MW for a single off grid storage plant. The transformers are "power reverse" models, i.e. they work in both directions, allowing energy to be stored and fed back whenever the power supply requires it. The design is not hermetic, but with radiators and a conservator, Dd0 vector group and with a C5-I paint finish cycle. The installation is outside in an equipped area dedicated to this purpose. GBE guaranteed the supply of the transformers complete with bunds for collecting the oil. This TÜV certified accessory is produced by the GBE steelworks plant according to the layout of the transformer and includes a rainwater drainage system.

In Europe, investments in this type of plant are, however, still limited. For now, the problem seems to be related to high costs because the storage system market is currently almost non-existent in countries with limited financial resources due to exorbitant battery prices. The obstacle is purely economic and operators are merely waiting for a drop in the price of accumulators to include them in their photovoltaic system offer. Standalone photovoltaic systems which include an energy storage system are still too expensive and the batteries are still too inefficient.

TRANSFORMERS FOR MEASUREMENTS



GBE also produces special transformers and reactors for measurement and testing laboratories. These products are executed according to customer specifications, guaranteeing a constantly high-performance product with a design geared towards specific operating conditions. There are numerous references of supply to testing rooms (ABB, Marelli, General Electric) and the experience we have acquired has allowed us to guarantee significant power. For example, in 2017, we produced a 4000kVA cast resin transformer according to the Eco Design Tier 2 table with an inrush current of less than 4 In, free from partial discharges, with the possibility of overcharges when carrying out electrical tests on machinery which must be subjected to abrupt operating cycles. The three cast-resin transformers are also significant with a total equivalent power of 7500kVA produced for the test rooms of a leading manufacturer of air conditioners located in the north of Italy. The transformers have oversized connections, both on the medium-voltage and low-voltage side, to withstand high currents and continuous inrush due to intermittent operation. And furthermore, we recently acquired an order for a 25MVA transformer for a test room of a Trieste-based company. This oil-filled transformer is decidedly unique in that it allows tests to be carried out at a variable frequency to test high-powered engines. Further details will be provided in the next issue of the GBE newsletter.

THE NEW WORLD

AFRICA: WHERE DEVELOPMENT IS CALLED FOR, GBE IS ON HAND



the local electricity power grid, but soon we will start assembling our range of cast-resin transformers which will be used on wind towers.

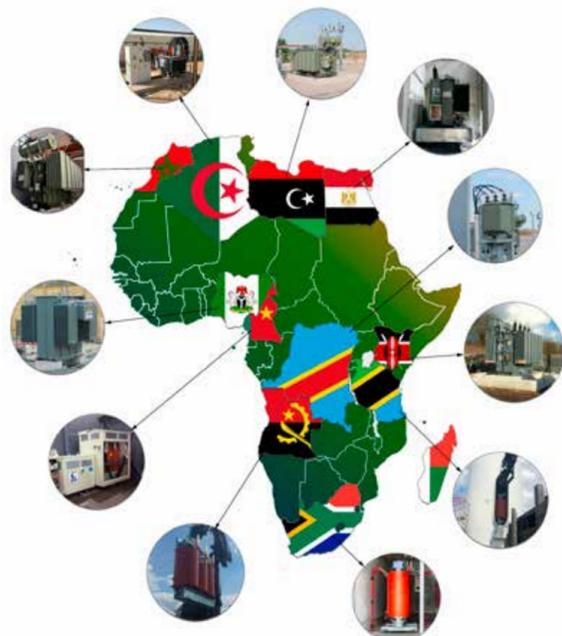
Many investments have been funded by the Nigerian, Ethiopian and Angola governments to increase energy production using their abundant resources. These are all the countries where our products have already been successfully installed. There is also the supply in Cameroon and Zambia of 6300kVA autotransformers with variable transformation ratios to allow greater flexibility compared to supply voltages, which, after the sudden development of the area, requires an electrical distribution system that can constantly adapt to cope with the drop in voltage due to electricity consumption. Moreover, in 2017 we also supplied starting motor transformers and excitation transformers to several companies in South Africa. These two types of products were designed according to the specifications of the European customer, then tested and monitored in our testing rooms to obtain component certification. These successful ventures are confirmation that Africa represents the future, not only in our sector, but in others as well. It is no longer the "forgotten continent". On the contrary, Africa is destined to occupy an increasingly strategic new role that challenges traditional stereotypes. There is no lack of resources and if the geopolitical and economic conditions are favourable, there are plenty of opportunities on offer.

There are many companies which are producing turnkey systems for Africa, both in densely populated countries, like Nigeria, South Africa and Ethiopia, and in other areas where the abundance of natural resources allows for increasing investment in infrastructures.

For many years, GBE has consolidated excellent relations with companies operating in the area, both European and local, as demonstrated by the various supplies of cast-resin, power and special transformers, as well as reactors. For example, we recently supplied MV oil reactors to the main Algerian electricity company for the production of filters, as well as special transformers for pumping units and oil extraction. In Congo and Libya, we have supplied a number of cast-resin transformers in IP54 protection boxes for external installation in extremely adverse weather

conditions, not just due to high temperatures, but also due to the presence of sand and a high level of humidity. Egypt, on the other hand, has invested heavily in solar and now wind power. Thanks to our partner, we have not only obtained approvals for cast-resin transformers for

GBE HAS CONSOLIDATED EXCELLENT RELATIONS OVER THE YEARS WITH COMPANIES OPERATING IN AFRICA, BOTH EUROPEAN AND LOCAL



PRODUCTION ACCORDING TO

Two years after the introduction of EU Regulation 548/2014 including the implementation methods of Directive 2009/125/EC and one year after the release of the EN 50588-1 standard which has assimilated both of the above, one cannot say that there is a lack of clarity or definition. No sector-based operator and transformer manufacturer can be excused from eco-design and eco-friendly manufacturing. It is not our intention to reiterate the provisions included in the standard, but simply to state that, unlike

many of our competitors, our standardised products have been tested by an accredited external laboratory. GBE has had several cast-resin and oil transformers tested in medium voltage: to be precise, transformers have been tested in Class 12 kV and Class 24 kV and have undergone, not only routine testing to ensure product compliance with EN 50588-1, but also additional type and special tests such as: short circuit, heating at nominal current and noise measurement tests. We have thus shown our commitment to a somewhat restrictive regulation, but above all we have set ourselves apart

CHECKS AND MONITORING ALWAYS AT THE TOP OF THE LIST

AN AVANT-GARDE SYSTEM FOR THE INDUSTRIALISED CONTROL OF MV AND LV COILS



In the production department of cast-resin transformers nothing is left to chance. One of GBE's strengths has always been control, not just of the production process, but of all the semi-finished parts and components, required to provide the highest quality of the finished product. A commitment that is constantly evolving: so, for the cast-resin division, our three testing rooms now have a new operating unit for monitoring the coils before the final assembly.

This is made possible by an automated machine that picks up the coils, places them on a single-phase core with a gap that can be removed pneumatically when inserting them and then carries out all the tests, with no exclusions: dielectric measurements, ratio measurements, resistance measurements on each voltage socket and for each transformation ratio. The operator outside the

verification station - in complete safety - monitors the execution of the tests and records the results of all the operations performed on a computer via a touch screen terminal. All the finished windings have a compliance sheet including all the data collected during the measurements and tests. Pre-testing every semi-finished product drastically reduces any surprises at the final test, thus eliminating any inconvenience in the delivery of the machinery. This method makes it possible to significantly reduce the preparation times and assembly of transformers in the various production

areas, precisely because the products have already been tested. In addition, some market regulations envisage restrictive tolerances on the difference in resistance of windings of the same machine: in the case of tenders, being able to identify the resistance value of each winding before the final assembly means that coils can be more efficiently assigned for the construction of the machines.

OUR THREE TEST ROOMS ARE NOW EQUIPPED WITH A NEW OPERATING UNIT FOR MONITORING THE COILS BEFORE FINAL ASSEMBLY

EN 50588-1

from all the manufacturers of transformers that promise a product compliant with standards, even though they offer incomprehensible and unjustifiable sales prices which are well below manufacturing costs. Nor are we worried about Phase 2 of the legislation, application of which must be guaranteed as of July 1st, 2021. GBE has already started production of both cast-resin and oil transformers with Tier2 losses and a new manufacturing design for a cast-resin transformer will be ready in 2018.



FOR GBE OBJECTIVE 4.0, THE FOURTH INDUSTRIAL REVOLUTION



With the advent of the so-called fourth industrial revolution, thanks to the diffusion of new digital and non-digital technology, the industry is undergoing a profound transformation of the mechanisms that have produced value, innovation and well-being. Once again, GBE is not satisfied to just sit back and wait. We are eager to invest in continuous growth and increased productivity with maximum efficiency, so we have made the most of existing opportunities in the form of major tax breaks for investments in the type of technology envisaged by Industry 4.0. In particular, the area that interests us is that of an "advanced connectivity", with the creation of a new generation data network that interfaces the key machinery for the production of the transformer up to the final test.

The GBE IT team, in collaboration with the internal software company, has implemented a data interconnection system between the technical department and the production department that allows the entire winding department to be programmed automatically. Data is uploaded to the machines directly by the department, with the planning and roll-out of the order. During the production process, the operator is required to identify the protocol number and authorisation to execute the work. The result is excellent: reduction in paperwork, elimination of machine setting errors, reduction of working time and, above all, of indirect times, standardization of mass production, and much more. At any given time, the state of progress of the production process, the material used, material in stock and waste can be viewed. All this is made possible by a simple "click", even at the final inspection, each test and measurement is transformed into a list of data and values that can be consulted from your desk.

ECO DESIGN



TRANSFORMERS FOR RAILWAY APPLICATIONS

WE HAVE ALREADY COMPLETED NUMEROUS, PRESTIGIOUS INSTALLATIONS WORLDWIDE

In all the countries where investments are being made in new transport infrastructures, GBE is the leading the way on the strength of its success as a qualified supplier for the underground systems in Warsaw (Poland), Sofia (Bulgaria), Helsinki (Finland) and Tallinn (Estonia). These are just a few of the projects that we have recently completed for some of the most important public underground transport networks in the world. On the other side of the Atlantic, for example, we recently supplied the Buenos Aires underground with 2750kVA resin transformers for the extension of the E line, a line originally built in 1944 and extended from Bolivar to the Retiro station. The subway is known locally as el subte, a colloquial form derived from the Spanish word "subterráneo", the public transport network serving the Argentine capital. The transformers have a primary voltage 13200 V and two secondary voltages 1212 V staggered by 30° to ensure the power supply of 12-pulse converters. The windings are connected in series with the line, i.e. two primaries connected in parallel and two completely separate, secondary windings to minimise any currents circulating between transformer and converter. The primary characteristic of the transformer according to the technical specifications for the component is also class VI load in compliance with the IEC 61378-1 (Converter Transformers) and EN 50329 (Railway Application) standards. The transformer was subjected to a load cycle of 100% of the nominal current followed by 150% of the nominal current for 2 hours and 300% of the nominal current for 1 minute. The qualification required, in addition to the combination test and all the routine tests, additional type and special tests, such as impulse and noise tests in the presence of our Argentinian partner and the final customer, the Buenos Aires Subterráneo.



Traction classes for railway applications

CASE HISTORY

OIL & GAS IN ALGERIA

GBE SpA has recently completed the supply of 4MVA oil transformers for a prestigious plant for the powering of twin-screw pumps for the Algerian state company. The contract was implemented in collaboration with a major Parma-based company operating in the Oil and Gas industry with no less than 6,000 employees in 16 countries. It is not the first time that GBE has engaged in the supply of special transformers suitable for complex installations in other countries. In fact, many Italian and foreign companies contact us for the manufacturing of transformers according to particular technical product specifications and according to the regulations in force in the

installation sites. The supply to Algeria consists of 6 4MVA oil-immersed transformers complete with protection box both on the medium-voltage side and on the low-voltage side and accessories for the measuring and remote control of the operation of the transformer. The protection of the surfaces of the tank and the boxes was carried out at our coating facility with epoxy two-component resins with finishing in two-component polyurethane, which guarantees maximum resistance to atmospheric agents in highly-corrosive environments, typical of industrial areas with high salinity and an aggressive atmosphere.



THERE IS STRENGTH IN NUMBERS



The founding partners of GBE are: Giuliano Sanson, Renato Tapparelli and Francesco Muzzolon

Trust and new responsibilities



Maria Rosa Menon
Head of the resin facility

GBE has always believed and placed its trust in me, progressively giving me new and greater responsibilities. I started as an operator on medium voltage winding machines, then I was made head of the department and subsequently head of production. GBE has always invested, not only in people, but also in equipment and machinery. The workplace is healthy and it is motivating to work in this company. Our strength is that we never get discouraged by the problems that occur every day. This is thanks both to the constant support of management and the willingness of the staff to help out at all times. In GBE, we are now part of a work team, where we all have our own attitudes and personalities. I believe that to have a tight-knit work group, it is important to know and value each person's skills with a view to achieving a common goal. My job is to make sure this happens, but what sets our internal organisation apart is the meticulous weekly planning of the orders, in which all the staff takes part. In the last year, there has been a transformation in company policy, with a view to switching over to mass production, becoming an industry to all intents and purposes. To achieve this result, a radical change in the way we work is necessary, just like international players. It is not easy but we have already taken the first steps and as we say in these cases, getting off to a good start is half the job done.

Dialogue is the key to training staff



Martin Rigon
Head of the oil facility

What sets us apart is, above all, the team spirit of all the staff, made easier by the fact that 80% of the personnel have worked their way up in the company along with me. We are young, we are enthusiastic and we are well organised. Our department is also a new concept and the layout has been created according to the dictates of lean production, with a logical, optimised and customised cycle.

In the Oil Department that I manage, we always succeed in rapidly solving production problems, respecting the needs of each customer. The staff are always willing to help out, never give up trying and always manage to amaze me. We are all very enthusiastic, but we also know how to accept criticism when we make mistakes. Over the last few years, we have also grown professionally and we are proud to produce a product that I consider excellent. These are the real satisfactions that make our work more stimulating. From what I have learned based on my experience, there is no magic wand to achieve a tight-knit workforce, but the secret is dialogue. We periodically schedule meetings with the department managers and it is thanks to this continuous dialogue that I get the maximum synergy from all the staff, which leads to respect for what I do and obviously to solutions to any problems as well. For GBE, the watchword is now industrialisation and, of course, our department is also involved in this change. In the facility that I run, we are making drastic changes in production planning with innovative order processing software and new terminals for managing time and material. In a well-organised structure, the work is less tiring.

Trust and respect: the most important values in a team



Silvio Ghiotto
Head of the structural work department

In the GBE organisation, the people assigned to a certain task have complete autonomy in carrying out the task in question. Clearly, the result must be guaranteed, but it is good to see that importance is placed on key values, such as trust and respect, allowing everyone to add value. Our strengths lie in the people and, especially in the managers of the four main activities. All the staff are professionally qualified and this is essential not just in guaranteeing the quality of the product, but also in being able to work well. The corporate layout, given that the company has been newly designed, is highly functional, as is the layout of the equipment and machinery, which is all latest generation. Thanks to the key figures who are in charge of everything from cutting, bending and welding up to painting, I can easily achieve cohesion

among the workforce. These two people are highly qualified and skilled. When we consult one another and make decisions, there is total trust which leads to mutual respect. Productivity and efficiency are the alter ego of the other and go hand in hand. To create value within our organisation, work must be planned in a timely fashion, avoiding down times. There have been many occasions when improvements have been adopted in the process or in the construction details, with a view to constant progress. We recently revolutionised the welding area with new workstations and we are currently modifying the storage of crates in the painting plant and in two process phases in particular. Our secret is that we never rest on our laurels.

Precision above all else



Francesco Vencato
Head of the QC and testing department

GBE is a company that invests and the measurement and testing service has always been considered very important. There are three test rooms and they are equipped with modern instruments and areas to carry out the tests in absolute safety. The testing activity and the final inspection are essential to complete the production cycle and knowing this is an incentive to do our job well. Our task in the QC department and test room is to check, verify and measure. This can be achieved with the excellent equipment provided by GBE, but above all with properly trained staff that take the utmost care in everything they do. We have one basic rule: precision. An essential part of my work is to carry out continuous updates on the regulations for our product and to schedule the calibration of the test equipment. In turn, I update and train the staff assigned to me to achieve a common goal. We are a close-knit, collaborative team. We are well organised thanks to the automated machinery for measuring and testing the coils that allows us to efficiently plan production and testing without any surprises. New purchases are imminent and this time for the test room, meaning we can double our power. Once again, GBE is not content to just sit back and watch but wants to challenge its main competitors and here in the testing department, we will do our part.

UPCOMING TRADE FAIRS

TO FIND OUT MORE ABOUT GBE PRODUCTS AND TECHNOLOGY AND OUR KNOW-HOW IN CREATING SPECIAL PROJECTS



DATA CENTRE WORLD - LONDON
 21/03/2018-22/03/2018



AFRICAN UTILITY WEEK – CAPE TOWN
 15/05/2018-17/05/2018



HANNOVER MESSE – HANNOVER
 23/04/2018-27/04/2018



HYDROMATTERS 4.0 – PADOVA
 18/09/2018



ALL ENERGY – GLASGOW
 2/05/2018-3/05/2018



MYANENERGY – YANGON (MYANMAR)
 29/11/2018-01/12/2018



CAST RESIN, DRY TYPE, OIL FILLED TRANSFORMERS & REACTORS
Standard and Customised Solutions



HEADQUARTERS



POWER AND CAST RESIN TRANSFORMERS PLANT



OIL FILLED TRANSFORMERS PLANT



STEELWORK PLANT