Design and testing of 3D printed stirrers to improve fluidization of cohesive powders

Motivation and Background

Fine powders are typically hard to fluidize. Due to their small size, interparticle forces, such as van der Waals forces and capillary forces, become dominant and make particles stick together. A way to improve the fluidization of these powders is by using a stirrer. This project is concerned with designing and testing different stirrer types to enhance the fluidization behavior of fine powders.

Research project

Stirrers come in all shapes and sizes. To find an optimal stirrer design for this specific function modular stirrers will need to be designed, such that they can be tested in several assemblies. For the design of these stirrers, computer-aided design and drafting software, such as SolidWorks or AutoCAD, can be used. The final design will be 3D printed and tested over a range of different powders. The stirrer needs to have a modular design such that many iterations of assemblies can be tested using the same building blocks. Design parameters to consider are the number of blades, the angle of the blades the axial difference between the blades to name a few.

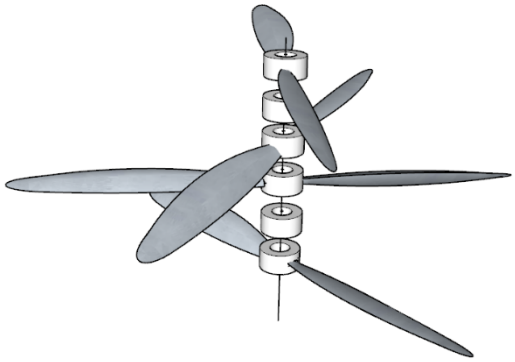

Fig.1

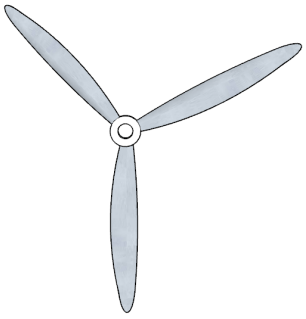

Fig.2

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Key words: 3D printing, fluidization, equipment design, nano powder