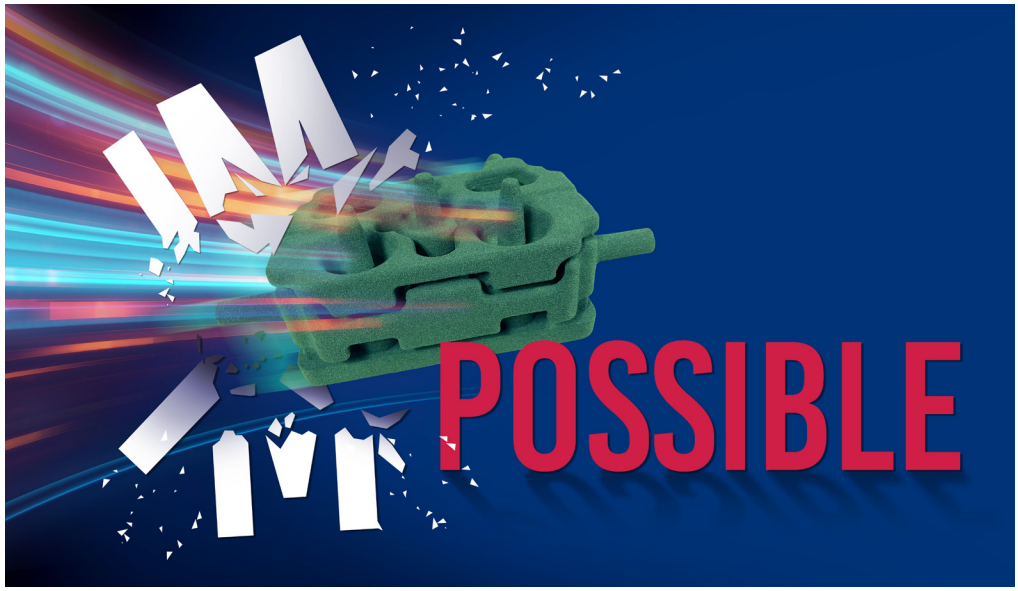
Breaking Through the Design Barrier

How OEMs can utilize additive manufacturing to push past common design limitations and start thinking 3 dimensionally.

May 29, 2024

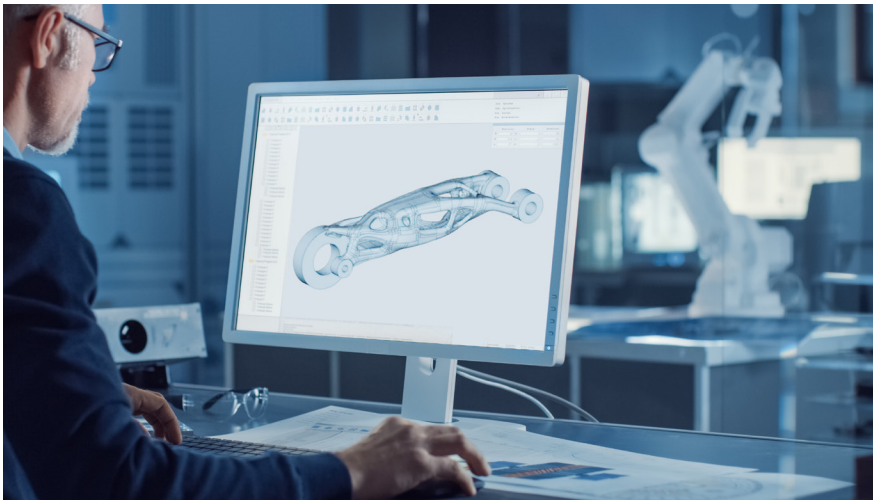


Getting beyond the concept phase and to the point when an OEM orders metal castings for an assembly has always been costly and time consuming, whether it is in the initial design stages or making tweaks before going into production. There are a number of challenges you need to overcome if you choose to get your casting done the conventional route. Whether you have to make concessions to your design because of limitations of the conventional process — like draft or stacking tolerances — or simply getting stuck waiting for the tooling necessary for design modifications. Each sticking point could threaten to sink your project. But the good news is those limitations are being eliminated, while freeing the imaginations of OEMs and igniting the spirit of innovation. Additive Manufacturing has quickly and radically transformed the prototyping process.

First and foremost, 3D sand printing is the key to creating far more complex, intricate metal casting designs. Because 3D printing involves building up a part layer by layer, voids and intricate details in the digital design file can easily be achieved. So, your team can spend more time really refining your design to make your product sleek and more appealing, with the knowledge and reassurance that 3D can

bring your imagination to life. You also don't have to worry about the conventional constraint of multiple cores being produced to achieve your metal castings. Also gone are the many man hours spent gluing and assembling those core pieces together before actually utilizing them at the foundry. In the end you get one complex core fast and efficiently, with no human error.

3D sand printing has made proof of concept a whole lot easier as well. Having access to a virtual model sure has revolutionized product design. But even though you can have a designer bring your product to life as a rendered model, and do some basic stress testing on the computer, you still need to build a working prototype to see if your product is viable. Traditionally, this has always been done with mostly off-the-shelf parts — that end up producing a mock-up that will be unrecognizable from your final product. This isn't the case with 3D sand printing.



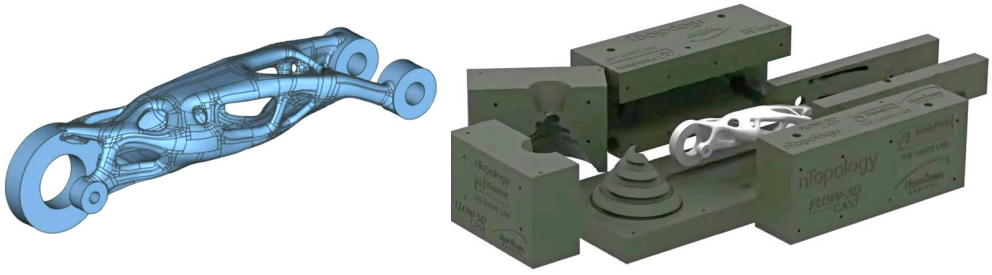
DESIGN FREEDOM: 3D sand printing is the key for OEMs to unlock design possibilities that could never have been acheived by conventional means.

Your print ready CAD files can be sent right to a 3D sand binder jetting printer, resulting in the sand cores necessary for your foundry to start pouring your metal castings available within 1 to 2 weeks. This means that all of the time and expenditures spent getting tooling fabricated every single time you make a design adjustment are a thing of the past. What does this all mean for you? Not only will your prototype look more like your final product design, but it will function more like it. This way you can spend your

time really ironing out those problem issues, and less time waiting for new castings to arrive every time you make a modification. OEMs no longer have to be satisfied with a design until it is absolutely perfect.

Even more critical, 3D gives OEM's the ability to circumvent past design concessions that had to be made because of the conventional production process itself. For instance, because the final sand core doesn't have to be pulled from a mold anymore after being formed, a product designer doesn't have to worry about accommodating for draft. This alone could help create a lighter metal casting in those situations where weight distribution is critical — like an assembly for an aircraft component. With 3D sand printed cores, you also no longer have to worry about stacking tolerances during the design process. One printed core means no longer having to consider assembly clearance and no more slop from tolerances stacking up. Additive Manufacturing has truly freed OEMs from old worries and allowed more time being spent where it should. Making the product more functional.

For these reasons and more, 3D sand printers have become an essential tool for OEMs that require metal castings to get their assemblies built. With ultimate flexibility during the design process, OEM's can modify their designs practically on the fly, create a proof of concept that is more accurate to the final design and avoid old pitfalls that could potentially derail a project. **Start thinking 3 dimensionally when it comes to your assemblies and make achieving speed to market that much easier.**



Humtown, nTopology, Penn State, Jarvie Performance Castings and Flow 3D Cast created an end-to-end digital sand casting work flow to create a topology optomized robot arm that was over 1 meter in length and and weighs over 240 pounds.

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