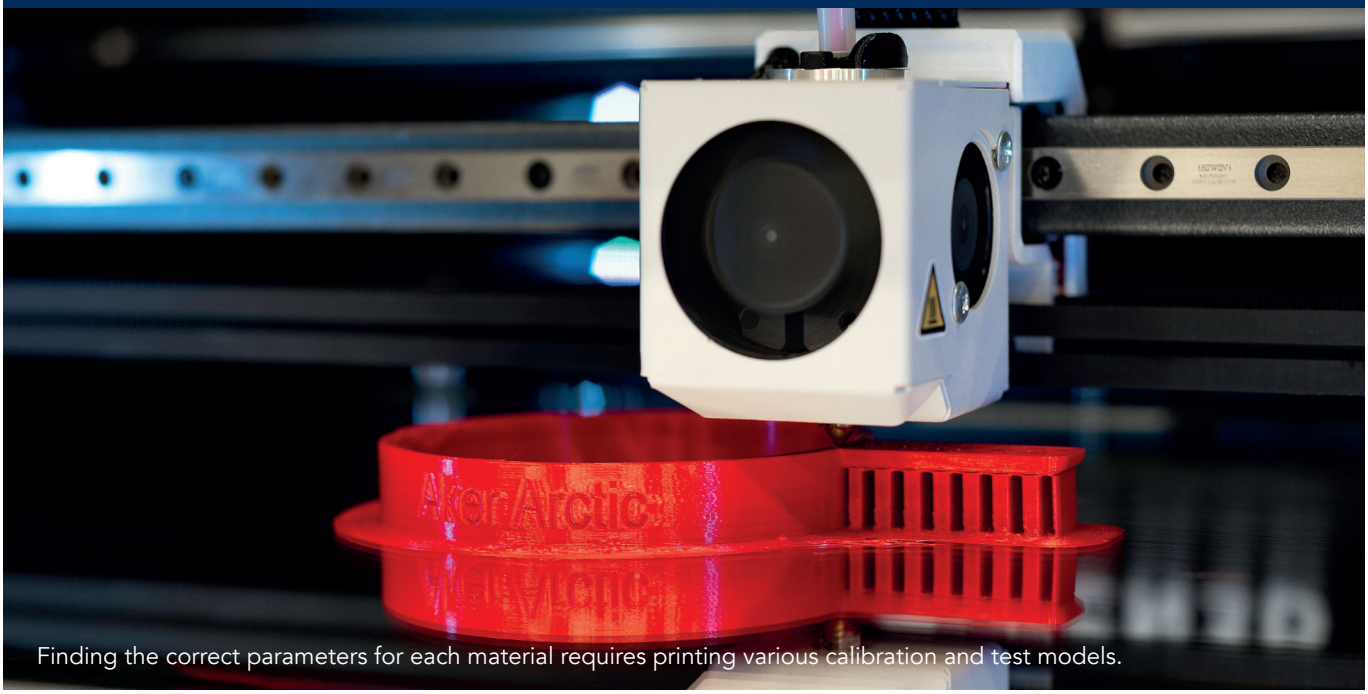
Flexibility in tests with 3D printing



Finding the correct parameters for each material requires printing various calibration and test models.

About a year ago, Aker Arctic acquired a 3D printer to investigate if certain parts for model testing and prototyping could be produced in-house to improve flexibility. The results have exceeded expectations.

Previously, hull parts for model tests were manufactured by milling out the desired part from closed-cell polymeric foam. The parts had to be ordered from an external provider with a certain delivery time and limited possibilities for alterations.

Easier to test options

Today, 3D printing is used in-house to produce azimuthing propulsion unit (APU) covers, rudders, ice knifes, bilge keels and other smaller parts for the models.

"The main advantage is that we can produce variants of parts quickly if we want to test various options or alter something in the design," development engineer Olli Kokko says. "This improves flexibility in the model testing. With 3D printing, we can now obtain perfectly-sized alternative parts, tailor made for each test, instead of using existing stock as we did in the past to save time."

Models can be further modified with add-on parts at short notice.

Ecological choice

In the traditional subtractive manufacturing method, the raw material is a chunk of polymeric foam which is then milled to shape. In the additive manufacturing method with fused filament 3D printing, only the necessary amount of plastic filament is used to manufacture the part to the desired shape and strength.

"The part becomes noticeably lighter and produces much less waste, but has enough strength for model testing," Kokko points out.

There are numerous alternatives for 3D printer filaments depending on the intended use of the components. After a thorough evaluation, the type of plastic Aker Arctic has decided to use shows good stability when submerged in water, is durable, and remains cost-effective for 3D printing. Additionally, it was decided to use filaments that are completely made of renewed materials.

Finding the parameters

The total production time of a part depends on its form; be it simple or with complicated support structures inside. The priority is to find the right parameters for manufacturing and ensure that the strength is suitable.

"For instance, a complete APU cover takes a few days to manufacture. Additional post-processing, such as spray filler and painting, can be done to achieve the desired surface quality, which is particularly important when testing hydrodynamic properties," Kokko explains.

"We are constantly looking for new ways to utilize 3D printing in our work. Currently, part size is a limitation, but we can join smaller segments together to create large assemblies," he adds. ■