Towards equality through collaborative productive work.
MAKING MANUAls
- OPEN SOURCE
- PDF/PRINTED
- DESIGNED
- FOR DIFFERENT
- GROUPS & CONTENTS

DISTRIBUTING MANUAls
WORKSHOPS

BUSINESS PLAN
YOUNG CREATIVES

DESIGNING PRODUCTS & PROTOTYPING
WHAT ARE THE NEEDS?
WHAT ARE THE POSSIBILITIES?
(TECHNOLOGICAL
LIMITATIONS)

DIVISION OF LABOUR
PRACTICAL/INTELLECTUAL
GROUP WORK/SELF-ORGANIZ.
EVALUATION

PRODUCING MOULDS & CASTING
TECHNOLOGY AND
PRACTICAL SKILLS
TEST & TRY

PRODUCTION & FINISHING
FINAL OBJECT

GIVING AWAY / EXCHANGING
GOING PUBLIC

GOING TO THE MARKET?
OR NOT

SHOP
CUSTOMERS

DISTRIBUTION
PLACES & MEANS

ADVERTISING?
CUSTOMERS FEEDBACK

SERIES MARKET OFFER
MARKET VALUE?
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...
hmmm, I would prefer that we follow the instructions for the moment, unless we have really good reasons to modify them.

but everything is almost fitting...

Oops, the bar is a bit shorter...

Hexagon bar modified 25eur

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

hooper
2mm laminate

2 bearings
type UCFL204

blades
stainless steel

box
regular steel

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

*download link for the blueprints - https://preciousplastic.com/en/videos/download.html*
BUILDING SHREDDER / بناء الممزق

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

2. **motor**: 1.5KW (2HP)  
   **reductor**: 70rpm 200eur

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

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

4. (compulsory use of the goggles while grinding)

الترجمة العربية:

بناء الممزق

1. **محرك إلى محور الممزق رماد قوي** 60eur

2. **محرك**: 1.5KW (2HP)  
   **المزيدر**: 70rpm 200eur

إذا ما كان من الصعب التواصل بين المحرك والممزق فقد يكون من الصعب أيضًا وضعه بدقة لأن محور الممزق صلب.

3. الاتصال بين المحرك والممزق صلب أيضًا، لذا فإن ضبط الوضع بشكل صحيح يمنع أية أضرار.

4. (الاستخدام الإجباري لل משجاع أثناء المزحة)
2. Framework & Motor Connection

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</table>

Electronics
Motor connector

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

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

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

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

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

* miksaštite - a refugee day center in Belgrade

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

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

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

translating

breaking

this work is fun!
1_sorting & cleaning

all plastic items belong to a particular type of plastic and are labeled with the appropriate number and abbreviation so that they can be recycled

plastic typology chart

&

most common applications

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

and then we are using

MOSTLY BOTTLE LIDS
HDPE

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

yep!

I would rather wash it in the washing machine...

& make plastic recognition detector

WASHING
BUILDING COMPRESSOR

A regular cooking oven makes a basic part of the compressor. When choosing one, it is good to pay attention to the fact that there is a different standard size; the biggest size would allow producing bigger objects but also it will consume more electricity. Our oven costed us 15eur 2nd hand.

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

The oven is a bit too small and too old! We should take this as a challenge and see what we could do with it.

dremel is good for cleaning (not recommended!!)

SIDE VIEW

oven standard big size

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.

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

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

dremel is good for cleaning (not recomended!!)

560
dismantling & cleaning oven

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, let's stick to the original plans.

I really wouldn't turn the oven vertically as in instructions.

Calculating the measurements for the frame regarding the size of the oven calculations for the supporting metal structure should be made.
BUILDING COMPRESSOR

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

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

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<td>Sheet</td>
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Compression Press

Oven Cover

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<tr>
<td>2</td>
<td>2</td>
<td>Angle 30x30x3</td>
</tr>
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</table>
2_oven & framework

welding is actually easy to do

standard car jack used as main compression mechanism - 12eur
we are replacing the original insulation with new and more efficient materials

compress the insulation well, to close this side!

it is so thick

...and don’t forget to leave space for the wiring
3_insulation & electronics

ELECTRONICS BOX

proportional integrative derivative (PID)

K-type
400°C max

ELECTRIC SCHEME
COMPRESSING /

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

it is important to place the mould in the center.

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

Trial Mould

outer side
4x

inner side
4x
1_building moulds

Square Bowl Mould Plans

HEXAGONAL BOWL MOULD

the edges of the moulds should be joined precisely
girls, who is going to shred next?

me!

the shredder is working well even with the big plastic parts.

what could we make out of this plastic?

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

mobile phone cases?

can I try?

cool
1_shredding & compressing

everything is in order, we can start compressing

the mould is in the center, good!

this is not the right screw

it is!

a bit of polishing perhaps?

looks grand
BUILDING EXTRUDER /

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

8mm discs
φ120mm 1x
φ40mm 4x

 bearing
UCFL308

can we make extruder and injector in one machine?

how to combine rotation and linear motion of the screw?

extrusion screw, ordered from Philippines, 250eur
the supports for the hopper need to be welded onto the pipe, being careful not to warp the pipe.

hopper mounted to the pipe

pipe Ø26/34mm

hexagon shaft 8mm

cutting the hole for the hopper in the pipe
**BUILDING EXTRUDER /**

A *cantilever* converts downwards manual force from the user into horizontal forward motion of the screw for injection action.

*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.

An *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

we use a bicycle chain drive to transfer rotational motion from the motor to the screw; in this way position of the motor could be more flexible than if its directly connected to the screw

shaft to extruder screw connection - made of 6 perforated discs and one blind disc

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 a full integrity and development of every social being. but, in actual capitalist regime of production achieving universal sustenance for everybody is not possible as capitalism is based on competition and extraction of profit - it requires many to be poor for few to be wealthy. having in mind this intrinsic contradiction of capitalism where individual struggle for achieving self-sustenance and providing general equality for everybody are found on the opposite sides, in minipogon we are taking up the challenge of experimenting and putting into practice a new kind of production relations oriented towards both achieving economic self-sustenance and social equality.

from there different questions are raised:

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? and as a consequence has formed 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 the to individuals and collective? and this values at all could compete on the capitalist market which we depend upon for providing basic self-sustenance for ourselves?

how jointly produced values get distributed so that they transcend the limits of the working collective? could the experience of collaborative work generate a new social environments which would function as a base and support for developing socially and economically more equitable relations?

also, 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 shell 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.
those tasks cannot be expected to be performed by a single person, rather the awareness of their totality is cultivated in our group so that there is an understanding and appreciation of everybody’s work involved.

we distinguish tasks by their technical versus organizational natures. technical tasks implies manual and practical skills such as welding, grinding, electric work, but also accountancy, cleaning, etc, while organisational concerning more of intellectual abilities relate to designing, planning, conceptualising, etc. while technical tasks tend to require more patience and could result more boring they actually 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. urged by efficiency of production and extracting more profit division of labour in capitalism imposes intellectual labour to the manual, so generating hierarchies and class divisions. organisational tasks also tend to accumulate more social agency by performing representation of the work done by others. but, as we know, representation without productive base remains vacant. in the minipogon we, on the contrary try to organise work from the material base giving priority to the practical tasks.

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 starts to correspond to what is being done - the produced objects display as materialisations of totality of relations that have been involved in their production. even more, once acquired and put in use by the third parties they continue to ‘work’ as the promoters of the relations which brought them into existence.

also, another question is how to preserve the communal status 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 social network channels (Vimeo, FB, ...)
communication with collaborators & partners
public communication
community radio

F. product development and distribution
product design
product certificate - ‘denomination of origin’
research & contact distribution places
redistribution of created values (monetary and symbolic)
transportation
bank transfers and operations

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 music
good mood
In our studio located in the Krnjača Refugee Camp in the outskirts of Belgrade we developed production of diverse useful objects from the recycled plastic. All products are half manually-half-machine manufactured, so each of them is unique in colours and shape. By purchasing our products you are also economically supporting camp interns, mostly young refugees from Afghanistan and Pakistan who other ways could not get any economic income, and also supporting efforts we are putting in building more environmentally and socially respectful working relations.

**OUR PRODUCTS /**

Our products and services you can order via:

- **Precious Plastic Bazar:**
  bazar.preciousplastic.com/

- **Email / PayPal account:**
  minipogon@gmail.com

- **FB:** Minipogon

- **Or check for more offers on:**
  irrational.org/minipogon/products

*shipping costs not included

**BOWLS & POTS /** produced in compression machine / HDPE or PP plastic /

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<tr>
<td>18x18x15cm</td>
<td>1x=25eur</td>
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<td>500gr</td>
<td>3x=60eur</td>
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**OFFICE & ACCESSORIES /** produced in sheet press / HDPE or PP plastic /

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<tr>
<td>7x9x1cm</td>
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<table>
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</tr>
<tr>
<td>A5 size</td>
<td>1x=8-12eur</td>
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<tr>
<td>B5 size</td>
<td>3x=20-30eur</td>
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Price:
- 1x=30eur
- 3x=70eur

Price:
- piece=4eur
- pair=7eur

Price:
- 1x=25eur
- 3x=60eur

OVAL
- 20x20x5cm
- 600gr

Price:
- 1x=30eur
- 3x=70eur

HEXAGONAL
- 20x20x5cm
- 550gr

Price:
- 1x=25eur
- 3x=60eur

WALL WATCH
- 22x22x5cm
- 250gr

Price:
- 1x=25eur
- 3x=60eur

We can conduct workshops in building any of the machines so as general introductory workshops into the process and accessible technologies of plastic recycling. Conditions to be negotiated.
The idea of minipogon (MP) starts to develop in summer 2017 in Belgrade as a small production unit aimed to explore different production relations capable of providing self-subsistence and economic equality through self-organised and collaborative work. Deciding to build our infrastructural base on the work of the Precious Plastic Community we are adapting their blueprints for building machines for processing recycled plastic. First machines get fabricated at Praksa Makerspace (PRAKSA), at first with our own means, and later with a grant of Trag Foundation (trag), which was sufficient for completing three machines and operating them in weekly open workshops in Miksalište (MIKSALIŠTE), refugee day center. In September 2018 MP visits Vienna’s Viktor-Adler-Markt setting up the whole production process in the framework of Wienwoche Festival (Wienwoche), and displays machines in the Circular Economy Exhibition (CIRCULAR SPACE). From October 2018 our studio is more permanently installed in Krnjača refugee camp in Belgrade outskirts, where our work continues thanks to the Research&Development Grant of European Cultural foundation (EU) and lots of people who are collecting disused plastics and joining us in the work.

Follow the progress of our work: www.irational.org/minipogon
Write us or get involved: minipogon@gmail.com / minipogon@irational.org

Belgrade February 2019