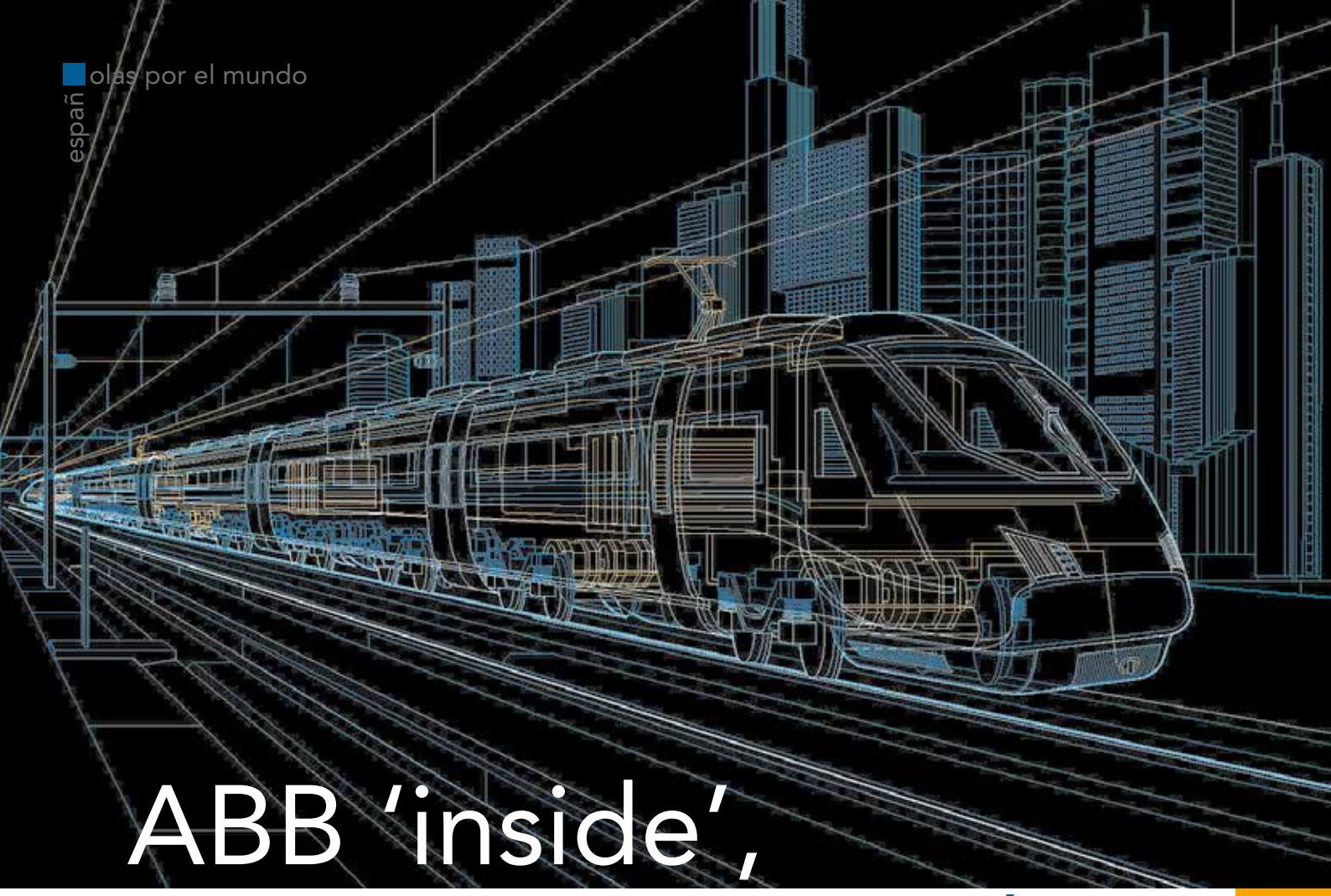

ABB 'inside', inner strength

They say that the wisdom of journalism is contained in a vast ocean, but that it is only a centimetre deep! We reporters suffer amnesia for anything that is not surprising and immediate. That is why I had already digested the fact that in 1999, when it sold the ADtranz rail subsidiary to Bombardier, ABB had written its last chapter in the railway business. I figured it was the farewell and end in an industry it dominated as a leader and benchmark for a century.

In this state of blissful ignorance I was surprised to discover that one of the companies with the largest presence at the mega rail fair, InnoTrans, held last September in Berlin, was no other than ABB, the Swiss-Swedish multinational. This astonishment grew upon learning that the Spanish train manufacturer Talgo had chosen the ABB traction package to supply maximum power to the heart of what is now its flagship product, its darling, its revelation, its great hope: the Avril new-generation high-speed train.

Having wounded my pride as an astute reporter specialized in the railway world, only a friendly conversation with Carlos Marcos, the ABB number one in Spain, gave me a reason to justi-

ABB did not leave in 1999, it just changed its strategy. It stopped making trains, but it has filled the core parts of former competitors' rolling stock, and all sorts of infrastructure for that equipment, with power supplies, which it was always good at. With the philosophy 'ABB inside' it exudes inner strength and has been able to supply hundreds of transformers manufactured in Zaragoza and Córdoba to any place in the world.

ABB Factory in Zaragoza.

fy my ignorance. "Have you noticed that in most computers, whatever the brand, there almost always appears a small label that says 'Intel inside'? It is the recognition that while Intel is not the company that manufactured the machine, without their input we would be talking about another product, and not exactly a better one. If we look for a parallel example in the world of industrial equipment and the railway in particular, in many of them, and for similar reasons, we could stamp the same sign: 'ABB inside'.

Behind the scenes

Luis Thomas, the head of ABB's business in Spain for the railway world, reinforces the point made by Carlos Marcos. "For a century we have built train units and locomotives. Now we don't. But today, thousands of units, locomotives and rail infrastructure that nobody identifies with our brand have made a leap forward in efficiency because they have ABB equipment inside that makes them better. They are always included in the traction package; transformers, converters, alternators, generators. In short, anything that allows the train and its infrastructure support to receive electricity and convert it into power, into the sap that turns it into a transport system".

The ABB plant in Zaragoza manufactures encapsulated dry type transformers.

'ABB inside'

We bought the idea 'ABB inside'. Carlos Marcos prepares the concept by describing the new railway role sought and loved by his company as "a kind of inner strength and soul that establishes character, while remaining hidden behind a facade".

"We are used to making things happen, to events that assist us happening without us worrying about the power that moves them. We rarely wonder why they happen. But very often these unexplained things are related to energy and automation, specialties in which ABB is a master".

Winning barter

The barter was risky. It handed over a brand like ADtranz, a renowned world leader and, in exchange, it opted for an 'inside' strategy where the principle of invisibility is dominant. The question is obvious; has ABB won or lost in this risky adventure?

Luis Thomas receives the question like a known subject that has been overcome. And he is emphatic in proclaiming the improved profitability following the change in strategy.

"Before we only manufactured equipment for our own trains. Today we are suppliers for all kinds of manufacturers; especially those giants that were once our competitors. In addition, we are proud of our spirit of independence in how we act: we don't depend on anyone or commit exclusive supplies to any customers. This is why our figures reveal that we grew exponentially in the train business during the last decade".


Rafael Joaquín Buenacasa.

More reasons: "A train can remain in service for some thirty or forty years. But the electrical part becomes obsolete within fifteen years. Manufacturers like us offer them the renewal of electrical equipment and we have a business opportunity once more at the midpoint of the service life of the train", Thomas explains.

The change of ABB strategy has created a new organizational paradigm. Before, one division of the multinational dealt with railway developments; Now "ABB has five multidisciplinary divisions and our train customers benefit from the cross exchange of experience and knowledge generated anywhere in the organization".

A Spanish company with Spaniards

If in a globalized world and a multinational organization it is difficult to endorse a single nationality and define something as tangible as a locomotive or a railway line, it is mission impossible to demand a passport and purity of race from "inner strength".

In previous episodes of the series 'Spaniards around the World', we travelled to faraway place to see at first hand the numerous emblematic projects developed by the national railway beyond our borders. It is an effort at internationalization and also an escape into the future to escape the inner drought and pestilence.

The 'ABB inside' phenomenon makes things difficult. Narrating the adventure of this "multi-

Carlos Marcos, CEO of ABB Spain.

The building of the ABB factory in Zaragoza was designed by Rafael Moneo.

national and Spanish company around the world" makes it necessary, first of all, to go to the plants which produce the equipment that will then be installed on national rolling stock. These factories are Turgi or Secheron in Switzerland and the technology, inverters and transformers, are destined to become the heart of the traction for trains derived from the expertise and technology of Talgo, CAF or at the Valencia Vossloh plant, and which then run on any network in the world.

The Spanish subsidiary of ABB "supports Spanish manufacturers and builders wherever they go", says Eduardo Delgado Casado, head of ABB traction. To provide a better service to "'Spaniards around the World'" who rely on their experience and equipment, the company has created an organization in Madrid with a score of people who perform engineering and energy consulting work for projects that are implemented all over the world.

New generation of equipment

What have train manufacturers with a strong presence in Spain seen in ABB equipment to include it as critical parts in the most demanding rolling stock?

Manuel Bueso, ABB railway area engineer describes the traction packages that its company has provided for the prototype of the new fast train from Talgo, the Avril.

(The prototype is at the moment completing the second phase of track testing prior to its final approval as a 100%, 330 km/h Talgo train)

"In the equipment supplied for Avril there is a major technological leap when compared with the standards of the previous generation of high-speed trains Renfe acquired at the end of the last century and that are now in operation. We have talked a lot with operators to understand their needs. What the customer wants is 'maintainability'. They say they want to have the train on the track and not in the shop. They even ask that repairs be done on the line. Another requirement is the reliability of the equipment. We have gone from accepting one failure every half a million kilometres to a situation where more than one failure every 2.25 million kilometres seems intolerable to us. The new traction package takes the concept of energy efficiency seriously and offers a saving of 15%. This is a key issue. I know of no country in the world where the price of energy is falling and we all know the bills for the consumption of this precious commodity in railway operations".

CAF and Vossloh

Manuel Bueso jumps from one example to another and mentions the collaboration of his company with the diesel locomotive series for passenger traffic that CAF is selling to Saudi Arabia. Here ABB supplies the traction inverters that supply the motors. "Given that these units run through the desert on a track in poor conditions we are very pleased with the performance of the equipment. Because electronics hate high temperatures

Luis Thomas, Eduardo Delgado and Manuel Bueso.

and detest rattling. And despite this, the customer has increased the CAF order with new units".

"For the German company Vossloh we supply the traction package in a contract to supply dozens of locomotives designed on the Eurolight platform. They are manufactured at its plant in Valencia and destined for the rail network in South Africa".

'Made in Zaragoza'

List of countries and environments where transformers manufactured in Zaragoza are installed

Railways: Montreal Metro (Canada), Athens Metro (Greece), Madrid and Barcelona Metros and ADIF connections (Spain), Istanbul Metro (Turkey), Tours Tramway (France), Alp Transit (railway tunnels in the Alps), Copenhagen Metro (Denmark), Salvador Metro (Brazil), Caracas Metro (Venezuela).

Hospitals: Norway, the UK, Saudi Arabia

Shopping centres: Ikea in Portugal and Germany, Marks & Spencers in the UK, Dundrum in Ireland, Arena Plaza in Hungary, Carrefour in Spain and Greece, Al Waab Malls and Barwa in Qatar.

Hotels: Turkey, Qatar, Greece, Poland, Italy.

Towers: Qatar, Uruguay, Saudi Arabia, Istanbul.

Airports: Thailand, United Arab Emirates, Germany, Hungary, Jordan

Power generation plants: Spain, South Africa Sweden, Kuwait.

Zaragoza, a factory for the world

The "ABB Inside" tour we propose now includes destinations in plants that the ABB Spanish subsidiary has in Zaragoza and Córdoba.

As soon as you enter ABB's factory for dry type transformers encapsulated under vacuum, located in an industrial park in Zaragoza, your eyes drift to the building structure and the large hall. The circular stairs are especially beautiful, a vivid contrast between their cream colour and the bright copper of the rails, which connect the first and second floor of what at first glance may seem like a palace. It is actually a neat and functional office area, attached to an equally gleaming factory which manufactures equipment that looks like big alchemist buckets.

115 years of history of the mutating leader

1890

SLM, one of the Swiss predecessor companies of ABB, supplies the first electric trams in France, and the first cog railway in the world in Geneva.

1896

BBC installs the first electric trams in Lugano (Switzerland) while ASEA commences electric traction operations with trams.

1905

MFO (subsequently Oerlikon-BBC-ABB) installs the world's first electrified section between Zurich and Wettingen using a single phase current.

1916

Coal shortages during both world wars encouraged railway electrification projects in Switzerland, successfully implemented primarily by BBC.

1944

BBC introduces the first train whose axles were all driving axles and not just trailing axles as was the case beforehand prior to that date. ASEA came on board in 1955 and since then all locomotives have driving axles, i.e. bogies.

1965

The Austrian railway operating company places an order with ABB for the first locomotives with frequency converters and induction motors to work on catenaries with very different voltages.

1989

ABB supplies the first high-speed trains in Germany. One of the test trains reached 280 km/h between Hamburg and Frankfurt.

1996

ABB and Daimler Benz merge their railway operations under the name Adtranz, train manufacturer.

1999

ABB divests its stake in Adtranz, which ends up becoming part of Bombardier.

2000-2014

ABB no longer manufactures trains but delivers its wide portfolio of electrical equipment to any manufacturer, including Alstom, Siemens and Bombardier.

Rafael Moneo

Factory, palace or hybrid building, the industrial headquarters of ABB in Zaragoza is installed in one of the first architectural projects that Rafael Moneo carried out there, back in 1954. The order was made by the Diestre family, who were able to demonstrate with such an initiative that the desire to meet domestic demand for these kinds of electrical devices was not incompatible with architectural beauty and efficiency. In the 60 years since then, more than 100,000 transformers have been manufactured at the Zaragoza plant.

In the 1990s, ABB bought both the building and the business. And at the beginning of the millennium it released the first dry transformer on the market. Since then ABB has made Zaragoza its centre of excellence for this type of product,

From the railbus to fast charging bus/train

In just a few years we have moved from the concept of the railbus, a type of diesel-powered bus that was equipped with iron wheels and operated on the railways, to the Tosa concept. It is a type of transport that is exactly the opposite of the former, and which is something like an electric train with bus wheels. To ensure its power supply without the need for a trolley in constant contact with a catenary, it has been equipped with a kind of pantograph that only unfolds when the vehicle reaches a 'charging station' and swiftly loads the bare batteries on this train/bus. ABB believes that this is a formula with a future and it has already implemented their operation on a line connecting the city centre with the Exhibition Hall in Geneva, Switzerland.

Tosa fast charging electric bus, designed and manufactured by ABB.

ABB in trains
Products for railway infrastructure

Static frequency converters
Ensuring a reliable single phase supply of 16.7 Hz and 25 Hz.

Medium voltage switchgear and cutoff equipment
Interior and exterior circuit breakers and disconnectors, air or gas-insulated switchgear.

Prefabricated external modules
For main power stations, auto transformers and switching stations.

Traction substations
Complete systems for large-scale applications and mass transit.

Transformers
Power transformers and compact and lightweight distribution for railway applications.

High voltage points
Modular construction for all voltage ranges.

Low voltage switchgear
Modular construction for reliable power distribution.

DC converter substation
Electrifiers and traction invertors for DC supply

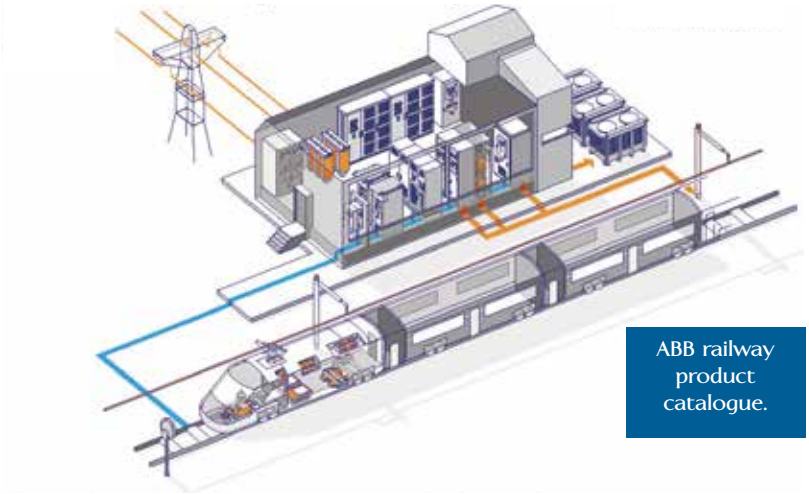

ABB railway product catalogue.

Products for Rolling Stock

Traction transformers
Different mounting positions: roof, underframe, interior.

Compact converters
Traction converters with integrated auxiliary converters.

DC ultra-fast circuit breakers
For automotive, tram and underground applications.

Traction motors and generators
For electric or diesel-electric rail vehicles.

Turbochargers
Compact manufacture for diesel engines with power up to 3,200 kW.

Semiconductors
For reliable and effective switching in traction and auxiliary converters

Auxiliary converters and battery chargers
To power the vehicle on board.

Low Voltage products and systems
A wide range of low voltage products is available for on board applications.

Lightning conductors
For reliable protection against DC and AC overvoltage on rolling stock and infrastructure.

which means the Aragon plant has exclusive distribution in the markets of Europe, Africa and the Middle East.

Young engineer

Our host on the tour of the ABB factory in Zaragoza gives us a business card with his name, Joaquin Rafael Buenacasa, and his office: "Railway Segment Business Development. Dry transformers. Power Products".

Entrenched in such a broad task, the person who receives us is a very young industrial engineer who, during a four hour visit with meticulous explanations and a nice hearty lunch, demonstrates early mastery of the business. Furthermore, he reveals how fortunate he feels to participate in the making of a product whose technology is as high as it is exotic, dry type transformers, without leaving the city of his birth.

Because Rafael Buenacasa is from Zaragoza, like his parents and his grandparents. Origins he is proud of, although in the time we share he receives persistent calls from everywhere in the world and answers unruffled in four languages. Buenacasa proves himself the reincarnation of the ABB factory in which he works and the best exponent of his philosophy: "Zaragoza Technology for the whole world".

Safety First

First of all, Buenacasa performs a safety demonstration. Although not transformer safety, but the safety of our visit. This is a mandatory protocol in all multinational organizations, similar to what the air stewards perform on planes before a flight, showing the

Historic photo of the presentation of the ICE 1, in which ABB cooperated.

steps to be taken if something unexpected occurs. "In the event of an accident, states Buenacasa, an alarm will sound. Keep calm, leave things that are bulky, head for the exit door and go to the meeting point".

If the goal was to impress, he succeeded. I blindly believe everything they tell me afterwards about the reliability of the devices manufactured at ABB Zaragoza.

Board in hand, the young engineer describes the logistics of supplying electricity to a rail transport system in a series of electrical fluids in which the most important thing is the dual passage through the ABB equipment, distinguishing between power for fixed installations (infrastructure) and mobile installations (rolling stock).

Walking through rooms and corridors whose level of cleanliness would be the envy of many private homes, Buenacasa explains that the daily production capacity of the plant is fifteen units, with the particular feature that "every transformer is custom made for customers, including the best state of the art at the time".

The engineer recites the benefits of transformers encapsulated under vacuum: they are designed to operate under extreme conditions; energy efficiency of 99%; they can be installed very close to the charging location; they occupy little space; maintenance costs are minimal and they have a longer lifespan; they have no risk of leakage of pollutants, or flammability.

Such an advantage means that, although it is critical equipment that must necessarily be located in public places, it is the most appropriate for providing services in stations, hospitals, shopping centres or airports.

Buenacasa says that transformers manufactured in Zaragoza are so safe that they are recommended for installation in football stadiums. In fact the victory of the Spanish team in the World Cup Football in South Africa was illuminated at the Soccer City Stadium in Johannesburg by electrical equipment from Zaragoza. He ruefully acknowledges, however, that the humiliating defeat of the 'Reds' against the Netherlands (6-1) at the Estadio de Sao Paulo during the last World Cup, was also illuminated with equipment from Zaragoza: "In Brazil we had too much power" he jokes.

Shell-type power transformers in Córdoba

- Córdoba is the main ABB factory specializing in the manufacture of transformers for high-speed lines. It already has 95 units in operation.
- The systems have been developed by the local R&D excellence centre specialized in shell-type power transformers.
- From Cordoba ABB has supplied 93% of power transformers for the Spanish high-speed network.
- Outside Spain, it participates with these systems in the Mecca-Medina high-speed project and networks in South Africa and the UK.