Manufacturing trains with additive technology

CAF DIGITAL MANUFACTURING

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Sector: Railway

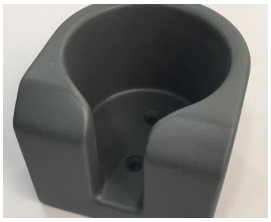
Challenge: The challenge is to introduce additive manufacturing at a competitive price and with the added value of design.

Solution: Parts capable of being manufactured by AM have been detected in the project phase, as well as their economic feasibility versus traditional manufacturing.

CHALLENGE

The project phase involves many parts that correspond to short series and are more expensive because they depend on moulding or machining. The challenge was to detect these types of parts and find out whether they could be produced by additive manufacturing at a more competitive price.

Regarding spare parts, the challenge was to be able to print large parts with additive manufacturing that complied with railway standard requirements. The part chosen was a front end hatch of a trolley since it is usually subject to extensive damage. The challenge was to manufacture and deliver the part in less time than it takes using traditional manufacturing. The complexity here lies in the size of the part and material requirements for its use in railways.

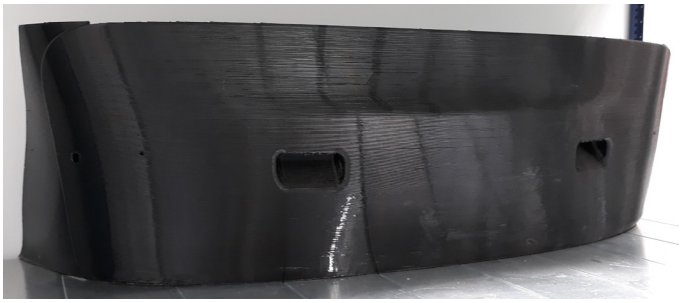


SOLUTION

A search was made for this type of part during the design phase of the project and the result was more than 40 references capable of being manufactured by AM. Nearly all of the designs of these parts were modified, providing added value regarding weight, functionality and design. All in all, there are more than 2500 parts assembled on vehicles.

Large-sized manufacturing equipment was obtained to work with the pellets. It is capable of printing parts with dimensions of up to several metres. Respecting materials, we worked with materials for which filaments are not available, which allowed us to cover a much wider range. There are several materials that meet regulatory requirements for fire and smoke. This allowed us to choose the material according to its position and requirement fulfillment.

Deadlines were reduced as much as 75% in some cases. The prices vary, depending on the shape of the part: the cost of some parts is somewhat more than 50% of the original cost and others are 30% cheaper than the original.



ADVANTAGES

The immediate advantages are the price, manufacturing times and the added value of each part of the design. In the medium term, this will enable us to acquire additive manufacturing knowledge that can be applied to large-sized parts and that we are extrapolating to other industries, such as aeronautics, automobiles and capital goods. In the long term, the intention is to create a department that covers the internal needs of CAF and carries out technological surveillance of additive manufacturing technology. The department should be economically sustainable and provide external services to CAF, using the acquired know-how in manufacturing both medium size parts intended for short series and large size parts with materials not exploited by other industries.

These results are already being achieved and have provided sustainable growth in the first few years.