

Team 501 Abstract

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*Abstract*

The Air Force Research Laboratory (AFRL) at Eglin Air Force Base, Florida uses a metal 3D printer to make parts. This printer uses a laser to fuse metal powder together to form desired shapes. This leaves some unfused metal powder trapped inside cavities in the part. Any remaining powder is waste because of contamination after the part is taken out of the printer. The lab is tasking us with creating a device to help remove the unfused powder from the part. This recovered powder should be captured and stored for reuse.

Knowing how to best handle metal powder is key to this project's success. The metal powder at AFRL has individual pieces that are about 10 times smaller than the thickness of a standard piece of paper. The powder particles easily catch on the surface and corners of the printed part. The powder must always be isolated because of safety concerns. Airborne powder can catch on fire and is dangerous to inhale.

Our system vibrates the part upside-down to remove powder. This powder falls and is funneled into a storage container. To account for the dangers of small metal powder, our vibrating system is placed inside a sand blasting cabinet. These cabinets already meet AFRL's safety standards. The designed system proves to be effective in recovering additional powder.