

Opportunities for 3D Printing in Foundry and Casting Applications



The foundry industry is one of the oldest trades known to mankind, and until recently has been practiced very much the same way as it has been for centuries. Additive Manufacturing has brought disruptive innovation to this industry. Traditionally, the metal casting process involves creating a tool or pattern to create the sand core and mold. However, with Additive Manufacturing, you can directly print the sand core and mold through software commands without any tooling.

To get first hand information, [Aditya Chandavarkar](#), Co-Founder, AM Chronicle had the opportunity discuss about the opportunities for AM in Foundry and Casting Applications with Brandon Lamoncha, Director of Additive Manufacturing, Humtown Products. Humtown Products has been a pioneer and has led an industry-wide transformation in bringing 3D printing to foundries, becoming one of the world's leaders in 3D sand additive manufacturing. Humtown Products also recently won the 2020 Manufacturer of the Year by the National Association of Manufacturers (NAM), USA in the small to medium enterprise category.



Brandon has worked with Humtown Products for over 19 years and has facilitated in many areas of the company. Starting as a Computer Aided Machinist (CAM), Brandon learned how to produce tooling for Aerospace, engine components, glass molds, and other foundry products. Now serving clients such as GE, Caterpillar, Cummins and other key accounts, Brandon uses his attention to detail to carry projects from the initial contact through production – this ensures that the client gets exactly the product they expect.

Before we dive into the specifics, we would be keen to know how the journey has been at Humtown for you and what have been the primary drivers for venturing into utilising Additive Manufacturing for foundry and casting applications.

Humtown has been serving the foundry industry in the USA since 1959, and we have always looked for the best ways to serve our client base. In the early days we would utilize whichever solutions our clients needed for pattern tooling, cores and molds, or even the unique patent for a blow-tube system called the Uni-Tube. Humtown was an early adopter of CNC machines in the early 1990's and even had 3D Plastic printers for making patterns in the 2000's so adding Additive manufacturing for 3D Printed molds and cores to the foundry actually seemed very logical in our progression to help the foundry base. Customers have needed higher and higher levels of complexity and better geometrical tolerance on components and we feel the best way to achieve these demands is to utilize additive manufacturing.

Additive Manufacturing has brought down the development time considerably along with providing a lot of design flexibility in many manufacturing areas. Your company has been a vocal supporter of implementation of AM utilising Sand Binder Jetting technology. According to you how big a role does Additive Manufacturing play in the case of companies like yours servicing the foundry industry and what are the challenges in implementation.

Days, not weeks or months is the slogan we use with AM to develop new products, implement changes to dimensional or performance areas of a casting. Humtown has been a very big advocate of this and we've been to hundreds of foundries showing the benefits first hand. Myself, I have personally given over 100 presentations at AFS national conferences, local chapter meetings, Lunch and learn meetings at foundry sites, and webinars. The message has to get out from the people like Humtown using the technology and giving testimony of large wins and its very slow and painful growth. The foundry industry has been around hundreds of years if not thousands, and people are very unwilling to change techniques, or believe in a computer aided solution to their casting problem.

All foundries can benefit from AM. Reduced turn around time for projects is the number one benefit that all foundries / casting buyers are looking for. The second would be reduced capital costs for prototype or R&D to develop a new casting or component. All foundries can benefit from this lower cost development cost as well.

Can you share few examples of components or moulds designed using Additive Manufacturing at Humtown and how they have been better over using Conventional manufacturing ?

Humtown has engineered 3D Printed molds for components that are very small and will fit in your hand such as valves or brackets, all the way up to molds and cores for castings up to 6000 kg iron castings that go in some of the most state of the art earth moving and construction equipment. Impellers and other critically balanced components are very popular withing the application range of AM produced molds and cores, as well as very complex pumps and castings for the aerospace industry. Conventional manufacturing has many drawbacks such as having to add draft to a tool, not able to have undercuts or back draft, as well as expensive loose pieces or slides. This is all avoided in AM printed parts using Binder Jetting.



To summarise, the applications which are very suitable for AM are pumps, impellers, complex valve body or complex casting housings for turbos in the automotive industry.

Would you like to share any specific expectations with the Additive Manufacturing community which will make it easier for you to use the technology and implement it.

- For AM in the foundry industry we're currently looking for a 3D Printer company to produce a printer that will be much faster to drive costs out of the process. One of the largest barriers to entry of AM in the foundry industry is cost. By speeding up the printers and getting more product from a single unit will help bring the costs down and throughput of a machine up for the typical client.
- The overall machine cost is currently very high, with more research and competition on the metal casting space for AM, we will see more printers coming to market in the next 2-4 years and this will also help drive down the costs on the actual printers.
- More adoption of printers on location will help drive down the costs of shipping 3D Printed molds and cores from service centers to the point of need. Damage is likely on extremely complex parts, so high

packaging costs and specialized transportation drive up costs to get the technology to the point of need in the foundries that can be in remote locations.

How does the roadmap for Humtown look like from here on ?

Humtown is still very much engaged in binder jetting for the AM community in foundry, but we are also looking for direct printed parts to even get shorter lead times and product to our customers. We feel this technology for direct parts is still several years away for end use parts due to mechanical properties being limited, lack of certain materials, standards still need to be written, but we know that it is coming.

Humtown will continue to support our customer base with 3d Printing of parts, consultation on installation of equipment and process, as well as continue to look at the horizon for new opportunities to grow in the space!

About the author

Aditya Chandavarkar



Aditya Chandavarkar is an established entrepreneur with business interests in manufacturing, innovative technology and consulting. He is the co-founder of CNT Expositions and Services (acronym for Catalysing New Technologies), which was subsequently formed by the acquisition of Inkjet Forum India – a leading knowledge sharing platform for inkjet printing technology founded by him. At Inkjet Forum India, Aditya was single handedly responsible for conceptualizing and organizing conferences and education programs, in the area of digital textile printing and industrial inkjet.

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