



— RAMONA HÖNL

Cleanly printed

In a project with USB-Düsen and Heilbronn University, TRUMPF has optimized sewer cleaning nozzles for 3D printing. A subsequent test series has shown that the 3D-printed variant clearly performs better than the conventionally manufactured nozzles.

To clean large sewer lines, workers plug a hose into vehicle-mounted machine, at the end of which is a 'bomb' or 'grenade' that slides down channels on a carriage. The head of the bomb is fitted with 12 to 15 nozzles that spray water. These jets hit channel walls at pressure levels up to 300 bar to blast away the sludge, which is then sucked into the vehicle via the hose.

— Simple components, complex production

The nozzles' design is simple, but it still takes four steps to manufacture these attachments. The first is to cut the raw material and then thread it on a lathe to create what is in effect a massive bolt. Then two blanks are placed in a milling machine to cut the contours of a nut into the front face. Finally, a worker glues in a ceramic insert by hand. "The operator has to remove the component from the machine for each step. What's more, gluing often leaves imperfections that change the jet's guidance," says Fatih Arikcan, additive manufacturing application engineer at TRUMPF, with a note of disapproval. TRUMPF decided to go with additive manufacturing to cut production time while boosting cleaning performance.

Its experts took a hybrid approach for the new nozzles, combining conventional and additive processes. They stuck with the lathe for the massive threaded base component, which is called a preform. "This process is solid. AM doesn't add any value here," says Arikcan. The 3D printer is to perform the following steps, milling and gluing. TRUMPF opted for Laser Metal Fusion (LMF), a manufacturing process where a laser builds up the component layer by layer in the powder bed. "This process is perfect for complex geometries. We need these to put these functions – that is, maximum cleaning performance with minimum water consumption – into practice," explains Arikcan.



