

3D Printing cuts end-of-arm tooling costs

If you thought 3D printing, or additive manufacturing, was only suitable for prototyping or short-run production then maybe it's time to think again, as MEPCA found out from 3DPRINTUK Director, Nick Allen.

End of arm tooling (EOAT) is about as bespoke as you get it in a production facility. But tooling can be expensive, even if you have the facilities in house to do so. So could they be made cheaper with additive manufacturing (AM) and in particular selective laser sintering (SLS)? If so, will the material stand up to the task? And even if you have your own in-house CNC facility, could it be better to outsource the job to a 3D printing bureau?

In many cases, the answer to all these questions is yes, and there are many reasons why AM is a viable option when it comes to EOAT.

The first area is cost. The cost to produce end of arm parts can be surprisingly low, and at 3DPRINTUK we have created them on behalf of clients for as little as £25 +vat. Yes, they can range up to around £1,000 for much larger and more complex items, however the majority of parts that we produce sit in the sub £100 area. The competitiveness of the method is demonstrated by the fact that a number of our customers have in-house equipment to manufacture parts, yet still choose to outsource to us.

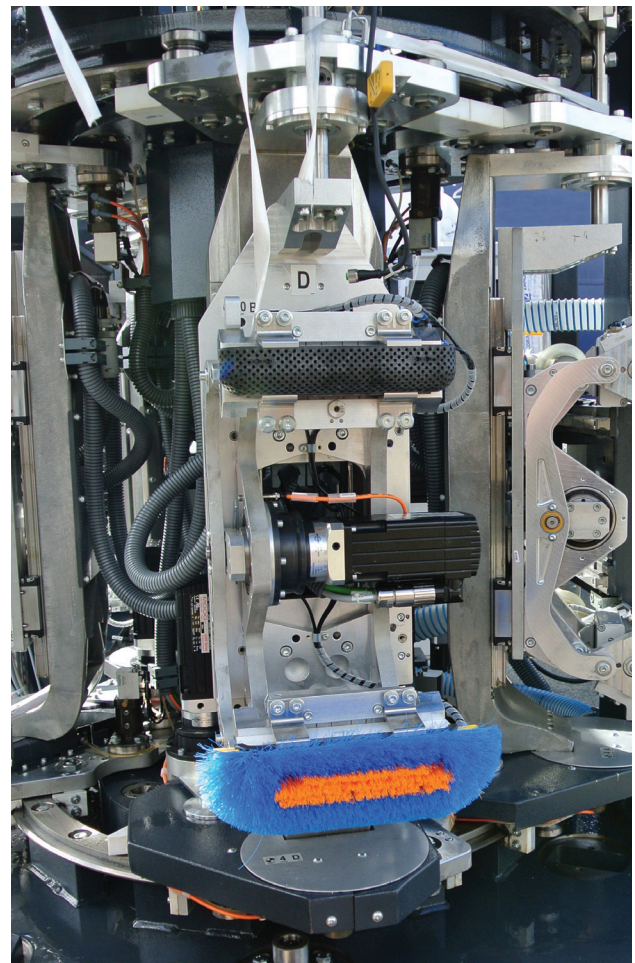
Of course, strength is another consideration. While not being as strong as a part CNC'd from aluminium, SLS nylon does display some decent strength. With a tensile strength of 48MPa, it is suitable for a large number of applications in low and medium harshness environments.

It's when you look at the design freedom the AM method offers when things get a little more interesting. Restrictions on the more traditional methods of manufacture mean that the ideal design for an application may not be achievable in one part, and often, may not be possible at all. With SLS, you have far fewer limitations, allowing for greater

freedom of design. These design aspects include:

- Multi-part in one – previously, complex designs would have to be made up from multiple parts which were then assembled to make a finished piece. By using SLS, you can more often than not, manufacture the part in one.
- Internal geometry – the geometry needed to hold items in place such as wires, sensors, mechanical parts etc., can all be designed internally without issue – you only need to make sure that you can get the parts in there once the item is printed.
- Weight saving – a lighter weight 'end' can reduce strain on a robotic arm and increase the longevity of the device.
- Pneumatic and hydraulic channels – these can also be incorporated into the print rather than needing external and additional piping. This is particularly useful for pneumatic picking systems that use a vacuum to sort parts. Hydraulic channels will need to be vacuum impregnated to make them completely watertight.

An excellent example of the benefits AM offers is Brushtec. The world-class manufacturer and designer of innovative brushware use our SLS prints to produce precise, robust jigs and high quality machine



parts for their brush production systems.

Brushtec uses SLS over machined aluminium because it can design complex SLS parts and not be restricted by the limitation of standard machining. Plus the cost of SLS printing its EOAT is considerably cheaper than machining aluminium in-house once it factors in the raw material purchase and delivery, machining centre setup, machining centre programming, purchase of milling cutters, overheads, and wages.

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