

How Dutch Railways, A Leading European Rail Operator, Lowers Maintenance Costs with Digital Part Manufacturing

Until recently, about 8 billion passengers would rely on national rail networks to move across Europe every year. But the COVID-19 pandemic has upended things dramatically for rail companies. As a result of the coronavirus, more people are working from home and rail operators are seeing their incomes decrease. This makes it even more necessary to take a serious look at all possible cost savings. Inventory has traditionally been a large cost driver and a particularly urgent one for Dutch Railways (also known as Nederlandse Spoorwegen, NS), the operators of the busiest rail network in the EU. For Dutch Railways, getting spare parts was a constant struggle, which often resulted in surplus inventory and part obsolescence. The situation changed right after they embraced digital manufacturing. The company is working with CastLab to digitize its inventory, allowing for the production of metal parts on demand. Their average savings per article amount to €25,000. Let's learn more about their story.

From excess stock to digital inventory

Business scenario	Example	Traditional	CastLab	Result
Obsolete parts		Extent life cycle with minimum cost		
Lower batch cost (MOQ)		50 pieces 10 pieces	10 pieces 1 piece	No surplus stock
Lead time reduction for parts with high demand variation		>200 days >60 days	10 days 10 days	Inventory value reduction (>€65.000)

At Dutch Railways, traditional production methods for metal spare parts were falling short. Pantograph parts, for instance, have a lead time of 12 months. To ensure they had the necessary quantity at hand, they would place large orders that would saddle them with excess stock. Over time, 62% of their entire inventory became non-moving stock. Another challenge they faced was purchasing parts for aging assets. Some equipment uses parts that are over 50 years old - a situation most rail companies are familiar with. Often, these parts are no longer produced by the original supplier and the drawing or design is no longer available. A new mold typically has to be made from scratch. This results in equipment downtime, as the process takes several months. Producing this mold in a traditional foundry is also very expensive, so suppliers have high minimum order quantities to make up for costs. In some cases, the supplier's MOQ would be 50 units when the operator needed a maximum of 1 per year (which is roughly 2% of the print run).

In sum, the current method for purchasing spare parts results in long delivery times, large and unnecessary inventories and long downtimes. It also results in tied up working capital and high costs for warehouse personnel.. The environmental toll cannot be understated. Obsolete parts eventually need to be scrapped, generating waste. Digitizing critical parts for on-demand production offers a much better alternative. That's where CastLab comes in.

An agile and comprehensive approach

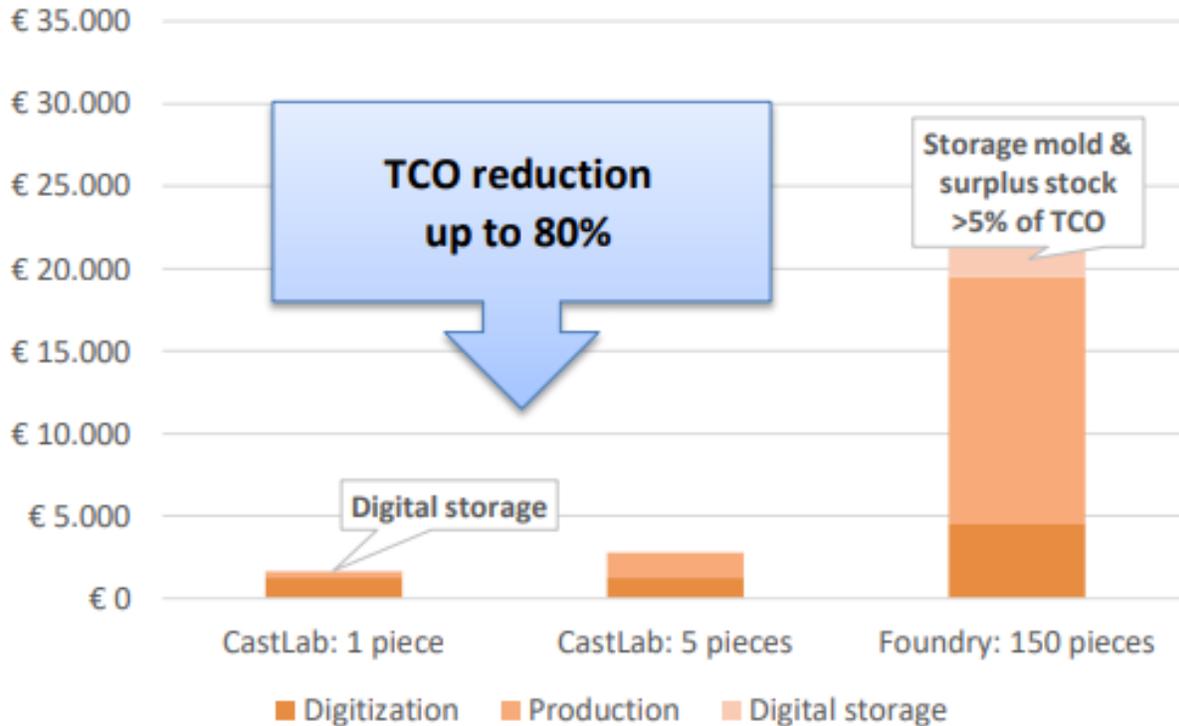
To kick off the project, CastLab performed an analysis of the spare parts catalogue and an assessment of quality control and security requirements with Dutch Railways. This resulted in a selection of 150 parts, which are getting digitized over the course of 2020. CastLab is developing digital twins (a digital replica) for these components and producing them with digital manufacturing methods. For most of these parts, a mold was produced through 3D printing, reducing lead times for end products from 100 days to less than 10. After the successful completion of this pilot, the rail operator decided to digitize 300 spare parts for on-demand production from 2020 onwards. A significant benefit being that any components that are reproduced are printed according to spec, and with the required quality approval and (original) certifications.



Lower waste and total cost of ownership

The results of this project are very compelling and shed light on how the rail industry can become more efficient and sustainable. Savings to date from the digitization pilot have amounted to €25,000 on average, per spare part. Digitizing and producing a catalogue of 300 parts (part of a total inventory of 85,000) would lead to potential savings of €7.5 million. The benefits include less maintenance costs and lower costs resulting from equipment downtime, as parts can be secured more than 10 times faster. Dutch Railways will also benefit from less scrapping costs in the long run and a more environmentally sustainable purchasing process. With this initiative, Dutch Railways is taking a leadership role in the Dutch market, being one of the first large organizations in the Netherlands to embrace digital manufacturing and on-demand spare parts production.

Total Cost of Ownership reduction with the CastLab method



A digital warehouse for the rail industry

CastLab is expanding its offering for other companies in the rail industry by making a digital warehouse of parts available. A digital intake form will allow clients to find out if their spare part can be produced through digital manufacturing. Later this year, CastLab will provide a digital library, where customers can quickly find a part, learn about the best production method (based on the part’s complexity, cost and material), and easily place orders.

About CastLab

CastLab shortens lead times for metal prototypes, obsolete parts and spares, delivering them within 10 working days using modern techniques like 3D printing, 3D scanning and casting simulation. The company has decades of experience and craftsmanship in casting production, with in-depth understanding of alloys and metals. CastLab’s service offering includes re-designing, reverse engineering, topology optimization, production, tooling, part assembly and digital warehousing.