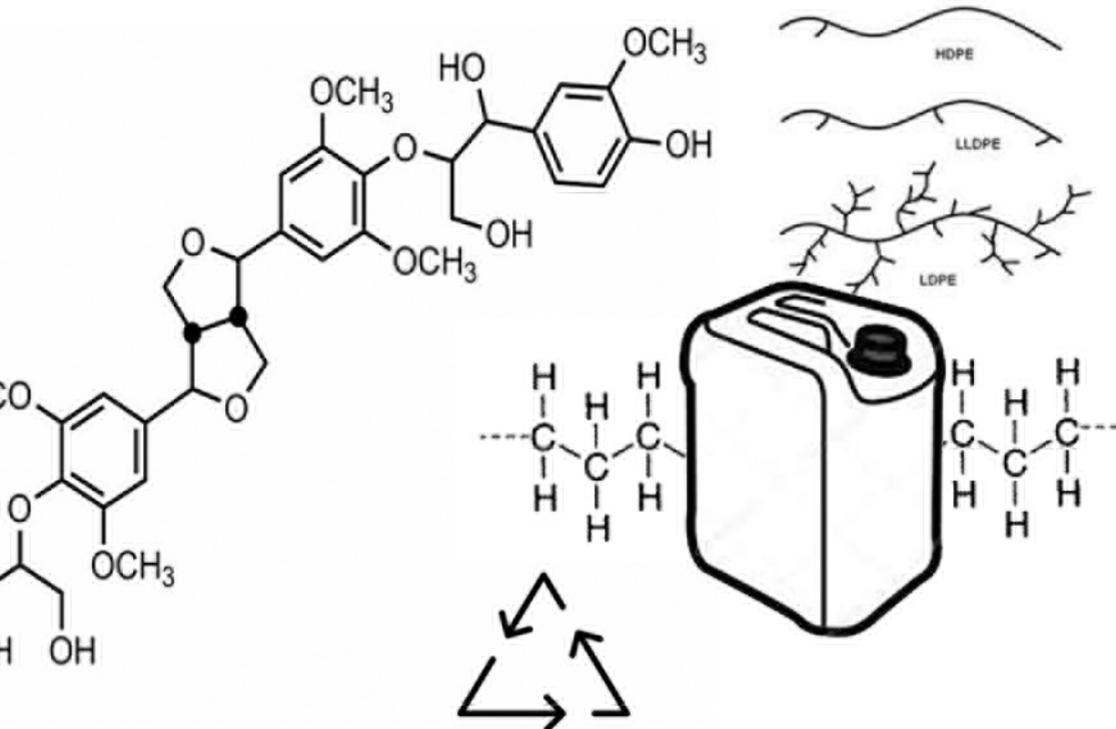


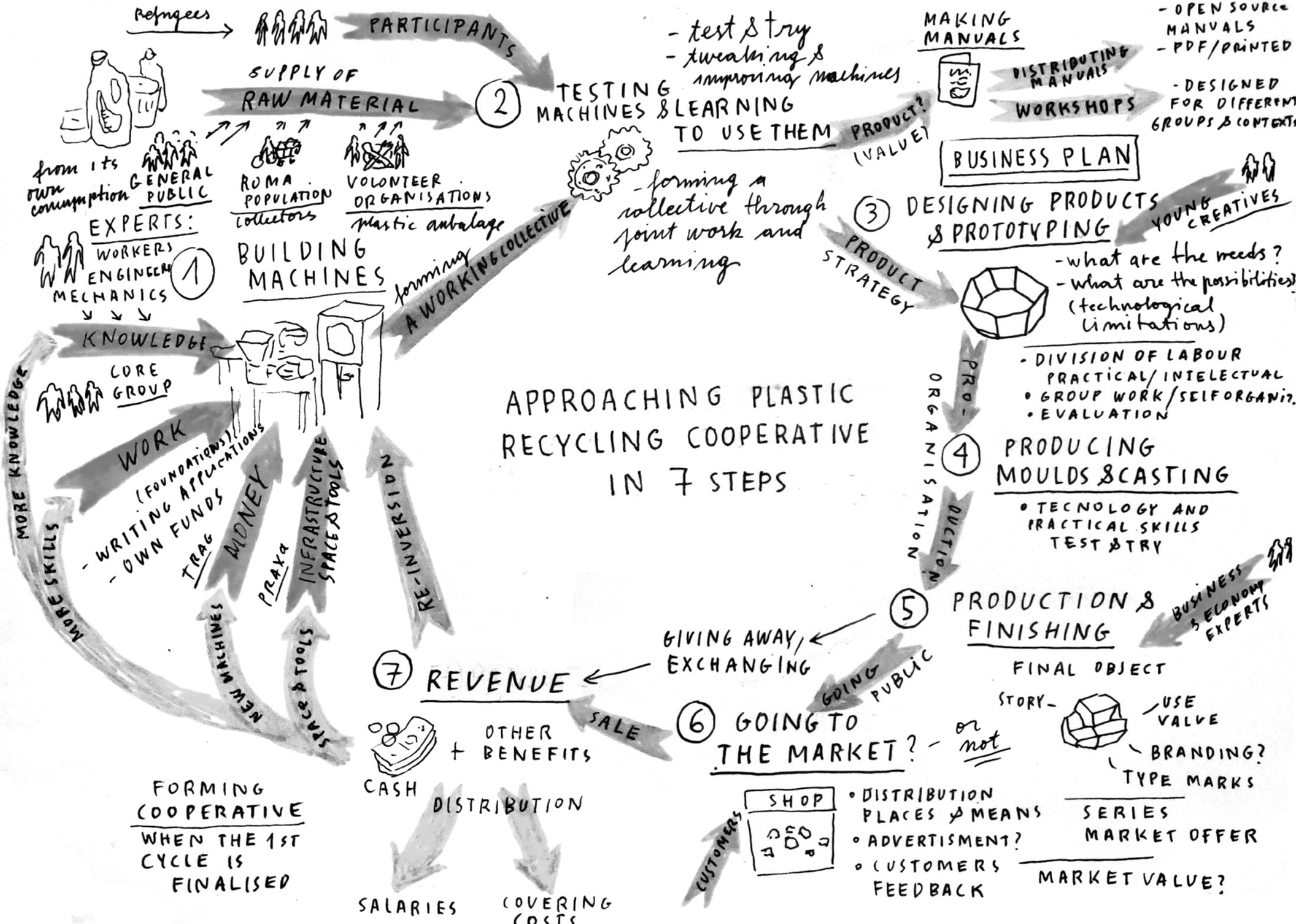
(user manual)



towards equality
through collaborative
productive work



APPROACHING PLASTIC RECYCLING COOPERATIVE IN 7 STEPS



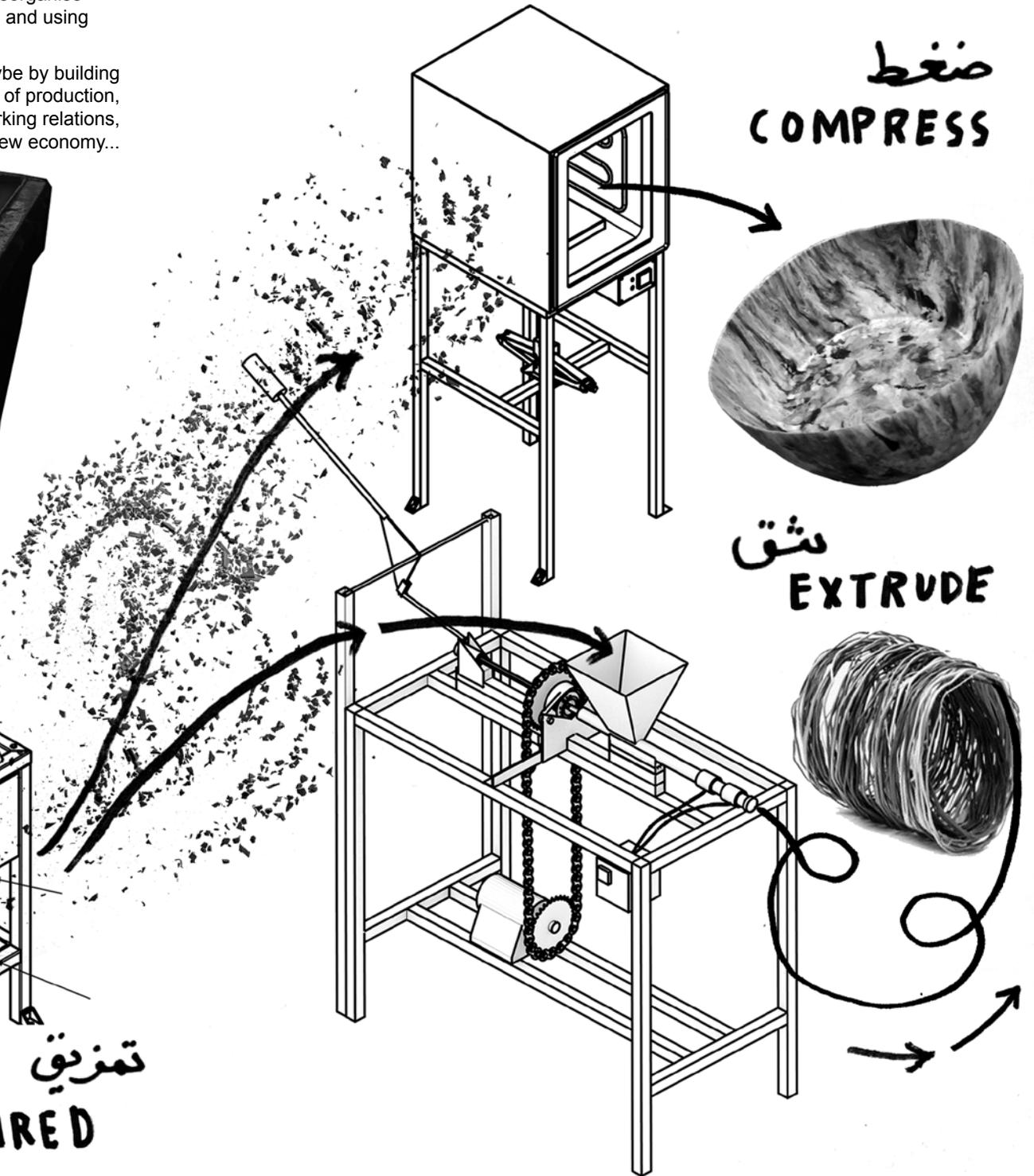
plastic products are mass produced, and cheap to replace by the consumer, resulting in large amounts of disposed plastic. this creates an environmental problem

how we could make plastic valuable again? and how we could reorganise the processes of producing and using things?

... maybe by building our own means of production, new working relations, new economy...



تمزيق
SHRED

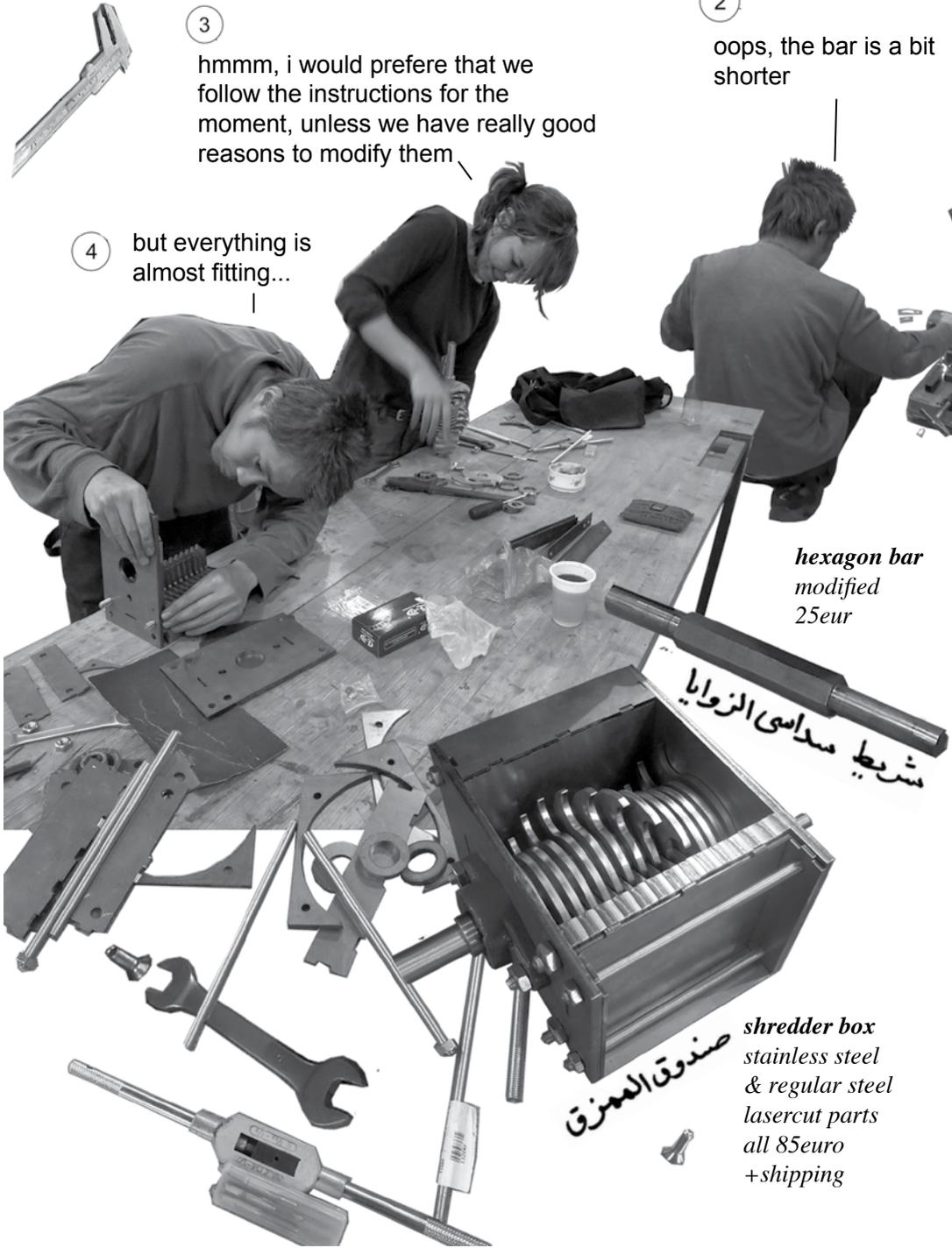


BUILDING SHREDDER /

بناء الممزق

1_the shredder box

صندوق الممزق



③ hmmm, i would prefer that we follow the instructions for the moment, unless we have really good reasons to modify them

④ but everything is almost fitting...

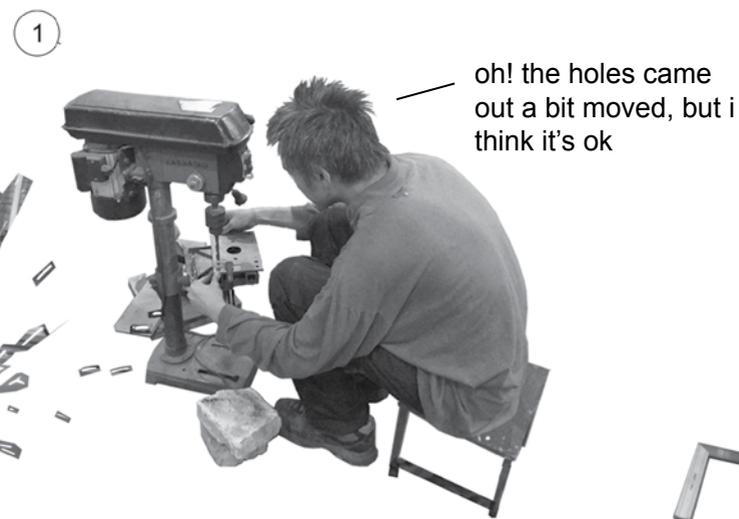
② oops, the bar is a bit shorter

hexagon bar modified 25eur

شريط سداسي الزوايا

shredder box stainless steel & regular steel lasercut parts all 85euro +shipping

صندوق الممزق

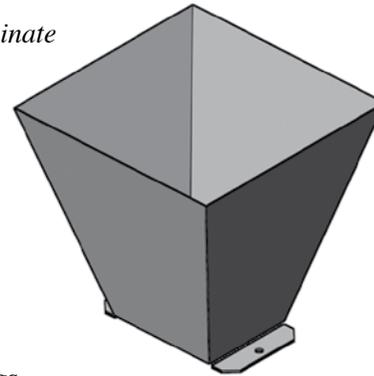


①

oh! the holes came out a bit moved, but i think it's ok

hooper 2mm laminate

هوبر



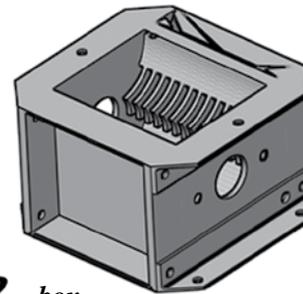
Shredder Box Assembling

2 bearings type UCFL204



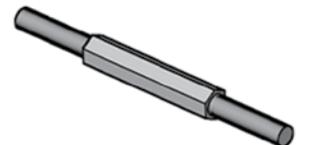
blades stainless steel

سكاكين



صندوق

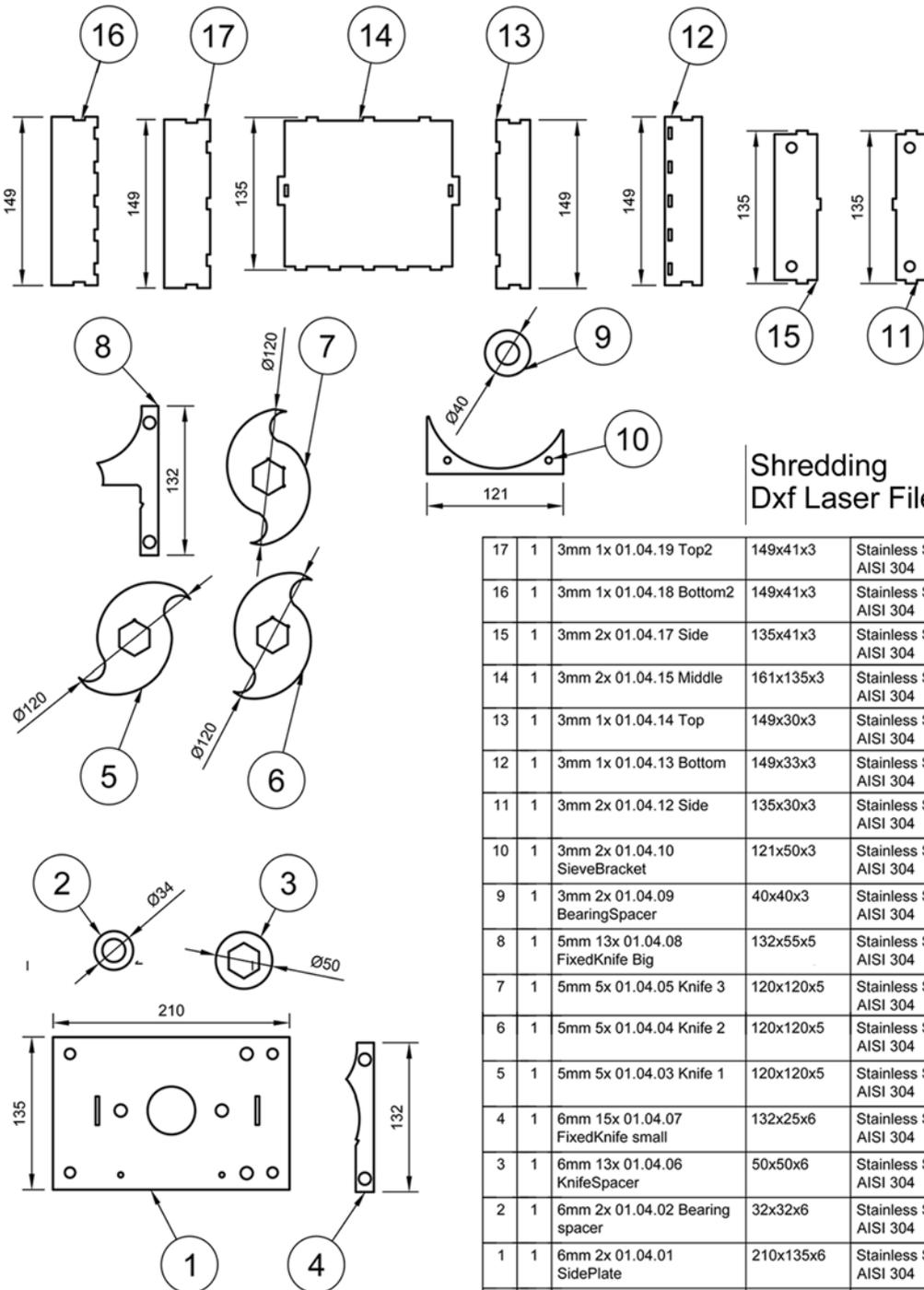
box regular steel



BUILDING SHREDDER /

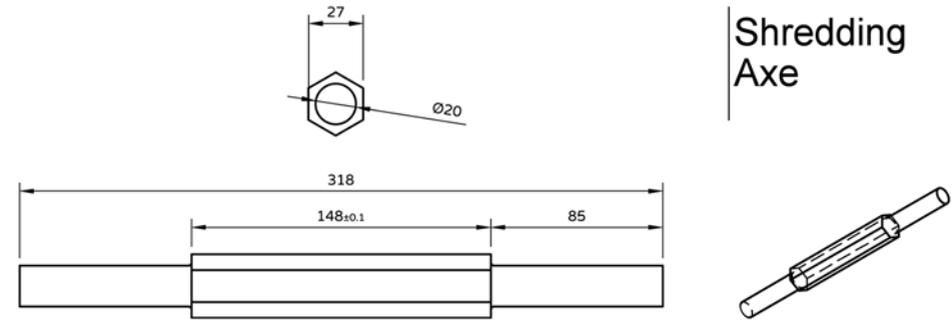
بناء الممزق

خريطة صندوق الممزق 1_shredder box plans

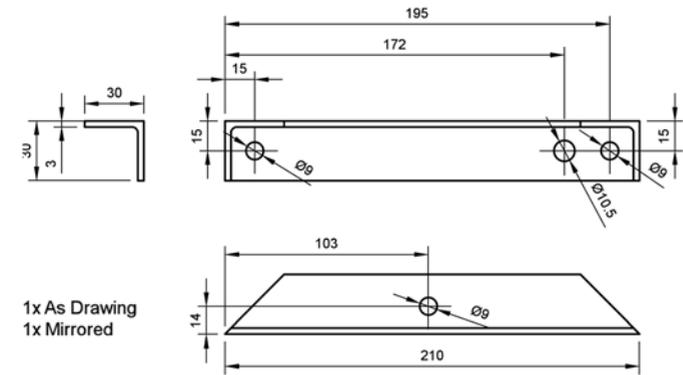
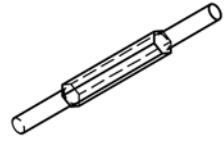


Shredding Dxf Laser Files

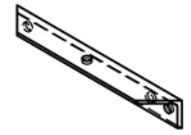
Item	Qty	Part Number	Description	Material
17	1	3mm 1x 01.04.19 Top2	149x41x3	Stainless Steel AISI 304
16	1	3mm 1x 01.04.18 Bottom2	149x41x3	Stainless Steel AISI 304
15	1	3mm 2x 01.04.17 Side	135x41x3	Stainless Steel AISI 304
14	1	3mm 2x 01.04.15 Middle	161x135x3	Stainless Steel AISI 304
13	1	3mm 1x 01.04.14 Top	149x30x3	Stainless Steel AISI 304
12	1	3mm 1x 01.04.13 Bottom	149x33x3	Stainless Steel AISI 304
11	1	3mm 2x 01.04.12 Side	135x30x3	Stainless Steel AISI 304
10	1	3mm 2x 01.04.10 SieveBracket	121x50x3	Stainless Steel AISI 304
9	1	3mm 2x 01.04.09 BearingSpacer	40x40x3	Stainless Steel AISI 304
8	1	5mm 13x 01.04.08 FixedKnife Big	132x55x5	Stainless Steel AISI 304
7	1	5mm 5x 01.04.05 Knife 3	120x120x5	Stainless Steel AISI 304
6	1	5mm 5x 01.04.04 Knife 2	120x120x5	Stainless Steel AISI 304
5	1	5mm 5x 01.04.03 Knife 1	120x120x5	Stainless Steel AISI 304
4	1	6mm 15x 01.04.07 FixedKnife small	132x25x6	Stainless Steel AISI 304
3	1	6mm 13x 01.04.06 KnifeSpacer	50x50x6	Stainless Steel AISI 304
2	1	6mm 2x 01.04.02 Bearing spacer	32x32x6	Stainless Steel AISI 304
1	1	6mm 2x 01.04.01 SidePlate	210x135x6	Stainless Steel AISI 304



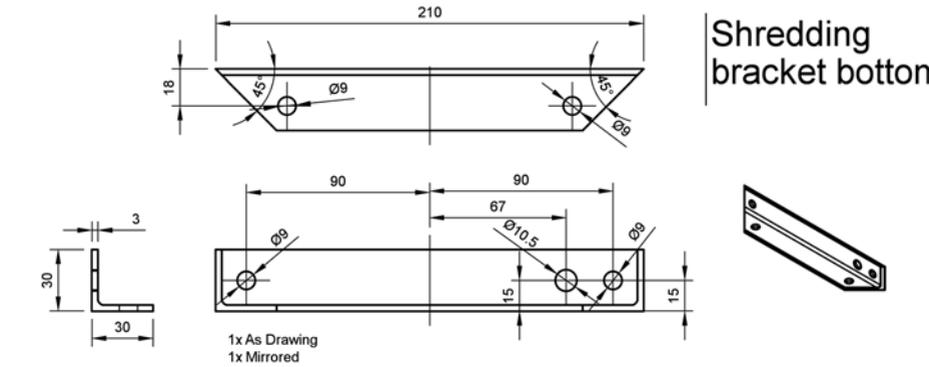
Shredding Axe



Shredding bracket top



Item	Qty	Part Number	Description	Material
1	1	Angle 30x30x3 (1)	L=210	Steel



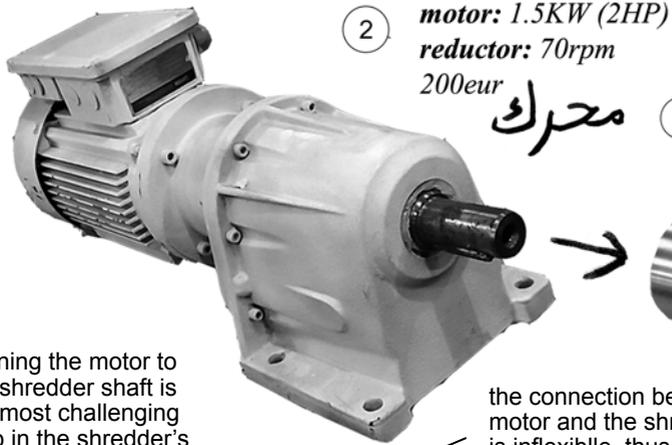
Shredding bracket bottom



Item	Qty	Part Number	Description	Material
1	1	Angle 30x30x3	L=210	Steel

*download link for blueprints: <https://github.com/hakkens/precious-plastic-kit/archive/master.zip>

BUILDING SHREDDER / بناء الممزق



محرك

③ **motor to shredder shaft connector *hard conn.**
60eur



the connection between the motor and the shredder shaft is inflexible, thus correct alignment is necessary to avoid damage

aligning the motor to the shredder shaft is the most challenging step in the shredder's construction because it needs precise positioning

④

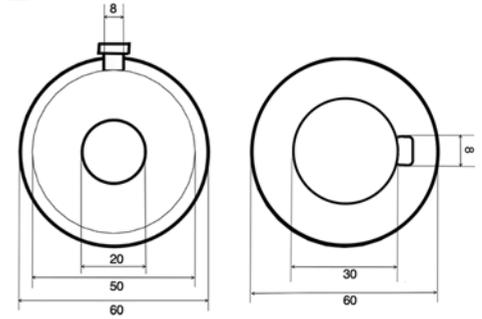
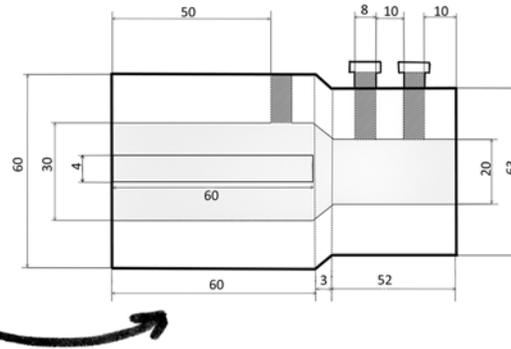


(compulsory use of the goggles while grinding)

①

2_framework & motor connection

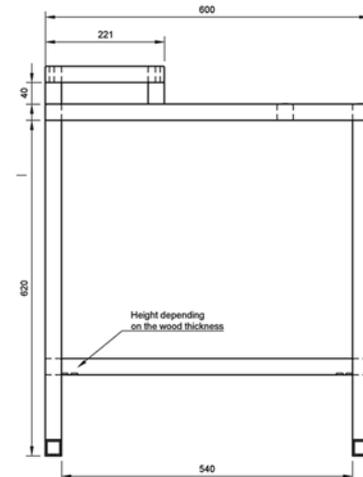
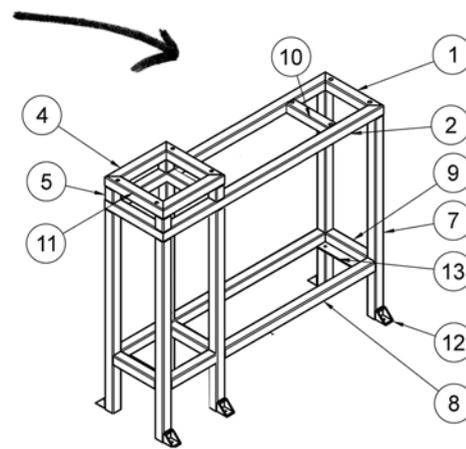
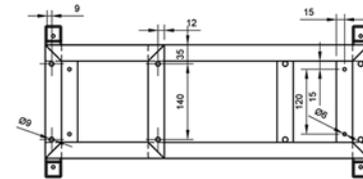
الإطار والاقصال المعرك



13	2	Flat 30x30x3	L=150	Steel
12	4	Tube 30x30x3 (6)	L=35	Steel
11	2	Tube 30x30x3	L=210	Steel
10	1	Tube 30x30x3 (4) (1)	L=150	Steel
9	2	Tube 30x30x3 (4)	L=150	Steel
8	2	Tube 30x30x3 (3)	L=540	Steel
7	4	Tube 30x30x3 (2) (2)	L=620	Steel
6	2	Tube 30x30x3 (2) (1)	L=40	Steel
5	2	Tube 30x30x3 (2)	L=40	Steel
4	2	Tube 30x30x3 (1) (1) (1)	L=221	Steel
2	2	Tube 30x30x3 (1)	L=600	Steel
1	2	Tube 30x30x3	L=210	Steel
Item	Qty	Part Number	Description	Material

Electronics
Motor connector

Framework

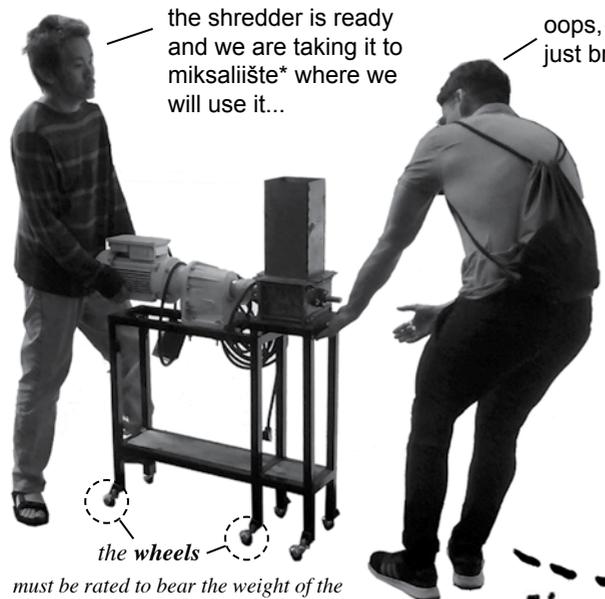


MATERIAL /

مواد

1_sorting & cleaning

الفرز والتنظيف



the shredder is ready and we are taking it to miksalište* where we will use it...

oops, one wheel just broke

(the poster announcing the opening of the workshop was displayed around the neighborhood)

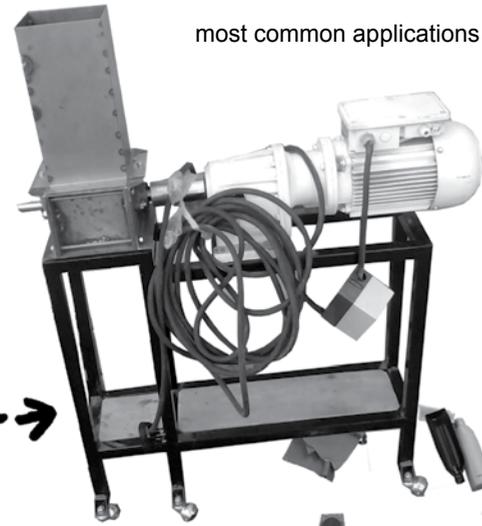
plastic recycling workshop
mini pogon

WORKING HOURS:
Wednesdays
from 4pm to 7pm

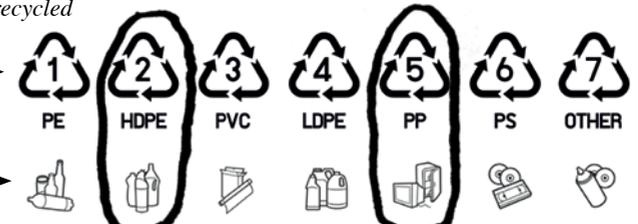
the wheels must be rated to bear the weight of the shredder; our shredder weighed around 100kg and we broke 2 sets of wheels because we bought the wheels by eye

نقل
TRANSPORTING

1st session / Wed. April, 25th
collecting & shredding
plastic types HDPE (2) & PP (5)



plastic typology chart --->
&
most common applications -->



the best results are obtained from HDPE (2) and PP (5) and them we are using

MOSTLY BOTTLE LIDS HDPE

VARIOUS PLASTIC OBJECTS



yes, but till then we have to do all this work manually

i would rather wash it in the washing machine... & make plastic recognition detector



غسل
WASHING



*miksalište - a refugee day center in Belgrade

the motor can be reversed in case of a jam in the shredder

variable frequency drive adapts motor for residential electricity and controls the rotation of the motor - 150eur

bigger plastic pieces have to be broken up to avoid jamming the shredder

sometimes the plastic type mark is so small that is hardly visible

كسر
BREAKING

this work is fun!

فرز
SORTING

yep!



BUILDING COMPRESSOR / بناء الضاغط

regular cooking oven

makes a basic part of the compressor when choosing one it is good to pay attention on the fact that there is different standard sizes; biggest size would allow producing bigger objects but also it will consume more electricity; our oven costed us **15eur** 2nd hand

oven is a bit too small and too old!?

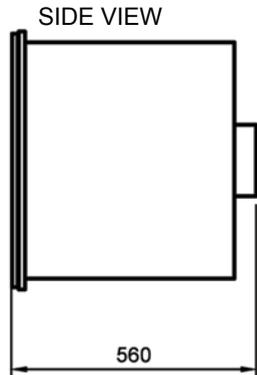
we should take this as a challenge and see what we could do with it

but all other ones were out of Belgrade; only transporting it would cost us 3 x more



oven standard big size

dremel is good for cleaning (not recommended!!)



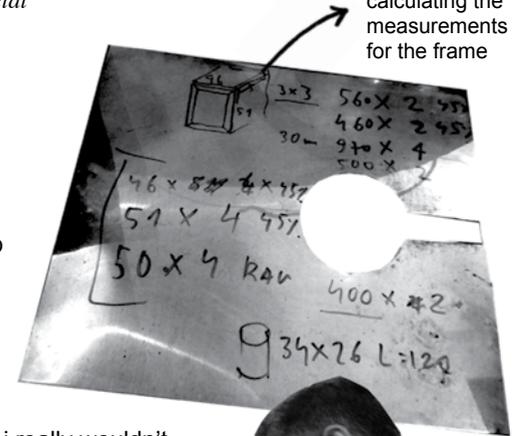
dismantling & cleaning oven

تفكيك وتنظيف الفرن

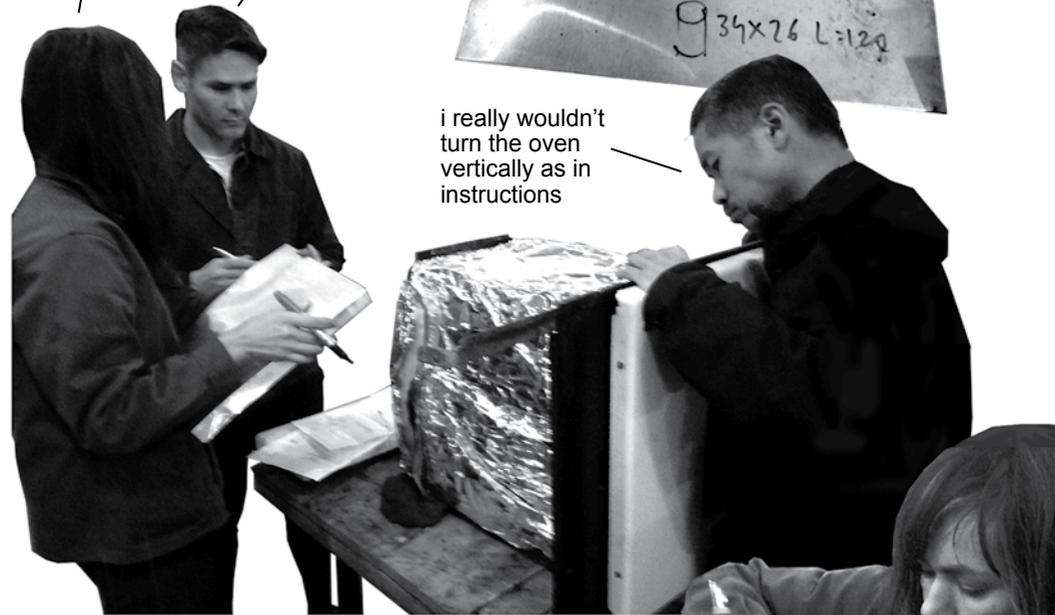
regarding the size of the oven calculations for the supporting metal structure should be made

our oven is smaller than a big standard size so we have to calculate dimensions for our structure

please, lets stick to the original plans

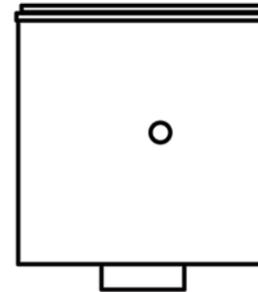
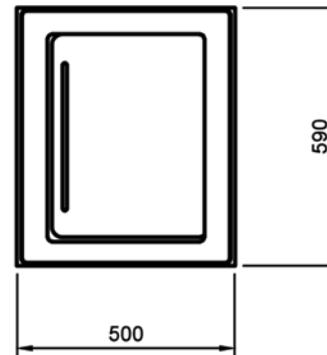


i really wouldn't turn the oven vertically as in instructions



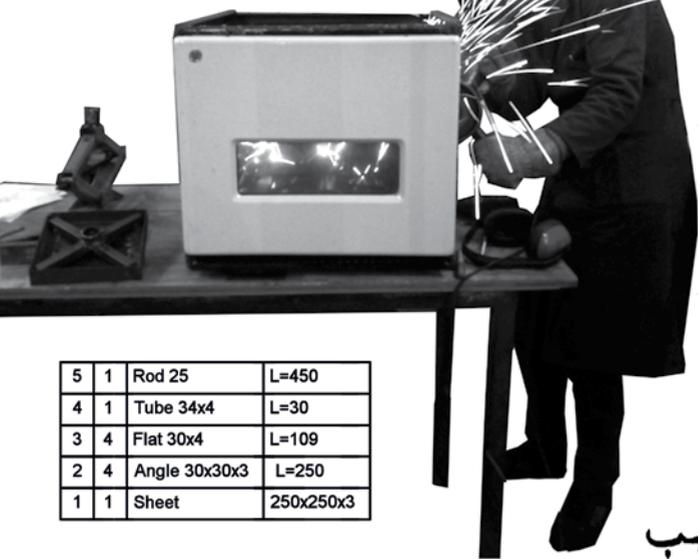
FRONT VIEW

TOP VIEW

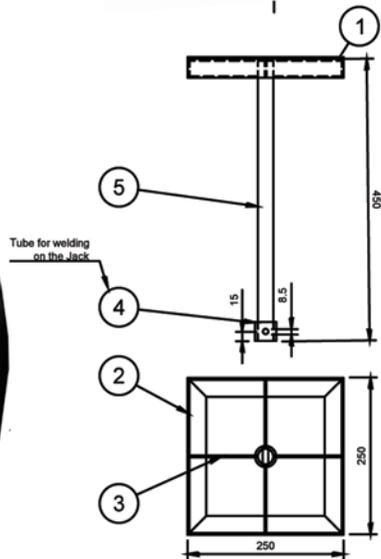


BUILDING COMPRESSOR / بناء الضاغط

the hole is now big enough for the tube to go through



5	1	Rod 25	L=450
4	1	Tube 34x4	L=30
3	4	Flat 30x4	L=109
2	4	Angle 30x30x3	L=250
1	1	Sheet	250x250x3

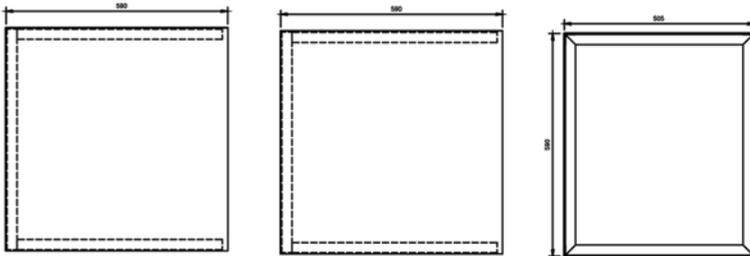


Compression Press

تثقيب

Oven Cover

everything must be polished so the steel panels can fit perfectly on to the frame

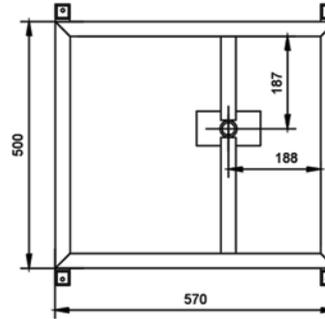


8	4	Angle 30x30x3 (1)	L=545
7	1	Sheet 1mm (2)	505x590x1mm
6	1	Sheet 1mm	505x590x1mm
5	2	Sheet 1mm (1)	590x590x1
4	2	Angle 30x30x3 (2)	L=590
2	2	Angle 30x30x3	L=505



طحين

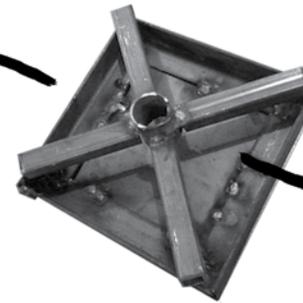
2_oven & framework



12	4	Tube 30x30x3	L=970mm	Steel
11	2	Tube 30x30x3 (3)	L=570	Steel
10	2	Tube 30x30x3 (2)	L=500	Steel
9	1	Tube 30x30x3 (1)	L=170	Steel
8	1	Tube 30x30x3	L=270	Steel
7	4	Tube 30x30x3 (7)	L=35	Steel
6	1	Sheet 3mm	70x130x3	Steel
5	2	Tube 30x30x3 (5)	L=510	Steel
4	1	Tube 30x30x3 (6)	L=440	Steel
1	1	Tube (1)	34x26 L=120	Steel
Item	Qty	Part Number	Description	Material

Framework

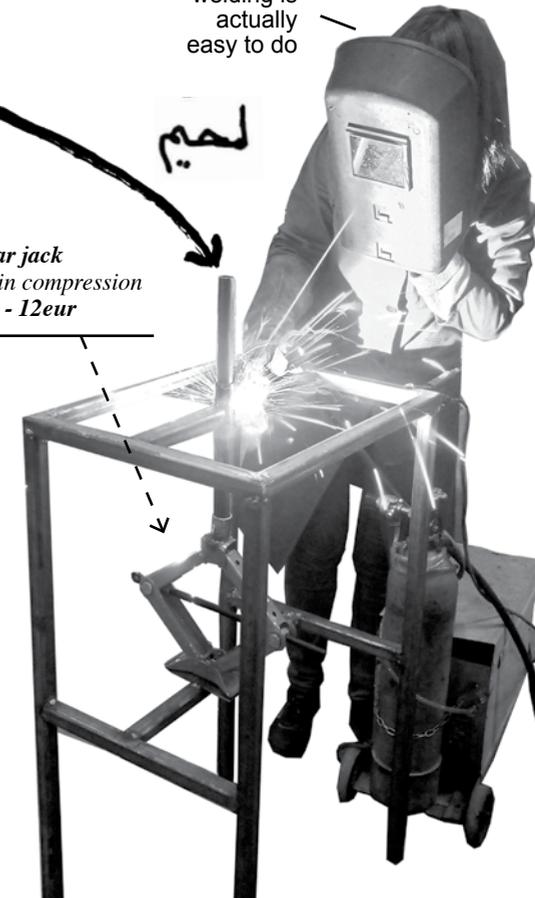
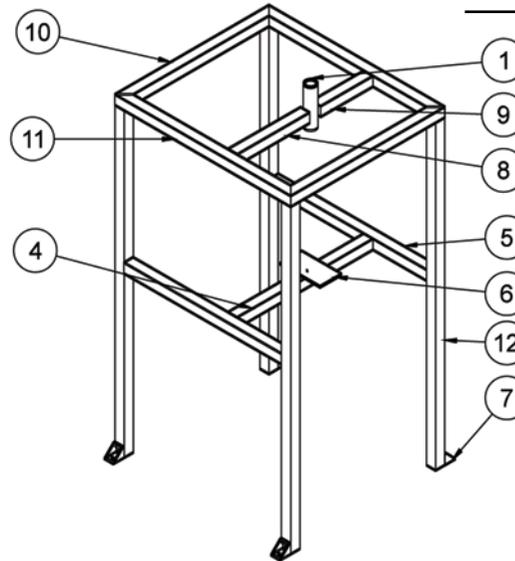
Press table



welding is actually easy to do

لحمي

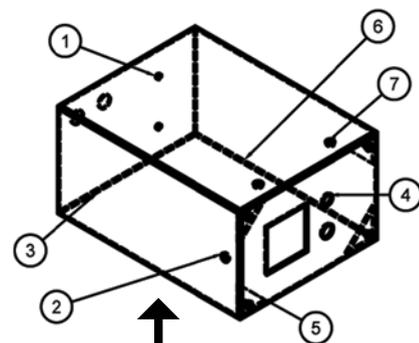
standard car jack used as main compression mechanism - 12eur



BUILDING COMPRESSOR / بناء الضاغط

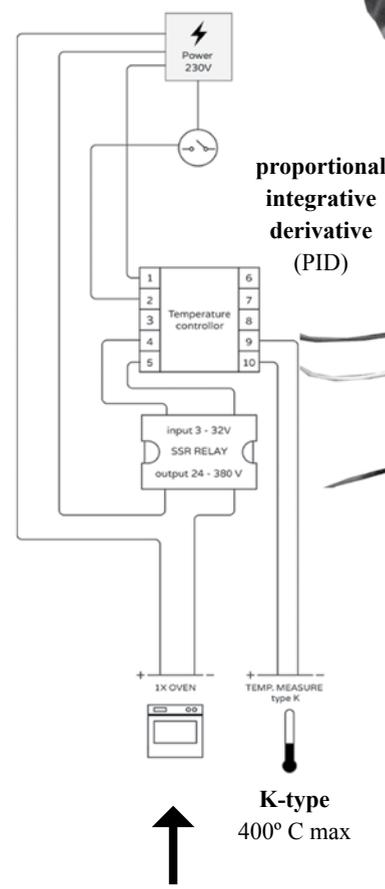


3_insulation & electronics العزل والالكترونيات

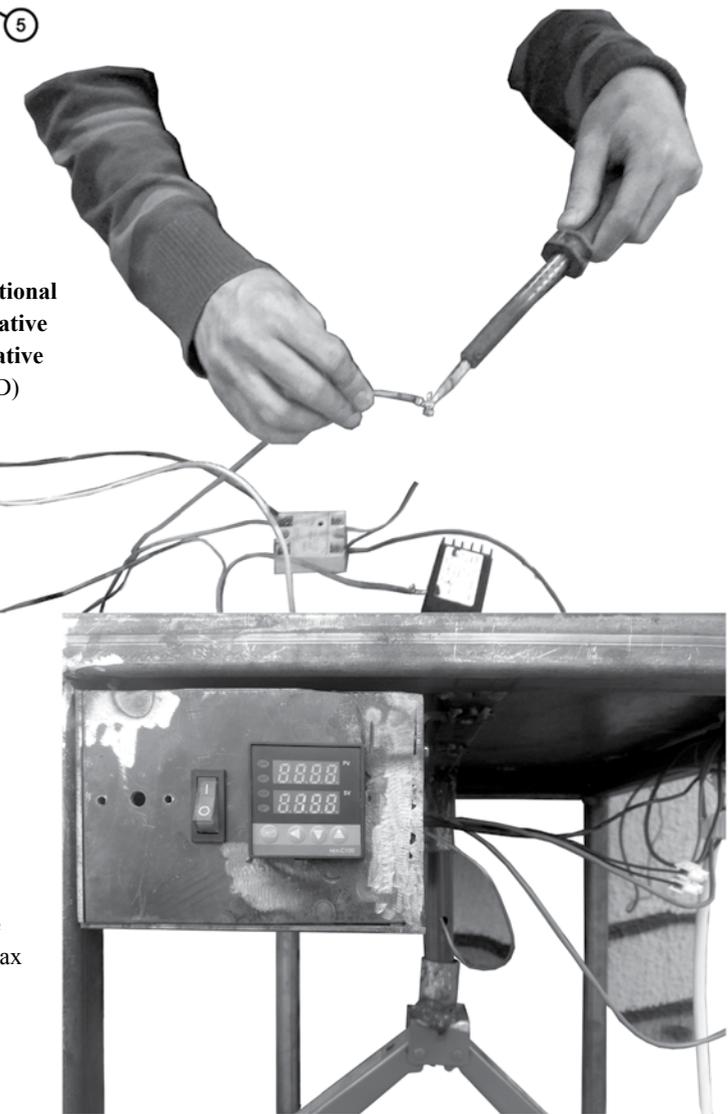


Item	Qty	Part Number	Description	Material
7	1	Top	150x200	Steel
6	1	Side	100x200	Steel
5	4	Bracket	Flat 30x3 -45'	Steel
4	1	Cover (1)	150x100	Steel
3	1	Bottom	150x200	Steel
2	1	Side (2)	100x200	Steel
1	1	Rear	150x100	Steel

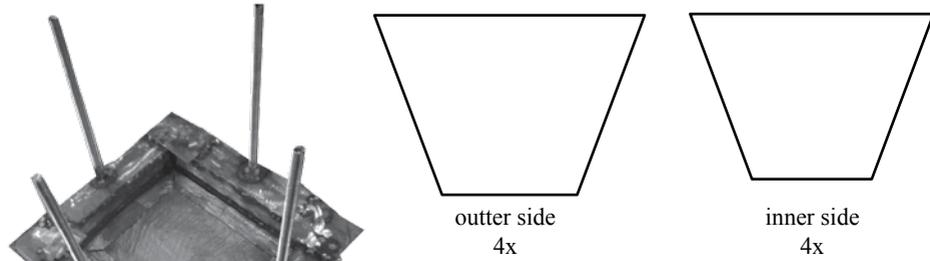
ELECTRONICS BOX



ELECTRIC SCHEME



COMPRESSING /



Trial Mould

it is important to place the mould in the center

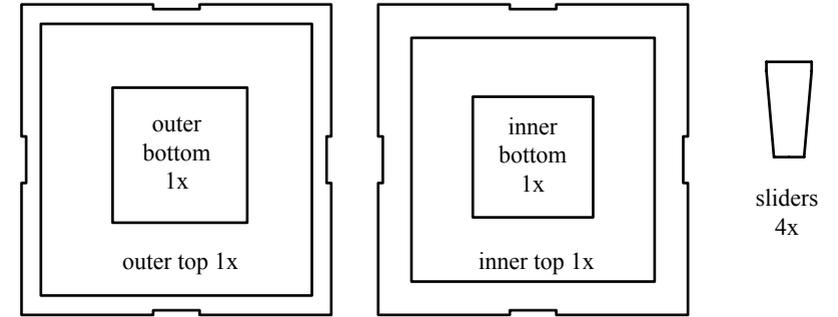
be careful not to raise the temperature excessively, the moulding process takes time



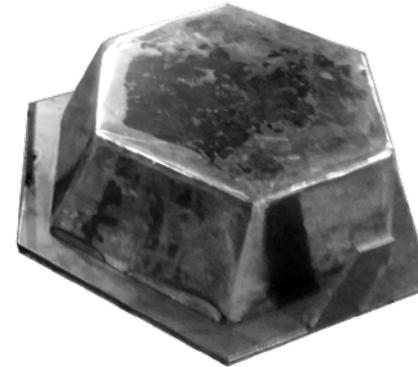
the mould is almost fully compressed, excess plastic will be squeezed out

1_building moulds

بناء قوالب

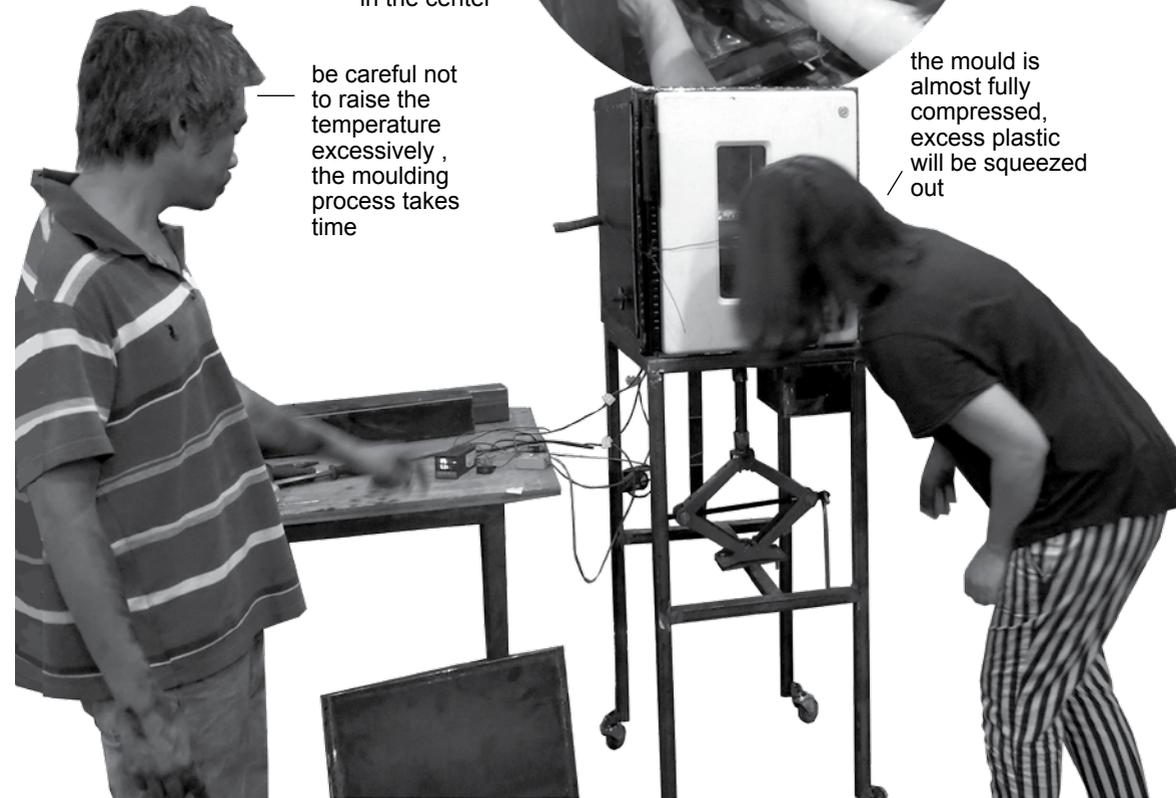


Square Bowl Mould Plans



the edges of the moulds should be joined precisely

HEXAGONAL BOWL MOULD



PRODUCTION /

إنتاج

1_shredding & compressing

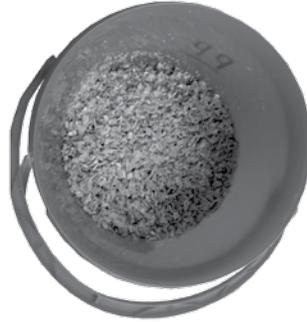
التمزيق و يضغط

girls, who is going to shred next?



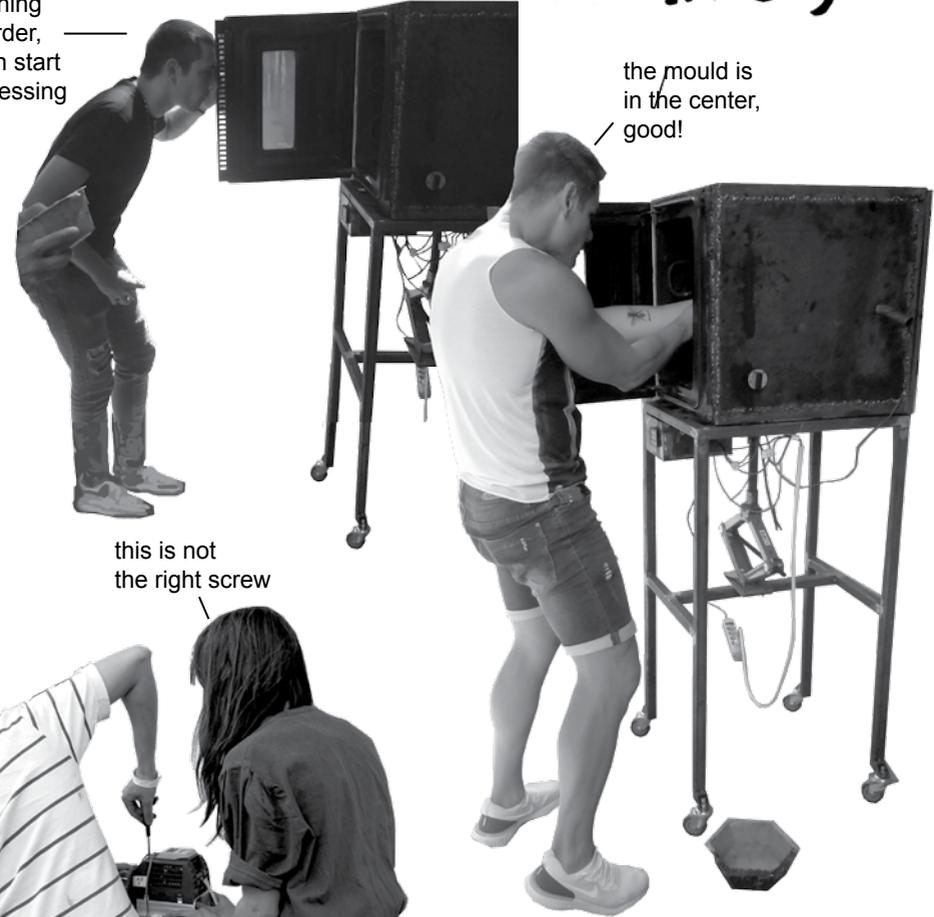
me!

the shredder is working well even with the big plastic parts



everything is in order, we can start compressing

the mould is in the center, good!



what could we make out of this plastic?

shredding is a violent process, cover the hopper to stop flying pieces of plastic

it is!

this is not the right screw

mobile phone cases?

cool



a bit of polishing perhaps?

looks grand

can I try?

BUILDING EXTRUDER /

بناء الطارد

1_mechanic_elements

الأجزاء الميكانيكية

2 bicycle sprockets
one is attached to the motor and
another to the screw

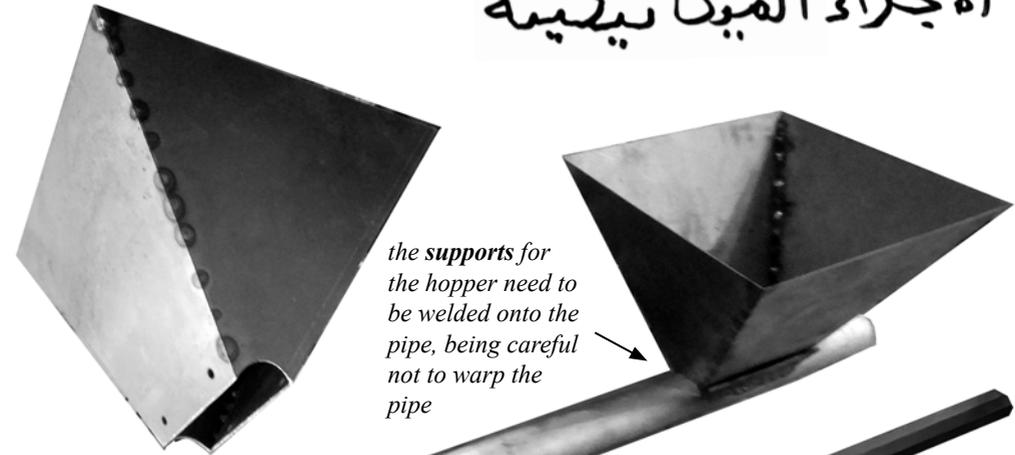
8mm discs
φ120mm 1x
φ40mm 4x

bearing
UCFL308

وضع الكره

القدر

أسنان لعجلة



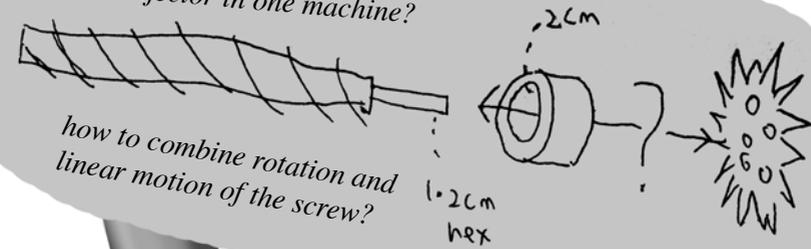
the supports
for
the hopper need to
be welded onto the
pipe, being careful
not to warp the
pipe

pipe φ26/34mm

hopper mounted to the pipe

hexagone shaft 8mm

can we make extruder and
injector in one machine?



how to combine rotation and
linear motion of the screw?

1.2cm
hex

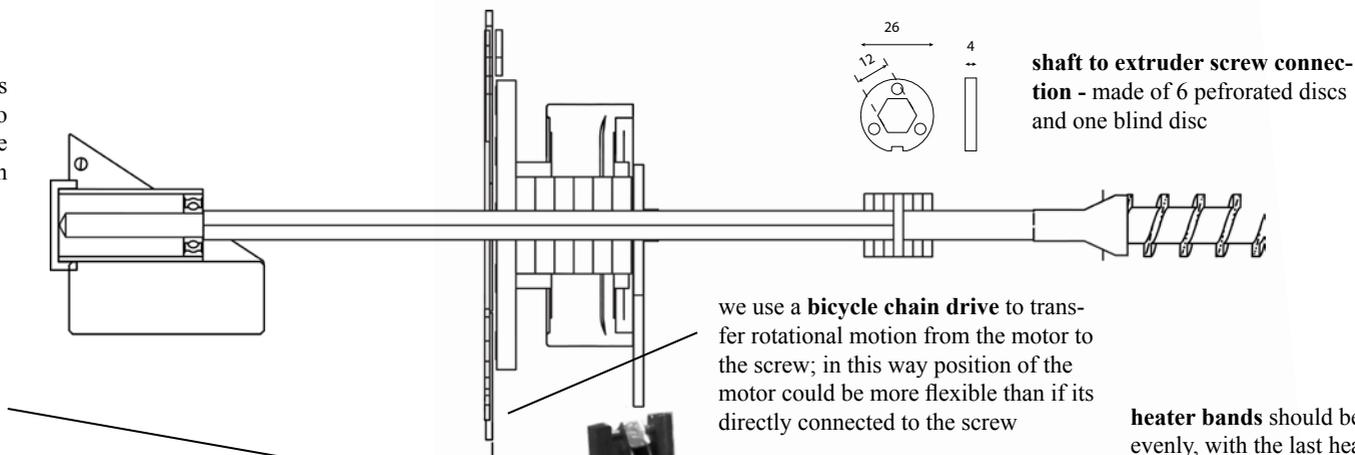
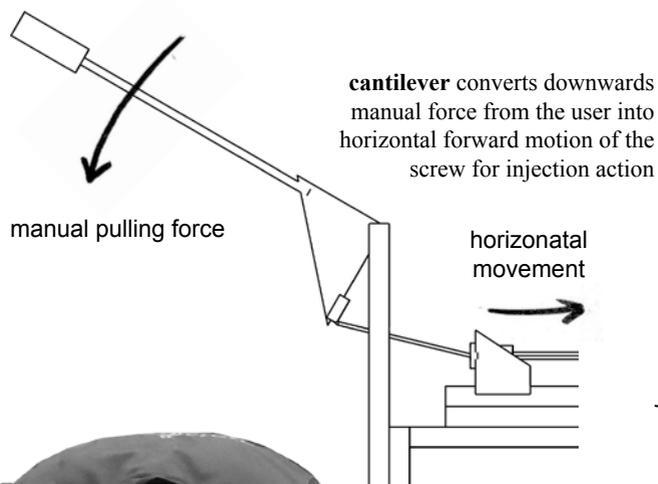


cutting the hole for the hop-
per in the pipe

extrusion screw, برغى البثق
ordered from Philipines, 250eur

BUILDING EXTRUDER /

2_heating_elements&electronics



heating electrical systems and electronics are installed after mechanical assembly

the **chain tensioner** is welded on an appropriate location on the frame to provide tension to the chain and keep the chain engaged to the sprockets

electronic temperature controller regulates the output of electricity to the heaters to maintain a constant temperature

heater bands should be spaced evenly, with the last heater band placed on the edge of the pipe to re-melt plastic and prevent blockage

nozzle - different standard threaded plumbing connectors can be used as the nozzle to create different output cross sections



economic self-sustenance is a base for full integrity and development of every social being. but, in actual capitalist regime of production achieving universal sustenance for everybody is not possible as it requires many to be poor for few to be wealthy. having in mind this intrinsic contradiction of capitalism where self-sustenance and equality are found in opposition to each other, we are taking up the challenge of imagining and putting into practice a new kind of self-sustaining and fair ways of production.

how can we generate equality through the process of collaborative work, given that each of us have different levels of experience in particular areas, different knowledge, and so ways of doing things, so as different needs and ambitions?

how to organise working process where one's own needs and interests will be satisfied simultaneously to the ones of the wider collective?

how do we value the work that has been performed and what has been produced in this collaborative process, and how do we reassign this value to individuals and collective? and in which relation this values stand to monetization?

how these values are shared and distributed, and how they could possibly transcend the limits of the collective? could the experience of collaborative work generate a new social environment which is based on more economically equitable relations?

so, how to deal with the diverse amounts of availability for collaborative tasks, different preferences in types of work and different perspectives on how and what shall be done? we counted over 60 different tasks which have to be performed in order to move our collaborative work forwards: from building and maintaining machines, to accountancy, documenting, editing this manual itself, amongst many others.

these tasks cannot be expected to be performed by a single person, rather the awareness of their totality is cultivated so that there is an understanding and appreciation of everybody's work involved.

working tasks are distinguished by their technical versus organizational natures. technical tasks implies technical skills such as welding, grinding, electric work, but also accountancy, cleaning, etc, while organisational relate to designing, planning, conceptualising. while technical tasks tend to require more manual skills, patience and could result more boring they act as fundamental for organisational tasks. one can't design well a mould without knowing how it could be manually assembled, or one can't make good working plan without knowledge in accounting, etc.

tasks also could be more productive or representational. again, productive tasks are base for representative ones, as representation without production base is vacant.

urged to complete common working tasks co-workers are confronting their different visions and ways of doing. through shared experience of this negotiation, so as consecutive failures and successes everybody involved is offered a possibility to acquire new knowledge which multiplies in group becoming a common sense.

in such organisation of work same working process corresponds to what is being done - the produced object displays as materialisation of totality of relations that have been involved in its production.

also, another question is how to preserve the communal status and function of collaborative work - what is shared, or communicated through which canals, and where all we could spot privatization and corruption of common values?
how to defend commonness?

WORKING TASKS

A. planning:

researching opportunities and collaborators
writing proposals, letters, applications
conceiving working plan
tasks overview and general structure and dynamics
discussing the development & orientation
general communications

B. means of production - building:

planning machine building
technical drawings
research & making orders for machine components & services
building (shredder, compressor, extruder-injector, moulds)
welding
grinding
other mechanical procedures
electronics
bank transfers & payments
updating list of materials on website
transporting, driving, organising the transportation
finding free wasted material

C. production:

collecting and transporting plastic
washing
selecting
shredding
compressing
finishing

D. accountancy:

budget planning (excel)
collecting and tidying invoices
communication with the bank and accountant
other administrative tasks

E. public representation & communication:

photo-documentation
video-documentation
website building
creating textual content
creating graphical content / design
uploading material *MP daytoday (image+text)

maintaining vimeo canal
communication with collaborators & partners
public communication

F. sale & distribution:

preparing product presentation
packaging
certificate
contacting distribution places
transportation
economic transfers
redistributing funds

G. building supportive environment:

maintaining relations with similar organisations and individuals
developing and extending cooperative principles

H. printed material - fliers & posters:

content
design
graphical treatment
distribution

I. educational material / manual:

storyboard
texts
graphical treatment of images
translations
layout
printing
distribution

J. maintenance:

machines
moulds
website
working space
tools

K. misc:

healthy food
good mood

minipogon (MP) was founded in summer 2017 in Belgrade with the idea to explore possibilities of achieving equality and self-subsistence through self-organised and collaborative work processes. We decided to build on the work of the **Precious Plastic (PP)** Community, adapting their blueprints for building plastic recycling machines. Our first machines were fabricated at **Praxa Makerspace (PRAKSA)**, firstly with our own funds, and later with a grant from **Trag Foundation (TRAG FUNDACIJA)**, which was sufficient to build three machines, and operate them in weekly open workshops in **Miksalište (MIKSALIŠTE)**, refugee day center. In September 2018, **MP** is visiting Vienna, where we are setting up a production process in Viktor-Adler-Markt in the framework of **Wienwoche Festival (WIENWOCHEFESTIVAL)**, and presenting machines in the **ARA exhibition (ARA INNOVATION SPACE)**.

Follow the progress of our work:

www.irational.org/minipogon

Write us or get involved:

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Belgrade, summer 2018.

