DANOBAT builds the world's most advanced automated train repair shop in Australia

➢ The project was presented today at the headquarters of the Basque enterprise in a ceremony presided over by Arantxa Tapia, minister of Economic Development and Infrastructure of the Basque Government.

➢ The manufacturer of machine tools and production systems has supplied a fully automatic digital solution for the leading mining company BHP Billiton, which repairs a freight wagon every 28 minutes.

➢ The facility, located in the deserts of the Pilbara region of North Western Australia, strengthens the position of the Basque firm as the benchmark agent for the development of solutions within the new paradigm of digital manufacturing.

➢ This workshop is part of the bid of the industrial group DANOBATGROUP, the holding company of DANOBAT, to develop high value-added systems based on the application of information and communication technologies.

Elgoibar, 6 July 2017.- In the desert of the Pilbara region of North Western Australia temperatures above 45 degrees centigrade are commonplace. The area is known for having exceeded 38ºC for more than 160 consecutive days. This inhospitable corner of the planet is blessed not only with extreme climatic conditions but also with abundant mineral resources. The Basque company DANOBAT has faced the technological challenge to develop a fully automatic digital workshop for the maintenance of freight wagons used to transport valuable mineral ore.

The facility, designed for the multinational BHP Billiton, world leader in the mining sector, has a capacity to repair a wagon every 28 minutes and is the most advanced fully-automatic train maintenance solution in the world.

The technological advances required for the design of the facility consolidate the position of the Basque company within the new paradigm of digital manufacturing. The workshop is already operational and was presented this morning at a ceremony held in the headquarters of the manufacturer of machine tools and production systems, which was attended by the Minister for Economic Development and Infrastructure of the Basque Government, Arantxa Tapia.
The project, which is already operational, is located in a remote area some 1700 kilometres from the nearest town. The site of the workshop was chosen because of its proximity to the railway line. In addition to normal wear, the railway cars are exposed to extreme climatic conditions.

This comprehensive solution was designed to repair trains for the transport of minerals from mining areas to port terminals, without any other human intervention than programming, maintenance and inspection.

One of the main challenges facing the engineers and experts of DANOBAT was the need to develop a fully automated solution for the entry, disassembly, repair and reassembly of wagons in a time of 28 minutes.

"The DANOBAT solution for the Australian mine is the world’s most advanced railway maintenance workshop of its kind for the repair of wagons and, even though it was not our first railway project with intelligent control systems, it was a definite transition to the new digital manufacturing scenario. A spin-off of this project has been the creation of highly qualified professional profiles and the generation of a network of very skilled suppliers in the Basque Country," said Xabier Alzaga, managing director of DANOBAT.

The contract between DANOBAT and BHP, which underwent several extensions since the start of the project in 2013, amounted to a total of more than 100 million Euros.

BHP Billiton, fifth global company in terms of market capitalisation and the result of the merger of Australia's Broken Hill Proprietary and the British Billiton, is a producer of raw materials such as copper, iron ore, nickel and silver.

The company, pursuing diversification of product, geography and market, is also active in the oil and gas industry.

A solution 4.0

The workshop is divided into four distinct areas, each equipped with its own facilities and automatic handling systems for maintenance work of the wagons, bogies and wheelsets.

The assembly is a comprehensive manufacturing solution composed of a main line for inspection and disassembly; a bogie repair shop; a wheel maintenance area and a body-repair workshop. The facility also carries out the final inspection of all parts and reports information on the manufacture process of each component.

In order to successfully complete every task, the workshop is equipped with smart digital solutions developed by the Basque manufacturer, such as the DANOBAT Control System. This system has been developed to monitor, supervise, control and fully manage the whole
maintenance process and all operations carried out within the workshop

The entire process of automatic disassembly, repair and assembly of parts requires precise coordination of all equipment. The flow of wagons, bogies or wheelsets can vary depending on the results detected during the inspection and measurement stages. For this reason, the comprehensive central control unit is extremely important. It coordinates all operations to ensure complete and correct overhaul of wagons every 28 minutes, including the complete repair of the body, 2 bogies and 4 wheelsets for each wagon.

In addition, the equipment used in the workshop is fitted with a SMART HMI, an intelligent interface, also developed by the company from Guipuzcoa. This guides the operator during machine operation to optimise all processes and enhance availability and reliability of the equipment.

Likewise, the equipment in this workshop is provided with an Intelligent Data System, a solution that allows smart machine control and improves the decision-making process. The machines in the workshop are equipped with sensors that pick up data relative to operation and condition of the parts. All this information is stored to allow analysis of usage patterns and to perform smart programming of future work. The Intelligent Data System allows automatic notification of maintenance work and self-diagnostics.

"This workshop stands out for its high productivity and a complete automation of operations to the most stringent quality and safety standards. It is also provided with online equipment following the paradigm of smart factories and complies with the requirements of zero-defect manufacturing," adds Alzaga.

The development of this solution forms part of the bid of the industrial group DANOBATGROUP, the holding company of DANOBAT, to develop high value-added systems based on the application of information and communication technologies for production plants and manufacturing environments. The digitization of industrial processes is one of the priority research lines of DANOBATGROUP.

**Major preliminary work and great challenges**

The workshop design required preliminary engineering work, studies of the machining process, analysis of production flows, definition of the facility requirements, technical specifications of the equipment and integration of all systems.

The location of the facility, in a remote desert area with extreme conditions, has required strict compliance with safety protocols. Added to these requirements was the requirement to meet the demanding quality and safety standards of BHP.
Advanced simulation programs were used to simulate the production processes in order to correctly dimension and optimize the machining and inspection operations. In this way it was possible to achieve effective automation of all interacting equipment within the workshop. Furthermore, a realistic 3D simulation of all machines; the production flow requirements; human resources and control of logistics had to be developed to enable full optimisation of the operation.

The project required high-added value engineering work that could only be performed by highly skilled technical staff. For this purpose, an average of 12 experts from the Basque company have been permanently on-site in Australia from the beginning of the project.

For the Basque company, this solution has been a major challenge. Especially because the entire installation was done at the final destination without any initial assembly, monitoring or pre-adjustment in the factories in the Basque territory.

About DANOBAT

The Basque manufacturer of machine tools and production systems DANOBAT is specialised in offering technologically advanced solutions fully adapted to customer needs for industrial manufacturing.

DANOBAT, founded in 1954 in the town of Elgoibar, manufactures high value-added solutions with a committed international focus and belongs to DANOBATGROUP, a partner of the MONDRAGON Corporation.