

CASE

WABTEC AND SLM SOLUTIONS

STUDY

A CASE STUDY ON HOW METAL 3D PRINTING IS
ENABLING THE LOCOMOTIVE INDUSTRY



WABTEC

Wabtec is a global provider of equipment, systems, digital solutions, and services for the freight, rail, transit, mining, industrial and marine sectors. Operating in over 50 countries with more than 27k workers, they have been listed as a Fortune 500 company reaching 8.2 Billion Dollars in revenues. If you have taken a train anywhere in the last decade, there is a good chance it has components built by Wabtec.

Since 2017, the company has been working towards creating newer, greener, and more future-ready parts regarding brake panels and various other brake and safety applications for trains worldwide.

HEAVY, EXPENSIVE, AND TIME-CONSUMING

Wabtec planned to redesign a brake panel weighing in at 52 lb and comprised several different pieces. The component was built in France before being shipped for use to the United States. The brake panel was unnecessarily heavy, which impacted the train's performance. The traditional process to manufacture the component was between 3-6 months—resulting in an expensive cost, lengthy customer wait times and emissions from transporting the product to the United States. A better solution was needed.



FUTURE-FORWARD SOLUTIONS

CARE OF **METAL 3D PRINTING**

After trialing several machines from various additive manufacturing companies, it was clear the system for the job was the SLM®800, using AlSi10Mg. The printer offered the speed and scalability needed for the component. Because of the sheer size of the part, it was the only system that could print a part of this magnitude. In addition to this, its printing speed guaranteed huge benefits on lead times, making it the perfect system for the task at hand. SLM Solutions and Wabtec collaborated on engineering and manufacturing a new and improved brake panel through additive manufacturing.

“The SLM®800 provided the performance in terms of the size and speed needed to address this design challenge.” Brett Heher, Lead Mechanical Engineer at Wabtec.

Adding to this was the factor of parameters. When used on one SLM Solutions system, they can be synced on all machines across the board, enabling Wabtec to print the part locally. This aspect further reduced lead times and the part’s environmental footprint. Furthermore, they can now produce six pieces per batch, compared to just one piece with traditional methods.

LEAD TIMES: REDUCED BY

70%



WEIGHT: REDUCED BY

50%



3D PRINTING PASSES THE TEST

"Because the brake panel is a critical part of the train, it goes through rigorous testing to qualify for certification to ensure its safety. Testing included dynamic, field, and functional testing as well as getting third parties onboard. Because the brake panel is a critical part of the train, it goes through rigorous testing to qualify for certification to ensure its safety. Testing included dynamic, field, and functional testing as well as getting third parties onboard. We were able to prove that the part was able to overpass the standard values of air pressure test requested by 30%, and by 50% for the hydraulic test. Not only did the component pass the test, but its reduction to a single element from multiple pieces also mean less maintenance in the future while improving the overall safety of the train," said Henri de Chassey Additive Manufacturing leader for Wabtec Transit.

"We have since been able to reinvent the brake panel, something that has been built the same way for a long time." Brett Heher, Lead Mechanical Engineer at Wabtec.

"It's important to note that these are safety-critical parts. There is a lot of scrutiny by our customers."

Although additive manufacturing may still be considered unconventional compared to traditional manufacturing approaches, Wabtec's customers have welcomed the future-forward transition to additive-manufactured components. Wabtec officials believe more of the industry will resort to additive manufacturing as it becomes the standard way to build.



TO THE FUTURE

AND BEYOND

Wabtec envisions whole new product families being created by implementing additive manufacturing. The company already investigated opportunities to 3D print heat exchangers and brake pads and improve their caliper.

Moving forward, Wabtec hopes that the use of the SLM Solutions' systems will open up an even more extensive product line. The company has begun to work with the smaller SLM®280 systems for smaller parts. "We've been working with SLM

Solutions for several months printing on the SLM®280 to identify heat-exchanger applications," Brett Heher explains. "We have also built these parts using other additive technologies but believe that the SLM Solutions technology makes more sense when it comes to making these parts in production due to part complexity."

"What I really enjoyed about working with SLM Solutions — we developed a swift way on a tender for a train in Europe. We produced it in three months, and it was well done." Henri de Chasse, Brakes & Safety Process Engineering/ Methods Manager at Wabtec.



WABTEC

CORPORATION

is a leading global provider of equipment, systems, digital solutions and value-added services for freight and transit rail. Drawing on nearly four centuries of collective experience across Wabtec, GE Transportation and Faiveley Transport, the company has unmatched digital expertise, technological innovation, and world-class manufacturing and services, enabling the digital-rail-and-transit ecosystems. Wabtec is focused on performance that drives progress, creating transportation solutions that move and improve the world. The freight portfolio features a comprehensive line of locomotives, software applications and a broad selection of mission-critical controls systems, including Positive

Train Control (PTC). The transit portfolio provides highly engineered systems and services to virtually every major rail transit system around the world, supplying an integrated series of components for busses and all train-related market segments that deliver safety, efficiency and passenger comfort. Along with its industry-leading portfolio of products and solutions for the rail and transit industries, Wabtec is a leader in mining, marine, and industrial solutions. Based in Pittsburgh, Wabtec has approximately 27,000 employees in facilities throughout the world.

SLM SOLUTIONS

is an integrated solutions provider and metal additive manufacturing partner. The company takes a vested interest in customer's long-term success with metal additive manufacturing. Robust Selective Laser Melting machines optimize fast, reliable and cost-efficient part production and SLM Solutions' experts work with customers at each stage of the process to

provide support which elevates use of the technology and ensures their return on investment is maximized. A publicly traded company, SLM Solutions Group AG is headquartered in Germany, with offices in Canada, China, France, India, Italy, Russia, Singapore and the United States