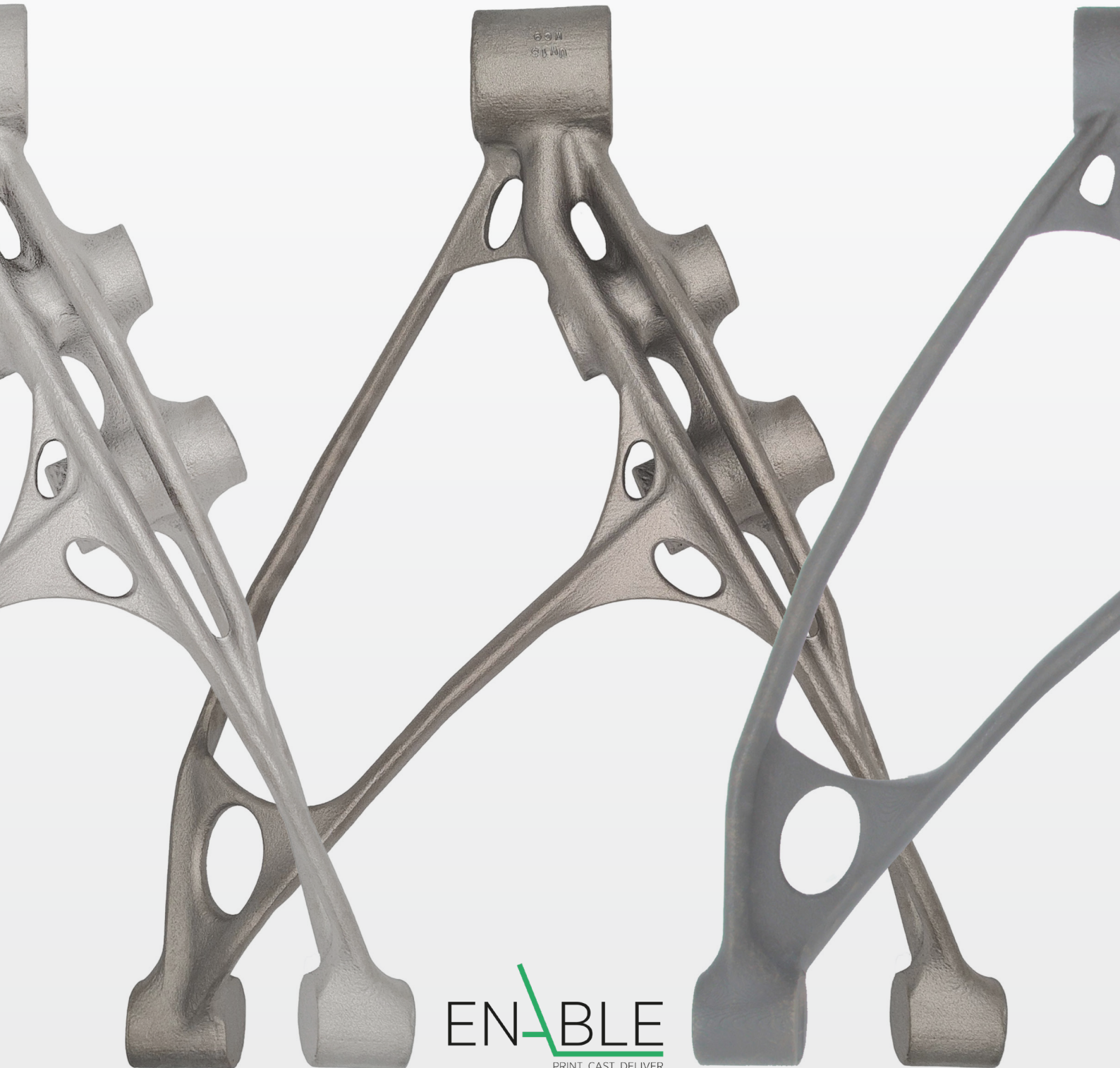


Making metal
parts with

ADDITIVE CASTING®



EN-ABLE
PRINT. CAST. DELIVER.



Complex parts like this can now easily be scaled at cost whilst offering great quality and a wide choice of materials.

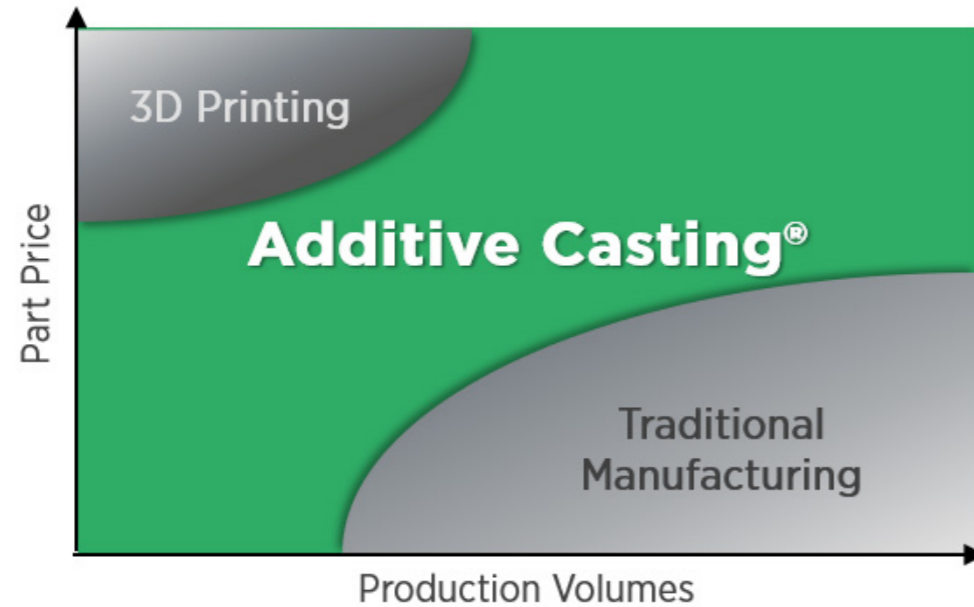
———— Steven Goguelin of Gen3D

ABOUT US

Enable is a UK business that first started in 2019 with the vision to bring a new, innovative manufacturing process to life, bridging the gap between 3D Metal Printing and traditional Casting – Additive Casting.

the gap between traditional casting and state-of-the-art manufacturing, offering the volume benefits of casting while increasing possible complexity, cutting lead times and eliminating the need for expensive tooling.

The process uses moulds made via additive manufacturing to cast high-quality production parts from over 130 different metals. It bridges



PART 1 - COMPANY OVERVIEW

PART 1 - COMPANY OVERVIEW

>50 years

of experience
in Additive
Manufacturing

>£7 mio

value of parts
supplied

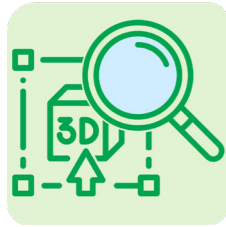
Expertise

for peace of
mind



ADDITIVE CASTING

The process



CAD file preparation

Along with the CAD file, specify your material, quantity, and any postprocessing required.



3D printing

The pattern and moulds are printed by state-of-the-art industrial printers in sand, polymer or wax. They are used one time only and perish during the casting phase.



Metal casting

Metal is poured into the 3D printed mould or pattern and allowed to cool before post-processing. Once cool, the 3D printed shell is broken off and discarded.



Quality control

Parts are thoroughly inspected, tested and then released for shipping.



Shipping

Parts are carefully packaged and are shipped directly to you, normally within a lead-time of 4-6 weeks from order to invoice.



Benefits



Range of sizes

From 10 mm to 60 tonnes



Short lead-times

Metal parts delivered within 4 weeks



Design flexibility

Highly complex parts are now castable



Cost competitive

No investment in tooling and inventory



High quality

Scale production at high quality



Choice of metals

Choose from 130+ metals

ADDITIVE CASTING

Sand Additive Casting

In the Sand Additive Casting process, a negative mould for a part is laser printed in a bed of sand. This sand mould is later used in the foundry to cast the metal part and perishes during the casting process, allowing engineers and designers to make changes to the part

at any time, as there is no permanent tool. This process is very environmentally friendly as sand is a readily available resource that can be re-used and easily be re-introduced into the eco-system at the end of its use.



Large parts

Ideal for very large and heavy parts ranging from just 100mm in size up to a weight of **60 tonnes**.



Scalable for production

This additive casting method is suitable for production volumes of up to 100,000 parts per year.



Suitable for prototyping

A cost competitive option to manufacture metal prototypes in single digits or small volumes.



Part: Suspension arm
Size: 504 x 402 x 104 mm
Material: Steel ASME SA217-17 WC9 and Magnesium L129



Choice of metals

Choose from 130+ metals

Suspension Arm

Aluminium - 3.3kg

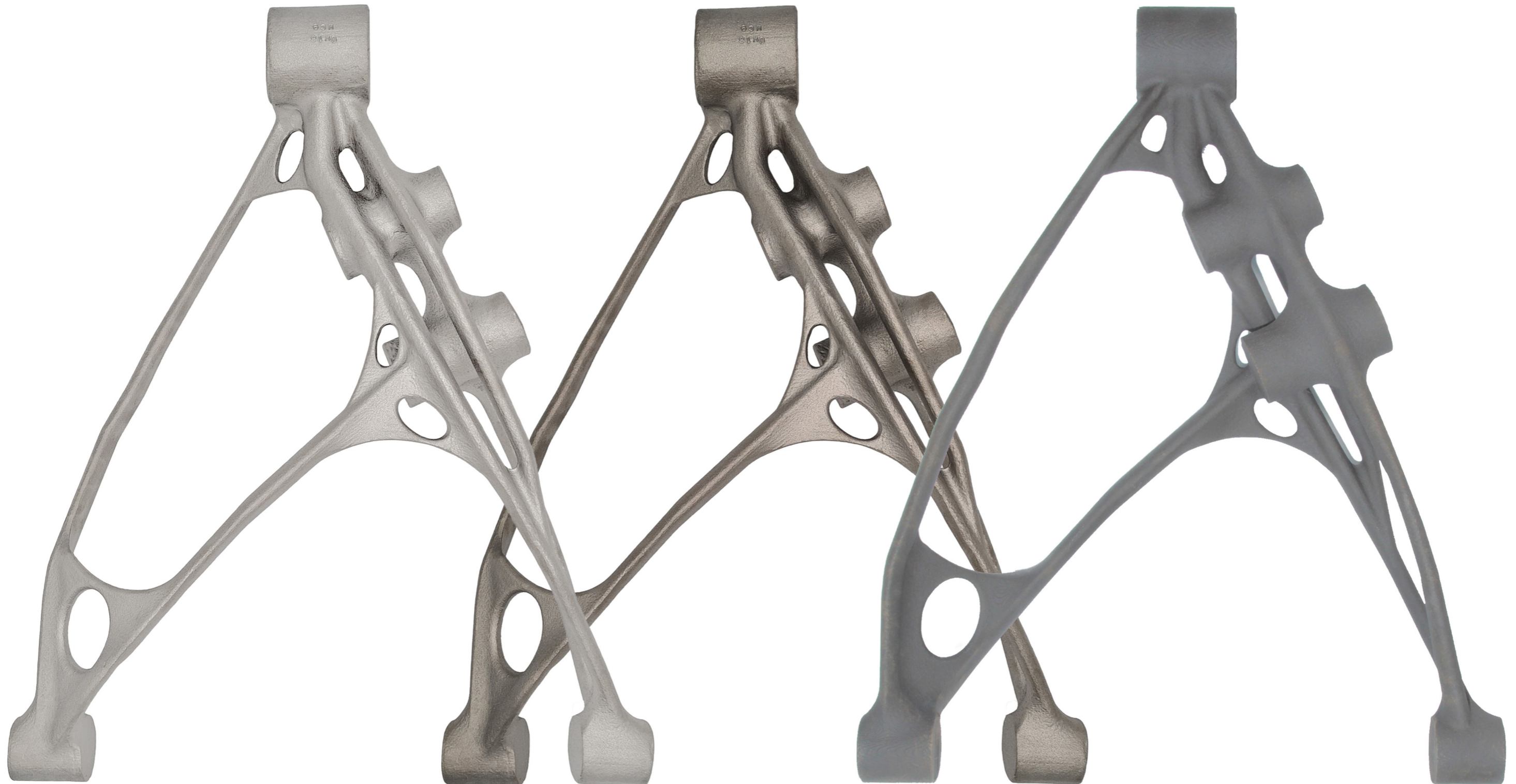
Standard manufacturing material with good properties.

Steel - 8.17kg

Twice as strong as Aluminium and Magnesium thanks to the wide choice of different grades and heat treatment options.

Magnesium - 2.15kg

Ultra light with a similar strength to Aluminium.

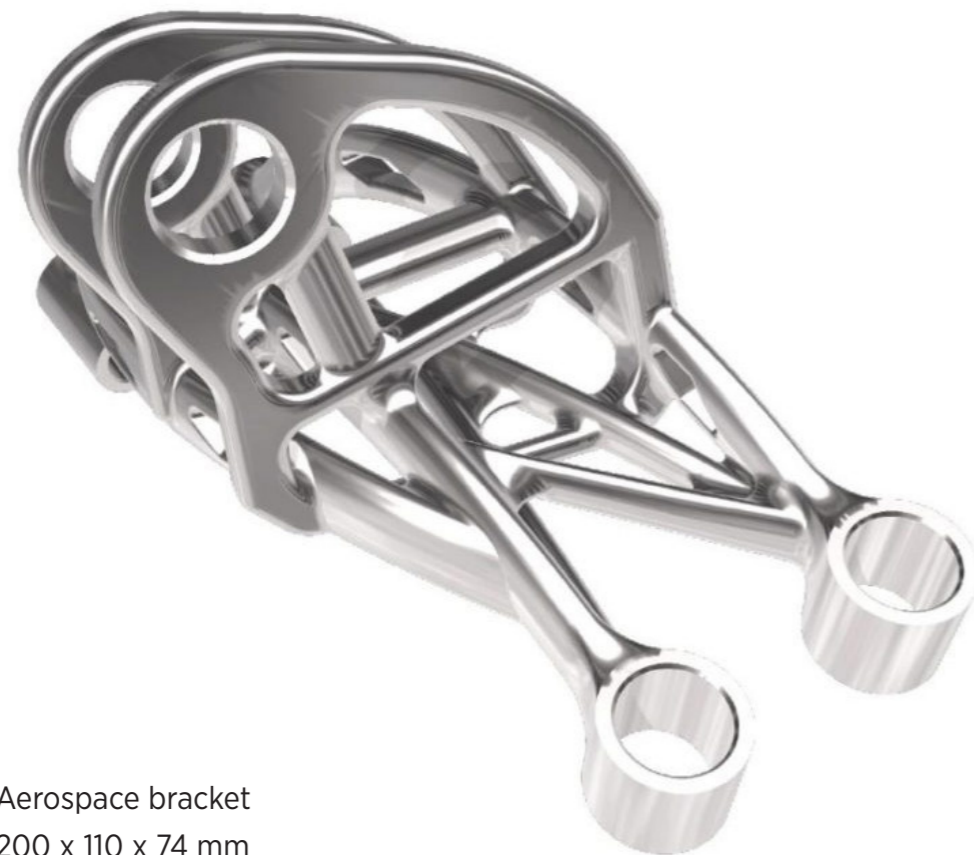


ADDITIVE CASTING

Investment Additive Casting

In the Investment Additive Casting process, a shell or mould is printed out of polymer or wax. Like all other Additive Casting processes, this mould is used in the foundry to cast the desired metal and perishes in the process. Also in this process, engineers and designers can

make changes to the part at any time, as there is no permanent tool.



Part: Aerospace bracket
Size: 200 x 110 x 74 mm
Material: Aluminium A356



Fine detail

Suitable for the production of metal parts from 10mm to 250mm in size.



Scalable for production

Suitable for small to medium production volumes.



Suitable for prototyping

Suitable for rapid prototyping of metal parts.

ADDITIVE CASTING

Vacuum Additive Casting

In the Vacuum Additive Casting process, a shell or mould is printed out of polymer and a vacuum is created during the casting process, driving liquid metal even in the smallest of cavities. Like in all other Additive Casting processes, this mould perishes in the process and

allows engineers and designers to make changes to the part at any time, as there is no permanent tool.



Ultra Fine detail

Ideal for small and highly intricate parts with wall thicknesses as thin as 1.5mm.



Scalable for production

This additive casting method is suitable for production volumes of up to 100,000 parts per year.



Suitable for prototyping

Suitable for rapid prototyping of metal parts.



Part: COVID secure pen
Size: 119 x 14 x 11 mm
Material: Silicon Brass MB1

Additive Casting can help manufacturers in the automotive sector manufacture better, lighter and more cost competitive parts.

Automotive



Lightweighting of parts



Part consolidation



Cost reduction



Scalable from prototype to production



ADVANCED
PROPULSION
CENTRE

Aerospace



Lightweighting of parts



Part consolidation



Approved and standardised materials



Thermal optimisation



Parts used in the manufacture of marine equipment can be extremely large and complicated. **Additive Casting** offers a cost competitive alternative to traditional production methods.

Marine



Corrosion resistance

We offer 130+ metals, including corrosion resistant options like Aluminium Bronze AB2, Stainless Steel 316 and Aluminium LM6.



Small and large parts

With our Additive Casting process, we can make parts as small as 5mm and as heavy as 60 tonnes.



Short lead-times

We deliver high quality metal parts within a lead-time of 4-6 weeks, supporting marine maintenance work schedules.



No tooling or MOQs

Ideal for spare part production or the manufacture of prototypes.

Rail



Short lead-times

We deliver high quality metal parts within a lead-time of 4-6 weeks, supporting marine maintenance work schedules.



Sustainable

Reduction of waste caused by machining and carbon emissions caused by shipping parts from the Far East.



Quality

Approved and standardised materials



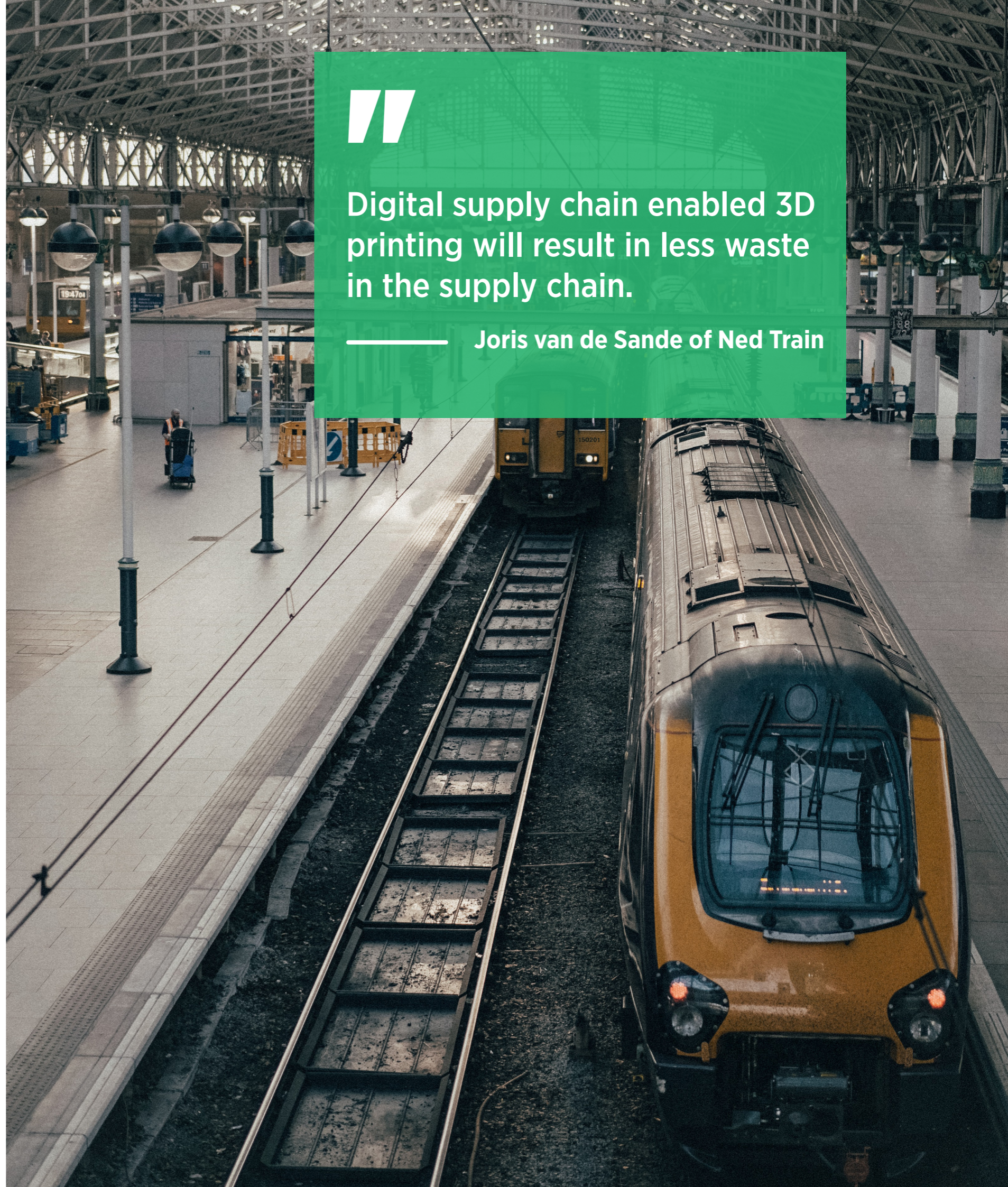
No tooling or MOQs

Ideal for spare part production or the manufacture of prototypes.



Digital supply chain enabled 3D printing will result in less waste in the supply chain.

— Joris van de Sande of Ned Train



THE UNBREAKABLE BOX

High temperatures, rapidly expanding toxic gases and extremely strong material properties – a perfect fit for Additive Casting®

In summer 2020, Addition was tasked with the design and manufacture of an enclosure developed to contain and analyze the resultant gases from a series of extremely aggressive chemical reactions.

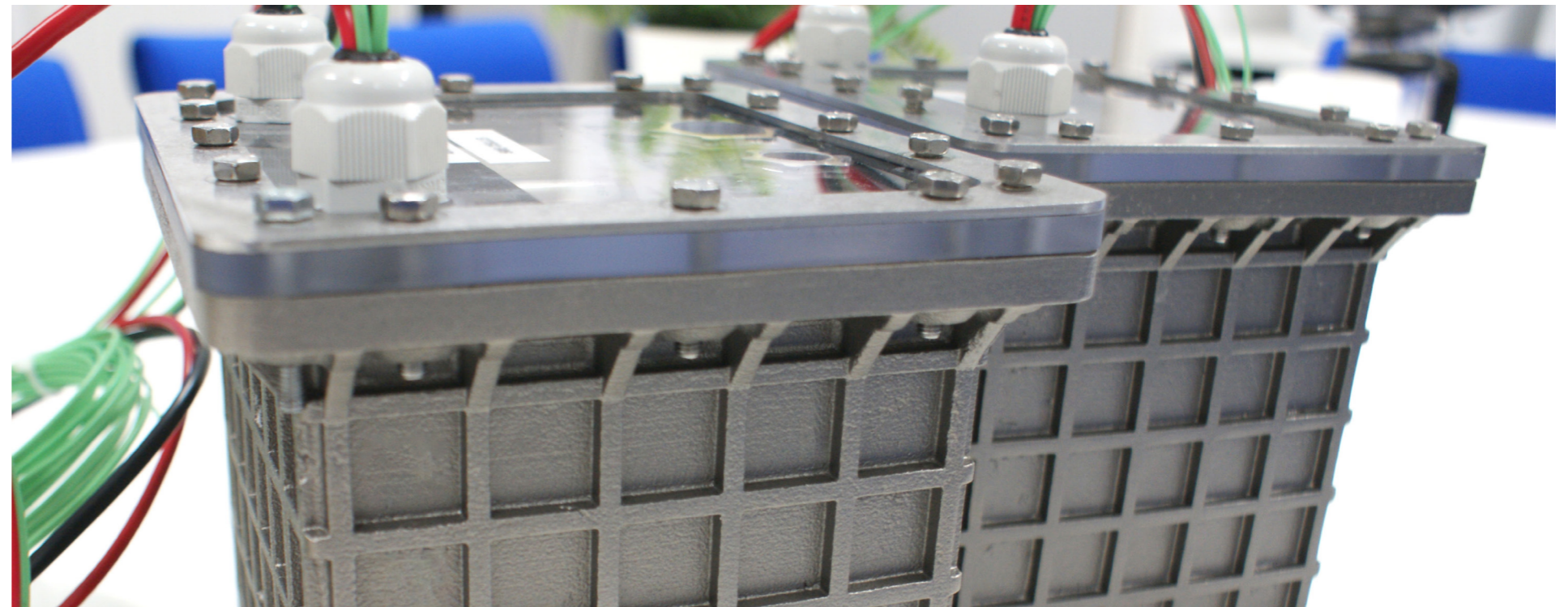
The environment within the enclosure was unknown but likely to be very high temperature with rapidly expanding toxic gases and therefore, material strength and accurate dimensions were of the highest priority for the team to ensure the safety of the equipment and effective monitoring of the reaction.

The client required only a small quantity of these test boxes and at first, the team at Addition attempted to produce the part with a metal binder-jetting process.

However, the material properties were not good enough and the part lacked strength, accuracy and integrity. Tooling the part was not an option either as the required quantities were in the single digits.

So Tom Fripp, Director at Addition, contacted Enable to see if it might be possible to produce the part in the required properties with Enable's Additive Casting process.

For the full story, go to enable.parts/case-studies.



This was the first time we have employed the Additive Casting process, and, in this case, we could not have made this part any other way.

Tom Fripp of Addition



Complex metal parts are castable

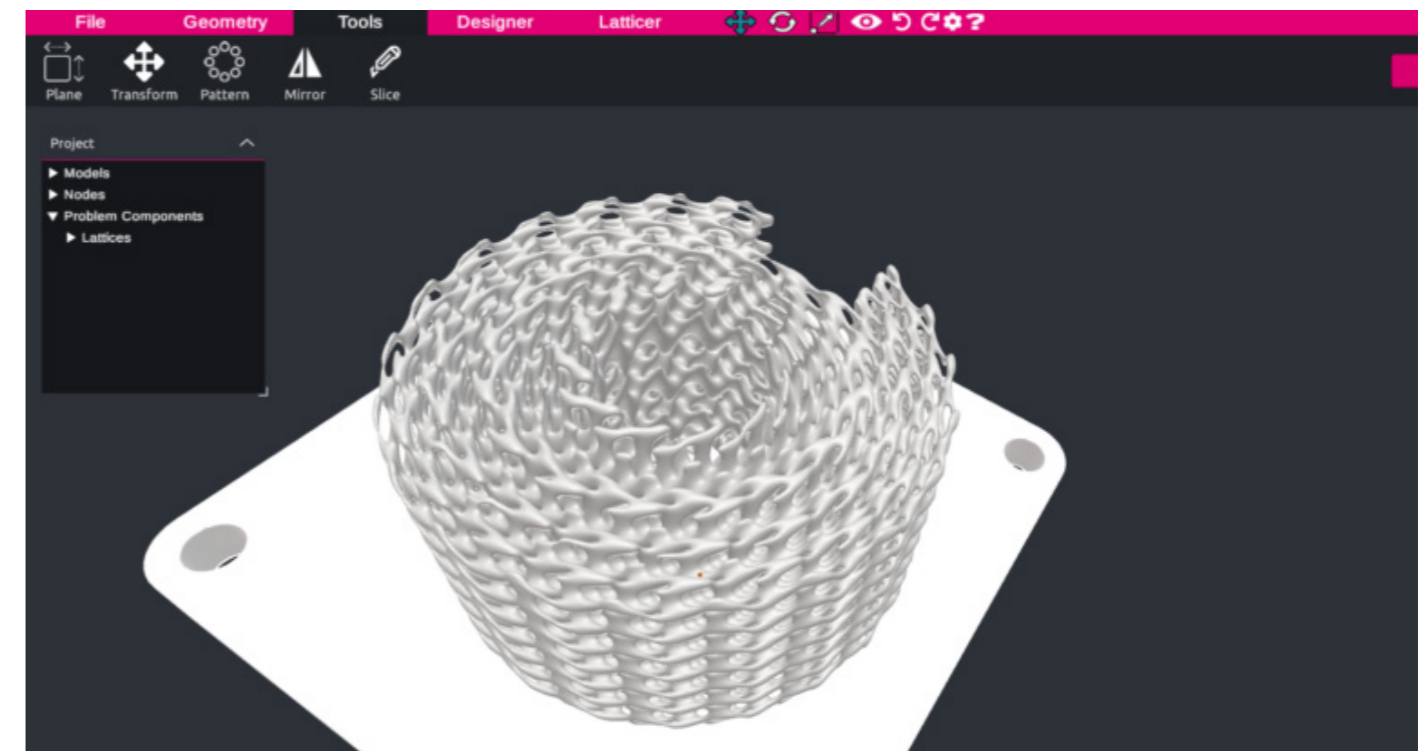
How Additive Casting[®] enables 80% cost saving compared to DMLS*

In autumn 2020, Enable collaborated with Gen3D on the production of a highly complex lattice structure for filter, heat exchanger or catalyst converter applications. This part was to be produced using Enable's Additive Casting process, a hybrid process combining the benefits of additive manufacturing and traditional casting, making un-castable parts castable.

UK based Gen3D specialises in the design of lattice structures and fluid flow geometry for additive manufacturing and has developed

a proprietary software application, allowing engineers to design and optimise complex fluid flow components. This software can reduce part cost and material use by adding complex lightweight structures to standard CAD models. The properties of the lattice structures can then be tailored to the application and production method by grading the cell size and density across multiple axes.

For the full story, go to enable.parts/case-studies.



“
We were pleased that we could reach a wall thickness of 1.5mm for this cast part, allowing for the design of a perfectly functional lattice structure

Steven Goguelin of Gen3D

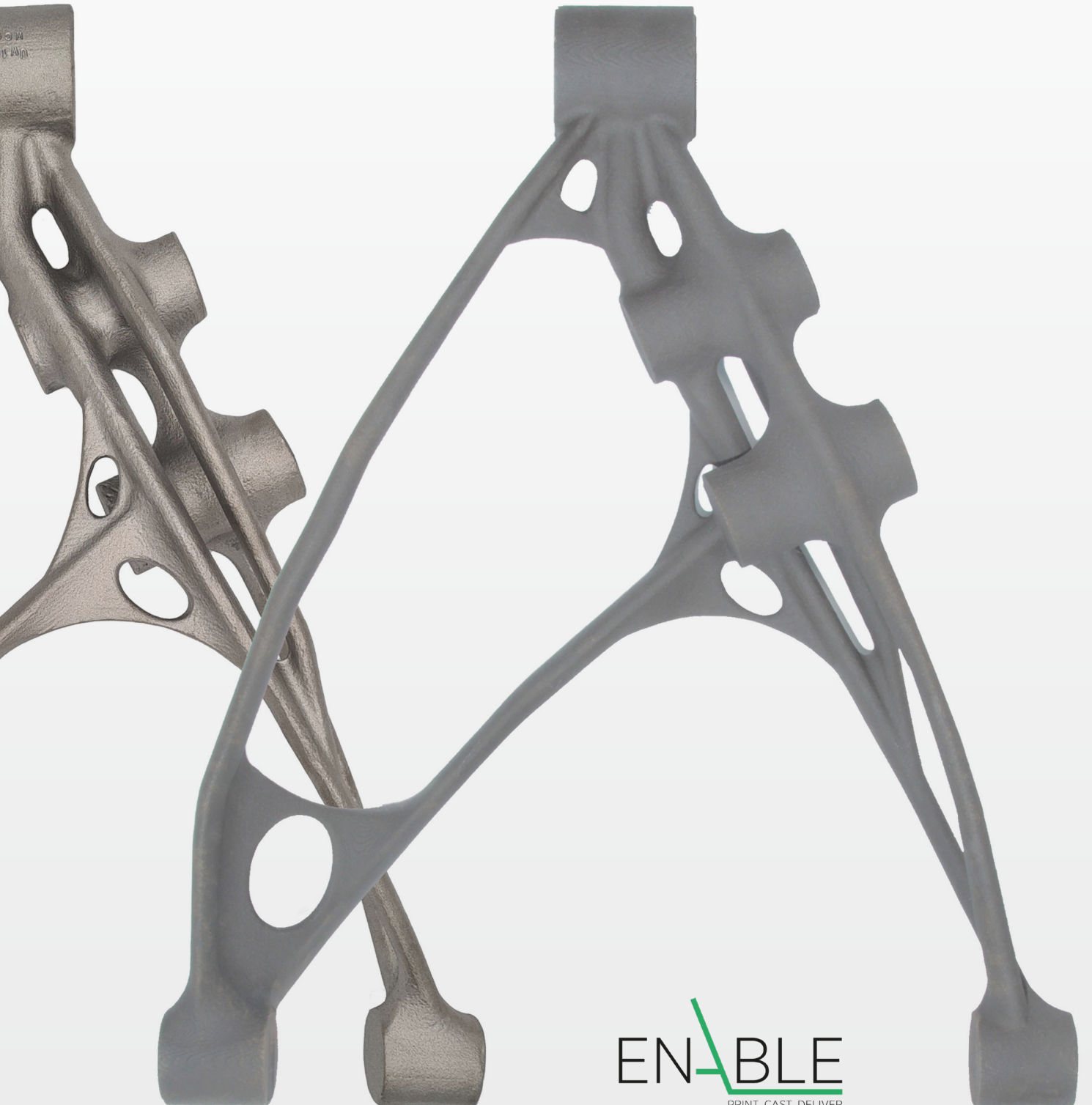
* Direct Metal Laser Sintering

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for you.**

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