INFOGRAPHIC

3D PRINTING IN THE RAILWAY SECTOR

2024

HOW TO USE 3D PRINTING IN RAIL TRANSPORT?



Design Optimization

DfAM and 3D printing can be used together to remodel outdated designs and streamline processes. This also allows for material reduction for better sustainability.



Train Parts

Many companies are working on creating enduse parts for trains, whether in safety-critical applications like brakes or interior design in cabins.



Components Along Tracks

AM can also be used outside of trains in the creation of track components like switches and connectors as well as structural elements including support brackets for bridge and tunnels.



Digital Warehouses

As railway companies increasingly see the benefits of using 3D printing for spare parts, they are creating 'digital warehouses' where all train parts are scanned and ready to be made when needed.



Train Maintenance

Additive manufacturing is one of the key tools in replacing or even helping to redesign obsolete, worn or defective parts on trains thanks to its speed and flexibility. It is particularly useful for spare parts.



Tooling & Prototyping

Like with other sectors, two areas where 3D printing truly shines are in the creation of perfectly optimized prototypes and tools (including the complex ones needed in the railway sector) much more quickly and cheaply than with other methods.

APPLICATIONS IN THE RAILWAY SECTOR

CONTROL PANELS

Wabtec Neighborhood digitally designed and 3D printed these panels using laser powder bed fusion.

VENTILATION SYSTEM

Bombardier Transportation and 3D printed a custom ventilation system, allowing them to cut time by 40% compared to traditional processes



connecting tool for the maintenance of train bogies. These parts are traditionally difficult because they have complex shapes that require a high degree of customization.



Responsible for transferring torque to the wheels of the train, this part was created by Deutsche Bahn using indirect 3D printing and rapid casting.

SILICONE SEALS

These parts are found in the braking system and protect the train from external agents. One railroad company turned to Lynxter's technology to print them with liquid silicone.



KEY FIGURES

150,000

The milestone for number of parts 3D printed achieved by Alstom in 2023 for the railway sector (ALSTOM)

5 DAYS The time it takes to create a foundry part by the SNCF using 3D printing compared to the usual 5 weeks (KIMYA)

56%

570

The percentage of savings reported by CAF when using multijet fusion for the creation of more than 4500 parts compared to traditional manufacturing (SICNOVA)

10%

Estimated reduction of carbon emissions for the rail industry through the adoption of 3D printing (SIEMENS)

> KG The weight of the 100,000th 3D printed part from DB, making it the group's largest and heaviest part made with AM (DEUTSCHE BAHN)



The amount of public funding giving to an SNCF project to accelerate and industrialize the use of 3D technologies for train maintenance (SNCF)

TIMELINE

2013	Union Pacific turns to additive manufacturing for the first time to create a prototype AEI device used to track railroad equipment.
2015	Deutsche Bahn begins using 3D printing for trains, producing simple models such as plastic coat hangers.
2016	Mobility Goes Additive, a network of railway companies aimed at 3D printing spare parts faster, is created.
2018	Nederlandse Spoorwegen (NS) starts integrating additive manufacturing into the railway sector in the Netherlands.
2019	3D printed parts are used on British passenger trains for the first time.
2020	Siemens Mobility invests in Stratasys solutions to support a digital rail maintenance project with additive manufacturing.
2021	Alstom opens a 3D Printing Hub in Barcelona, a space equipped with all types of additive manufacturing solutions.
2022	France's SNCF creates a consortium to accelerate 3D printing of parts.
2024	Renfe starts manufacturing spare parts for its train fleet by 3D printing.

