Market Sector:
AEROSPACE

Technology Theme:
ADDITIVE MANUFACTURING

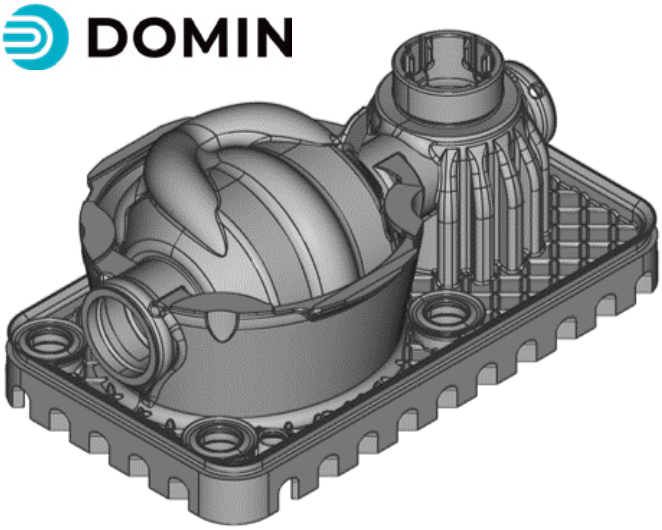
NATIONAL CENTRE ADDITIVE MANUFACTURING

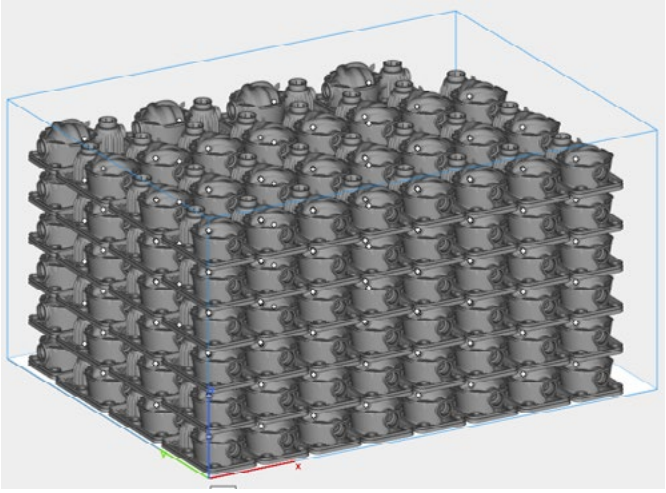
mtc Manufacturing Technology Centre

SERIAL PRODUCTION EVALUATION WITH METAL BINDER JETTING

Domin are seeking to revolutionise the fluid power industry and save a billion tonnes of CO2 per year by 2030. One of the key enablers for this is a low cost, high volume additive manufacturing process. A servovalve body with complex internal channels was trialled to assess the potential to move production from laser powder bed fusion to metal binder jetting to enable a ramp up in manufacturing output and reduction in part cost.

DOMIN





THE CHALLENGE

High performance electrohydraulic valves often have complex internal geometries. Additive manufacturing (AM) is well placed to manufacture these complex geometries without the need for large numbers of components.

Domin are leveraging the capabilities of AM to improve the performance of products. Laser powder bed fusion (PBF-LB) is one technology currently being used for their complex valves. However, opportunities exist for higher volume production of the components at lower costs.

Metal binder jetting (BJT/M) has the potential to produce parts at a higher rate due to its suitability for 3D nesting. It is desirable to avoid complete redesign of the part for the new process to aid transition.

MTC'S TECHNOLOGIES

- Design for additive manufacturing
- Metal binder jetting
- Non-destructive inspection

MTC'S SOLUTION

- Assessment of the valve component to highlight potential challenging aspects in the current design for the manufacturing process.
- Small design modifications to reduce risk of build failure where possible.
- Manufacture of sample parts to investigate feasibility of metal binder jetting process for serial production.
- Non-destructive testing to assess dimensional accuracy of parts.

MTC'S SPECIALITIES

- Identification of the opportunities for AM applications.
- Evaluation of components for suitability for AM processes.

THE OUTCOME

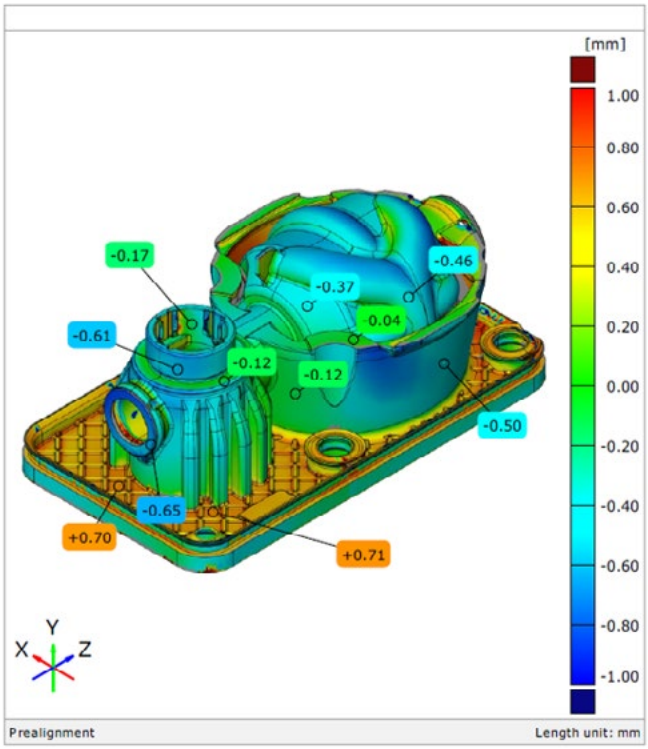
- Metal binder jetting shows initial feasibility for the serial production of these components.
- The components cracked during sintering but this could be addressed through development of the sintering strategy.
- Through adjustment by the metrology team, to account for the effect of the cracking, the deviation from nominal was seen to be within a manageable limit which can be improved with development.

BENEFITS TO THE CLIENT

- Maximised utilisation of build volume.
- Increased manufacturing throughput.
- Greater understanding of the transferability of parts between PBF-LB and BJT/M.
- Light-weight components.

> This support package has given us useful insight into the different design approaches needed for the adoption of alternative additive manufacturing technologies, and will allow us to continue developing a complete portfolio of highly disruptive electrohydraulic parts.
>
> **Simon Jones, Chief Technology Officer, Domin**

LASER LIGHT SCANNING RESULTS



AS BUILT COMPONENT

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