Unpacking and fine cleaning of 3D printed metal parts

Cooperation between Reichenbacher and Solukon brings together essential post-processing steps and for the first time permits automated box unpacking.

The removal of loose powder is a key step in the post-processing of metal parts produced by additive manufacturing. For years, Solukon systems have been automatically removing the powder from components manufactured using the LPBF process. A joint project between Solukon and Reichenbacher Hamuel now takes this a step further and automates both in one system, the unpacking from the building container and the de-powdering.

At the end of the LPBF process in the AMS 400 system, the printed component sits in a building container in a so-called ‚powder cake' consisting of unused metal powder. Unpacking the component, i.e. freeing it from this powder cake, is usually done by suction and clearing. Once the component has been uncovered and taken out of the building container, there follows the clamping in a Solukon system to remove the loose metal powder from the inside of the complex component automatically. Programmable 2-axis rotation and vibration make the powder flowable and thus it can drain from the internal channels in a controlled manner. This is the usual procedure for removing powder from complex laser-fused metal parts. The Reichenbacher and Solukon project, which combines both process steps in an automated system for the first time, addresses this very issue.

The AMS 400 3D printer from Reichenbacher and the SFM-AT1000-S powder removal system from Solukon for the automated unpacking and fine cleaning of 3D-printed metal parts.

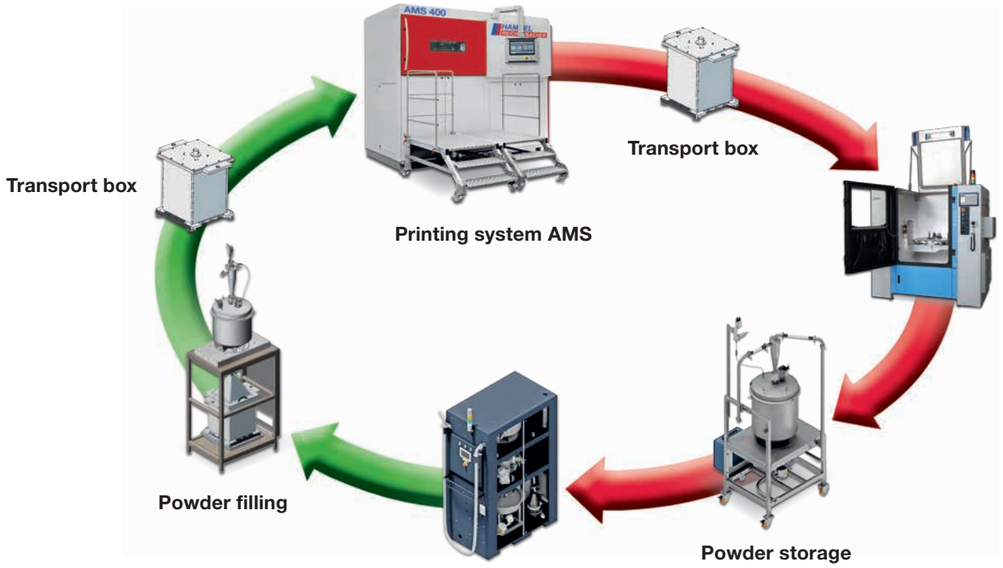
The combined solution is already in use at a leading manufacturer of steel moulds for the concrete industry.

The operating principle of the combined unpacking and cleaning station

The central feature of the project is that, rather than the component alone, the entire building container with the component inside is loaded into the SFM-AT1000-S system. Once fixed by a zero-point clamping system, the Reichenbacher building box, whose base and walls are separable, is turned upside down and the loose powder of the powder cake is emptied. The powder removed goes directly into an external material preparation station.

The user then takes off the box frame by means of an external mobile lifting device to make the component freely accessible. Subsequently, the Solukon system (in the version with a short swivel arm) cleans the component as usual using the unique SPR technology® with programmable 2-axis rotation and targeted vibration excitation. Thanks to the SPR-Pathfinder® software, the Solukon allows the convenient and fully automatic advance calculation of the movement sequence based on the component‘s CAD file. The SFM-AT1000-S can handle building boxes weighing up to 800 kg and uses a high-frequency knocker to loosen even the most stubborn powder clumps in the internal channels of the component.

Compact end-to-end solution



”Featuring box unpacking, the SFM-AT1000-S is a system with a high degree of automation. Moreover, we show the flexibility of our systems for individual customer solutions. As a competent system supplier, we support Reichenbacher in their project for the box unpacking of laser-fused metal parts. Together, we provide our customers with a real competitive advantage,” says Andreas Hartmann, CEO and CTO of Solukon. Thus, in cooperation with the Additive Manufacturing team at Reichenbacher led by Dr Alexander Kawalla-Nam, an automation solution suitable for industrial use has been created in record time. ”With Solukon, we have another system with a truly unique selling point in our portfolio and are setting ourselves apart from the standard solutions on the AM market in the area of post-processing, too. As a result, we are now able to cover the entire 3D printing process chain,” adds Dr Kawalla-Nam. The combined SFM-AT1000-S system with box unpacking has already been field-tested. It has been successfully in use for months at a leading manufacturer of steel moulds for the concrete block industry.

The building box with component and powder is unloaded from the Reichenbacher printer and inserted into the Solukon system. There, the box is turned upside down first as a whole before (after removal of the frame) fine cleaning takes place without the box.