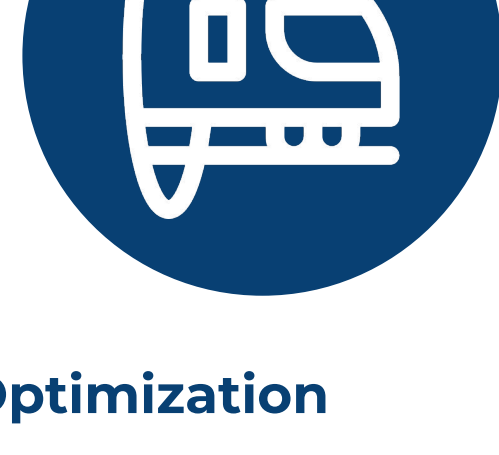


3D PRINTING IN THE RAILWAY SECTOR

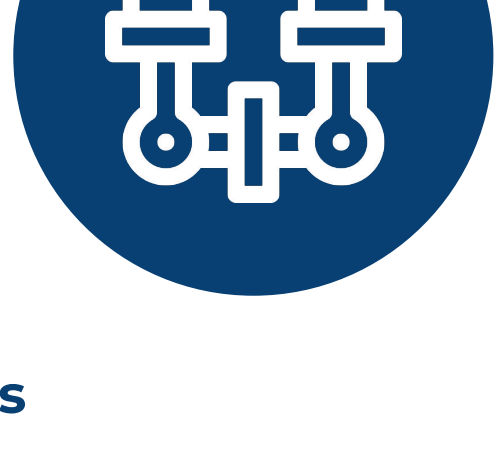
2024

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DfAM and 3D printing can be used together to remodel outdated designs and streamline processes.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 end-use 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

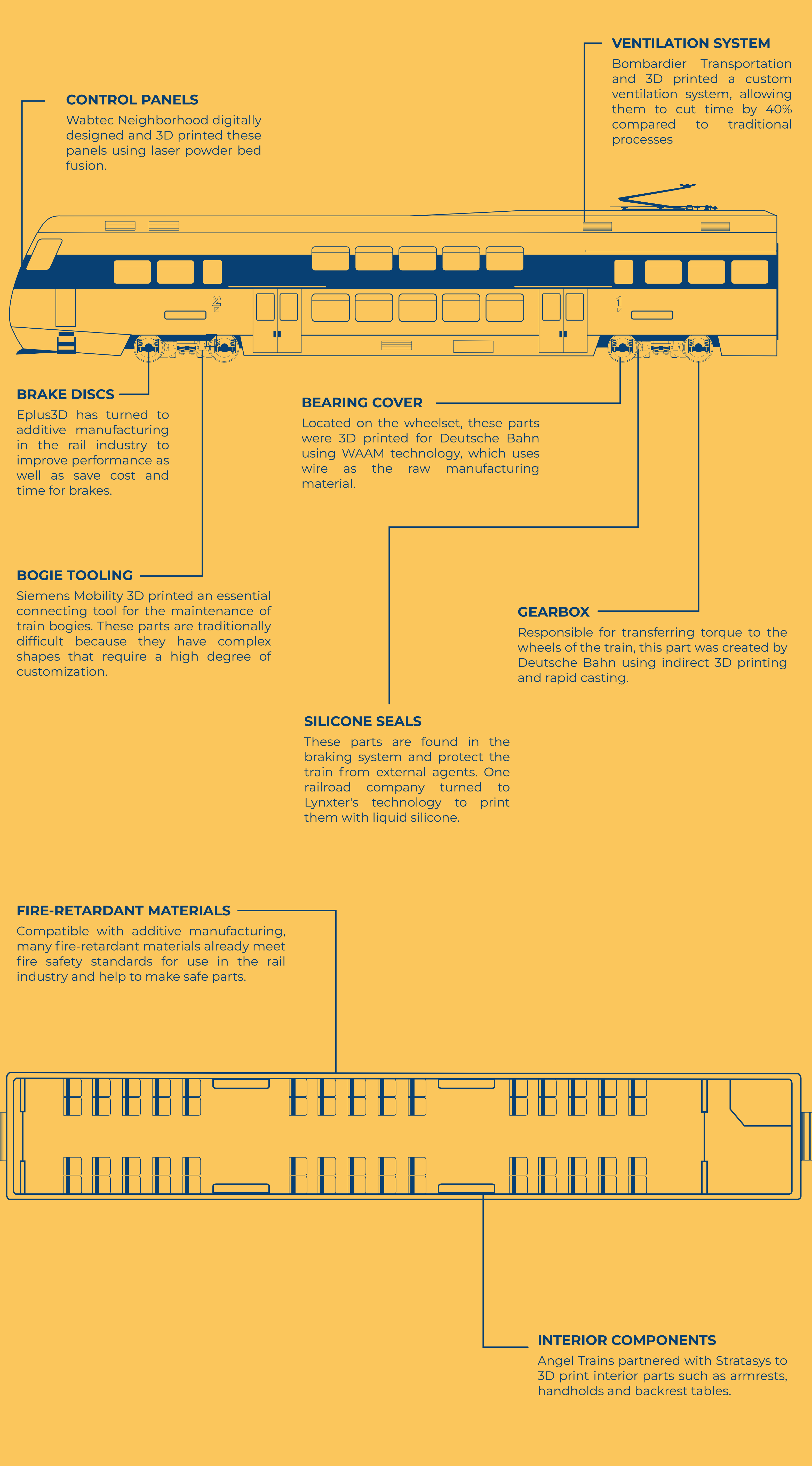
Additive manufacturing is one of the key tools in replacing or even helping to redesign obsolete, worn or defective parts on trains thanks to its speed and flexibility. It is particularly useful for spare parts.



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



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%

The percentage of savings reported by CAF when using multi jet 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)

570 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)

€10.7M

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.