Forschungsarbeit / Bachelorarbeit

Design and development of a shredder for disposable medical products

Each year there are roughly a total of around 419,200 tons of waste generated in the healthcare sector in Germany. Of this, 91% (Approx. 381,500 t) are textiles, dressings, and similar materials, but cannot simply be recycled, but must be separated again). Since this is where most single-use instruments (that can actually be recycled) are found, these wastes carry significant importance. The Institut für Medizingerätetechnik is investigating a project regarding design and development of a shredder and a small hydraulic compressor for disposable medical products. This is a peer collaborative project, and students can work in groups. This encompasses design and development of both a Shredder (Sh) and a Small Hydraulic Compressor (SHC). Students can decide on working on either topic (Sh or SHC). The Sh project focuses on developing a shredder that is capable of tearing apart the medical products waste into small pieces, and the SHC project focuses on compressing the shredded waste into small blocks so that it will be easier to deal with in terms of handling, safety, and transportation. Accordingly, sensors, electronics, and mechanical parts are required to be selected. It is noteworthy that the size of the shredder and the small hydraulic compressor should be limited to 60 cm, 50 cm, 80 cm (Width, Depth, Height). Below there some shredders in the recycling sector:
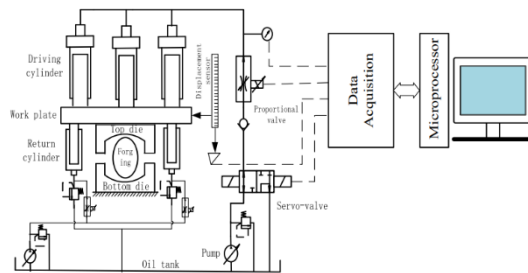

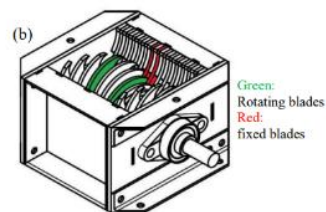*Figure 2 Diagram of a hydraulic press machine, Lu XinJiang et al. 2015*

Figure 2 Shematic diagram of a shredder, Jeh Wong et al. 2022

Aim of your thesis:

Design and development of the SHC
- to model and characterize the SHC
- to design and conceptualize the mechanics and electronics integration
- to validate the statics and dynamics of the system using MATLAB

Design and development of the Sh
- to model and characterize the shredder
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The following requirements would be ideal for the prospective students:
- basic knowledge of programming microcontrollers
- good knowledge of CAD (Creo Parametric)
- basic knowledge of manufacturing processes and mechatronics

Supervision will be provided in English. Hence, the thesis should be written in English.
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