

Safety circuits of Wall-E

General context:

The association EPFL Xplore wants to develop a 3D printed parts recycling machine. After one semester of development, a first version of the machine is ready. Nevertheless, to improve the capacity of the machine and the general understanding of the parameters, a lot of work remains to be done. This is why we offer semester projects to EPFL students. The recycling process of 3D printing filament can be decomposed in the following steps: grinding, drying, extrusion, cooling and spooling.

Project description:

The objective of this project is to develop safety solutions for the whole plastic recycling machine but especially for the shredder part. The student will set up mechanical as well as electrical solutions to ensure safety. Moreover, a general safety circuit connected to all the machine sub-systems must be installed including a kill switch.

Furthermore, the student will be a part of the Xplore plastic recycling team, they will need to attend the team meetings as well as the working sessions.

Tasks:

- Strong literature review and familiarization with different subjects:
 - o Electrical circuits of the machine
 - o Electrical safety circuits implemented in market shredders
 - o Mechanical safety solutions implemented in market shredders
- Implement a mechanical solution to hinder the shredder access when it is running
- Implement an electrical solution to prevent the launching of the machine when a safety element is not in its normal state.
- Set up a kill switch for the user
- Set up a safety circuit that switches off all the machine when something goes wrong from the shredder to the spooler.