

FCA intelligent factory in Cassino

Abstract

One of the Italian factories that have readily adopted 4.0 technologies is the FCA plant in Cassino. Technological innovation is seen as a means to improve the quality of the cars, the efficiency of the production lines and the eco-sustainability. The partnership with Samsung led to the creation of innovative solutions which allow to monitor the production process and contribute to better quality of work for line workers.

The logo for Fiat Chrysler Automobiles (FCA) is displayed in a large, bold, blue font. The letters 'F', 'C', and 'A' are stylized and connected.

FIAT CHRYSLER AUTOMOBILES

Introduction

The FCA factory of Cassino is one of FCA Group's factories, located three kilometers from Cassino, in the Lazio region. The factory was founded in 1972, aiming at building a small economy car: the Fiat 126. It was a very successful model on the market.

Thanks to this success, the production continued and many more models were realized: the Fiat 131, the Fiat Ritmo, the Fiat Regata, the Fiat Tipo...

In just over ten years, the company managed to root the neighboring Lazio region, allowing incredible employment numbers and becoming one of the most important production centers for Fiat.

In 1978, a highly automated system, the Robogate Comau, able to lighten and speed up the work of the operators in the paving department, was installed in the Fiat plants in Rivalta and in Cassino. That's the first of many technological innovations to revolutionize the sector.

At the beginning of the 21st century, the factory underwent a relevant restructuring phase: the old production lines got dismantled and left room to those of the new Fiat Stilo. It was also time for yet another technological innovation: the Robogate got replaced by the Open Gate system, which offered better efficiency and precision in the welding of the sides. The production capacity of the plant rose to 250 thousand cars per year, even though sales didn't perform as planned.

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In 2016 Cassino became an Alfa Romeo plant, with the full operation of the chain destined for the new Alfa Romeo Giulia and the start of the production of the Alfa Romeo Stelvio SUV.

The factory was officially renamed Alfa Romeo factory in Cassino and it was the start of the fourth industrial revolution for FCA and Alfa Romeo. The plant became a precursor of what will be the factory of the future.

Today the Cassino plant has a production capacity of about 1,000 cars per day thanks to the work of about 4,300 highly specialized employees. A factory that represents the best synthesis of FCA's construction know-how in the global automotive field, where people, technology and the environment interact in harmony to create premium cars of the highest prestige.

Challenges

The activities of the factory repose on respect for the environment and social sustainability.

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Change Management transformed Cassino in a "World Class Sustainable" plant. Thanks to numerous technological, cultural and process innovations, today Cassino is a premium factory for the production of the new generations of Alfa Romeo. To achieve excellence, no detail has been overlooked. From the line workstations, created and designed by those who work there, to the revolutionary technology, to the spasmodic care for the environment that results in three zeroes: zero emissions, zero waste, zero water. World Class Manufacturing (WCM) is the continuous improvement program adopted in FCA plants all over the world that aims at greater plant efficiency through the elimination of waste, the participation of staff and the

achievement of high-quality standards. Product quality, work safety and respect for the environment are its main pillars.

The focus on eco-sustainability characterizes every activity in Cassino. Thanks to the recovery of rainwater and the use of dry painting, zero water is removed from local water resources. One hundred percent of the energy for industrial use comes from guaranteed renewable sources. Zero industrial waste is sent to landfills thanks to the "use, reuse and recycle" method.

Great attention is also given to the operators. In order to reach maximum efficiency, it's essential that they work in the best possible conditions. The digitalization of the production lines will not only make the production chain even more efficient but also improve an increasingly important aspect: the quality of the work of the line operators.

Work Place Integration (WPI) is the system used to create workstations according to the most ergonomic standards. Every single place has been designed and built with the contribution and experience of people.

Innovation is not only about automatization, with the risk of removing the expertise of the personnel, but it means to integrate people and tools. In fact, without people no type of innovation would be possible.

Solution

Since the transformation of Fiat Chrysler Automobiles began, the company's production facilities have played a central role in the affirmation and success of the Group's various brands. FCA has worked on the digitalization of production plants with various partners to further refine the efficiency of the production chain and contribute to a better quality of work for line workers.

Various solutions have been implemented by the factory in the process of digitalization.

Display devices have been integrated such as specific monitors along the production line and eBoard touchscreen in some strategic points on which the production trend is shown. In the

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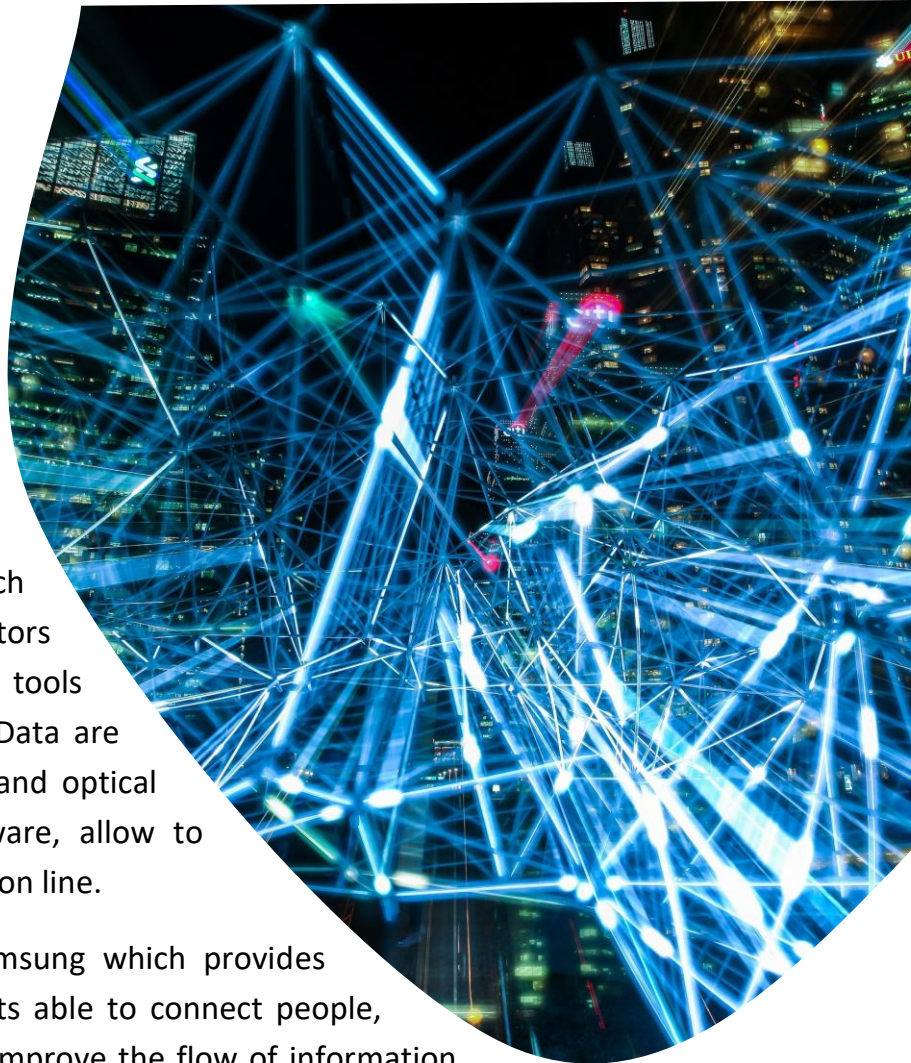
case of anomalous situations, warnings are generated and immediately taken over by the Team Leader, who is ready to resolve any anomaly and above all not to delay the entire assembly line.

Solutions and devices have been designed on the basis of the information gathered by the Team Leaders, which highlighted the needs of the line operators and are useful to implement the tools necessary to help them do their job. Data are collected through the use of sensors and optical viewers which, connected to a software, allow to monitor in real time the whole production line.

The company has partnered with Samsung which provides smartphones, smartwatches and tablets able to connect people, machines and products, and ready to improve the flow of information that usually takes place between machines and professionals. The goal of the partnership is to bring more efficiency and better quality to the work of the FCA's plants in Italy.

One of the solutions granted by Samsung is called Samsung Knox, a special defense mechanism designed by Samsung to protect all devices from threats such as malware or intrusions, through encryption and continuous verification of the integrity of sensitive hardware and apps. It transforms the consumer terminal in a smartphone or tablet and gives total security to the data gathered by the terminals. Any team leader, through the use of his Samsung smartphone, is able to interact with every point of the production line.

Antonio Bosio, product and solutions director in Samsung electronics Italy, says: "There is an increasingly blurred border between the consumer and the business world. The concrete example is the smartphone: used for professional purposes it brings its characteristics of reliability and the possibility of continuous updating as an important added value. At a time when many speak of industry 4.0, with FCA we managed to concretize this paradigm by basing



our collaboration on an industrial and engineering approach, validated by the Polytechnic of Milan.”

One of the most innovative aspects is the adoption of a smartwatch to be worn by line personnel, the Samsung Gear S3 Frontier. It represents something unique in this area, since it is the only one on the market that doesn't need to be connected to any smartphone to work and is highly customizable. Every operator will be constantly connected to his Team Leader and with the entire assembly line, making it easy to update information about his own work. The device is integrated with FCA's Manufacturing Execution System (MES), the informative system that manages the entire production process. The operator receives from the MES the list of operations to be performed from his post on the workpiece. Once the operation is complete, he sends confirmation through the smartwatch. The activity gets recorded as completed and the production line can continue to the next stage. If, on the other hand, an operation cannot be performed for any reason, the operator is able to send a report to the responsible Team Leader, who will take care of the problem.

Other technologies and processes, adopted by FCA on its path towards a 4.0 work environment, regard the exploration of forms of artificial intelligence for the man-robot collaboration or the additive management. The paving department is the most automated in the plant, with nearly 1300 robots.



The Samsung Gear S3 Frontier worn by a line worker.

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To help workers lift heavy weights an exoskeleton was designed. It is based on the human-robot iteration for the handling of heavy goods, the prototype is a passive exoskeleton (with enhanced actuator) in a non-anthropomorphic form capable of helping to lift weights up to 15 kg. The robotization project for the workers was born in the laboratories of the military-industrial complex in the 1960s. Such experimentation has become central in globalized 4.0 factories for a couple of years. The utility for the automotive sector is relevant because the exoskeleton serves to increase productivity even though there are some doubts regarding health implications.

With an approach similar to the one developed by FCA, Alfa Romeo and Samsung, any company is set to become capable of competitiveness and to receive the advantages that it brings, in terms of flexibility, speed, greater productivity, safety, sustainability and also product innovation. That's an idea of Industry 4.0 that every Italian company must make its own in order to improve its production processes. Cassino is a reality to be envied by many.

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