# Mobile fab lab: Plastic recycling

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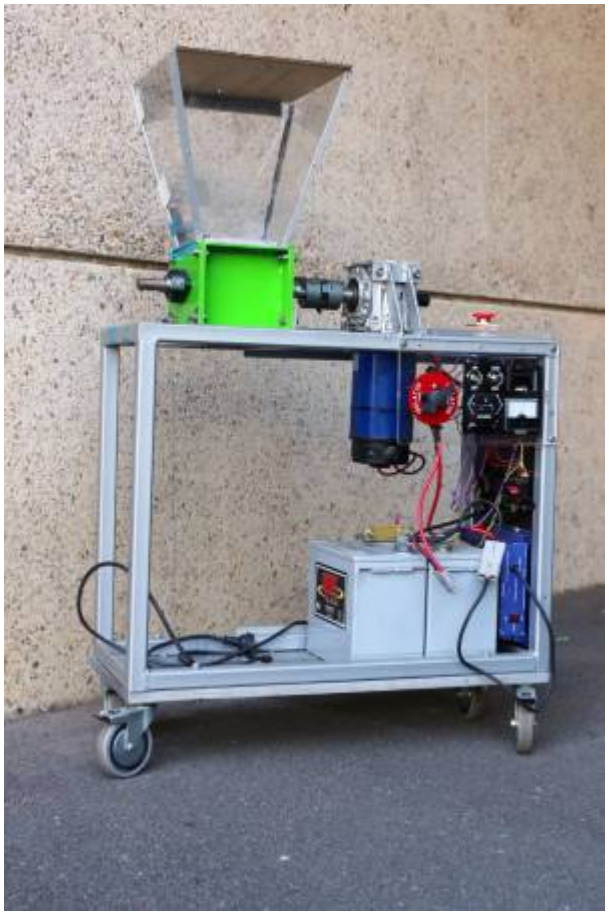

## Summary

This is part of a a multi-faceted project to develop a mobile fab lab suitable for location in remote, regional and third-world sites. Recycled waste plastic is proposed as a source of materials for users in remote locations where access to existing commercial sources of plastic filament (for 3D printing) and plastic sheet (for laser and CNC) is problematic due to transport or economic issues. The designs will be adapted from existing solutions (https://preciousplastic.com/en/) by developing solutions for energy supply, raw material processing and reducing costs. The aim is to facilitate a self-contained mobile Fab Lab that has the capacity for community users to manufacture copies of the equipment it contains, so that the local knowledge developed can ensure sustainable ongoing use, as well as allowing for the mobile facility to be relocated to another site when this is achieved (in 6 - 12 months)

**Complimentary Research- PLASTICS WELDING**

### Activity Summary

As a first step, it is proposed that equipment capable of

- shredding and granulating plastic waste
- extruding,
- injection moulding , and
- sheet forming

be constructed according to existing designs.

Including professional designers and engineers in a review of this process will then help identify modifications and improvements that can be implemented. Low-cost methods for fabrication and identification of cost-effective local suppliers will also be part of this process.

Subsequently, redesign with a focus on addressing energy and supply problems inherent in remote area installation will be undertaken , and prototype solutions made and tested. For example, human powered shredders, low-cost washing methods and solar energy systems will be investigated.

# Production notes

## Design Modifications

### Shredder

In negotiations with fabricators to make the shredder parts, the following modifications were implemented:

- 3mm mild steel was used to make the housing, rather than stainless, to reduce cost. Painting will be required.
- BIS 80 hard steel was used to make the cutting blades, rather than stainless, to increase working life.
- the hex bar available was 28.257mm, and this was substituted to reduce cost. This meant the size of the holes had to be adjusted accordingly in the dxf design files
- the drive shaft (hex bar) was flattened on one end to allow for easier attachment of a driving mechanism (using grub screws)

In an effort to increase the utility in remote situations, the design was modified to use 24V power (supplied by 2 rechargeable, deep-cycle lead acid batteries). The 24V DC motor used was bought new, and a recycled 24V battery charger included to charge from mains as required. Future upgrades to enable solar charging, and grid independence will be undertake.

The entire machine was bolted to a 25mm square section steel frame, and mounted on castors.

Specifications of parts used are here:

parts_and_materials.xlsx