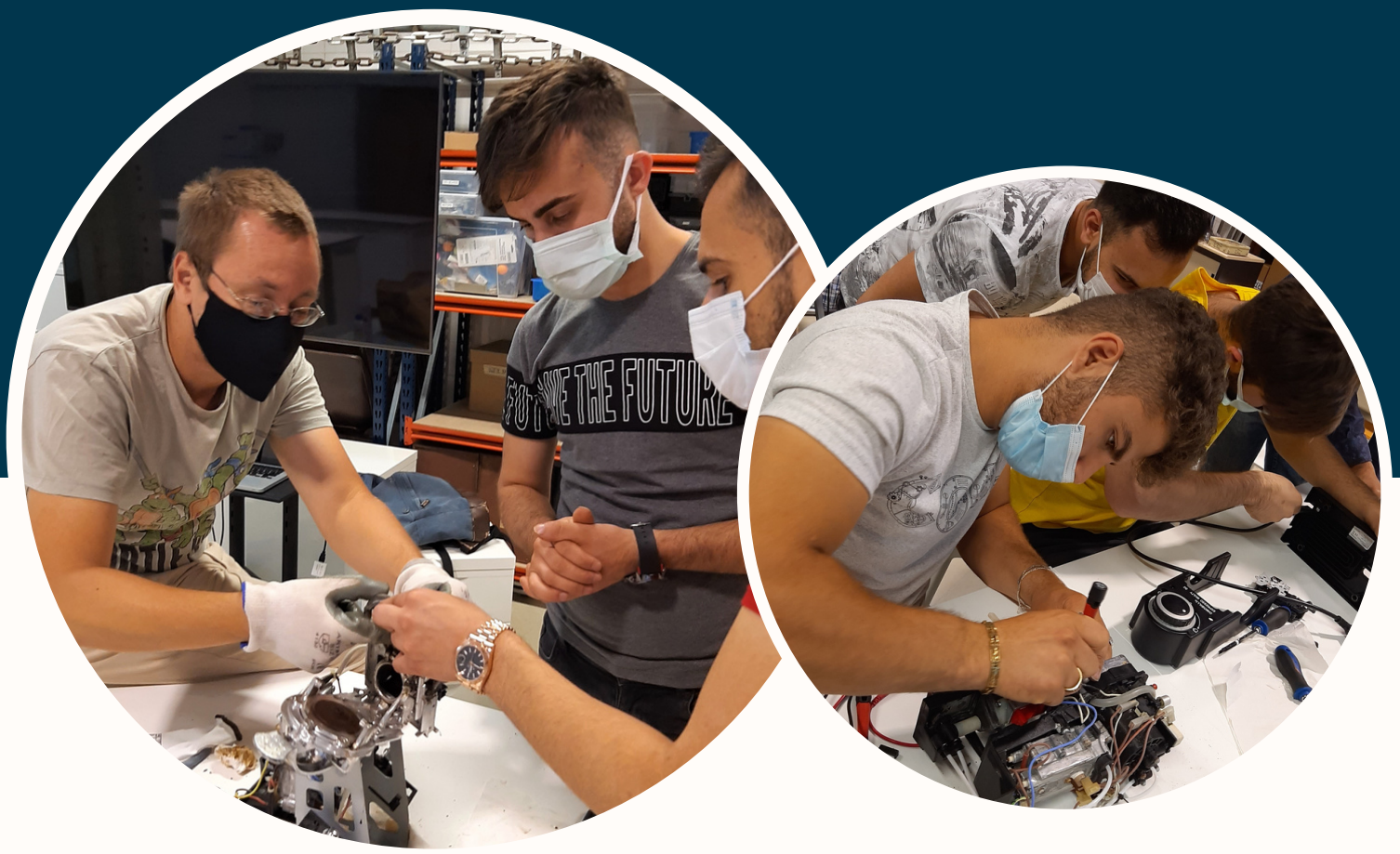
LIVING MORE SUSTAINABLE LIVES: CIRCULAR SOLUTIONS FOR REFUGEES´ INTEGRATION IN EUROPE

2020-1-PT01-KA204-078418



MODULE ON REPAIR

CIRCULAR SOLUTIONS
for refugees' integration in Europe

Co-funded by the Erasmus+ Programme of the European Union

CPR

Circular Economy Portugal

AccemLESS ONLUS • IMPRESA SOCIALE

euroTRAINING

kisa

INDEX

ABOUT THE PROJECT

The project aims to support the socio-economic integration of refugee people arriving in Europe, through the acquisition of skills in circular solutions and recycling techniques.

Within the scope of the Living more sustainable lives project, workshops on sustainable gastronomy, circular fashion, upcycling and repair of small appliances were implemented through activities developed in Portugal, Spain, Cyprus, Italy and Greece, with the participation of six international partners, under the coordination of the Portuguese Refugee Council.

At the end of the project, a Circular Economy Curriculum is presented, aimed at refugee and migrant populations.

“IF IT’S BROKEN, FIX IT AND MAKE IT BETTER.”

THE REPAIR MANIFESTO
PLATFORM 21, 2009

I- INTRODUCTION

The Module on Repair aims to guide trainers to develop a workshop on how to do a diagnosis and perform a repair focusing on EEE. The term "EEE" is going to be used to describe Electrical and Electronic Equipment which is defined as appliances that are:

-"dependent on electric currents or electromagnetic fields to work properly: the equipment needs electric current or electromagnetic fields (not petrol or gas) to fulfil its basic function. So when the electric current is off, the equipment cannot fulfil its basic function;

-for generating, transferring and measuring these current and fields;

-designed for use with a voltage rating 1,000 volts or less for alternating current, and 1,500 volts or less for direct current"[1].

EEE are divided in 10 categories:

1) Large household appliances cold and non-cold (LHA);

2) Small household appliances (SHA);

3) IT Equipment and Telecommunications;

4) Consumer equipment;

5) Lightning Equipment;

6) Electrical and electronic tools;

7) Toys, leisure and sports;

8) Medical devices;

9) Monitoring instruments and control;

10) Automatic dispensers.[2]

[1] Reference: https://www.gov.uk/government/publications/electrical-and-electronic-equipment-eee-covered-by-the-weee-regulations/electrical-and-electronic-equipment-eee-covered-by-the-weee-regulations#definition-of-eee

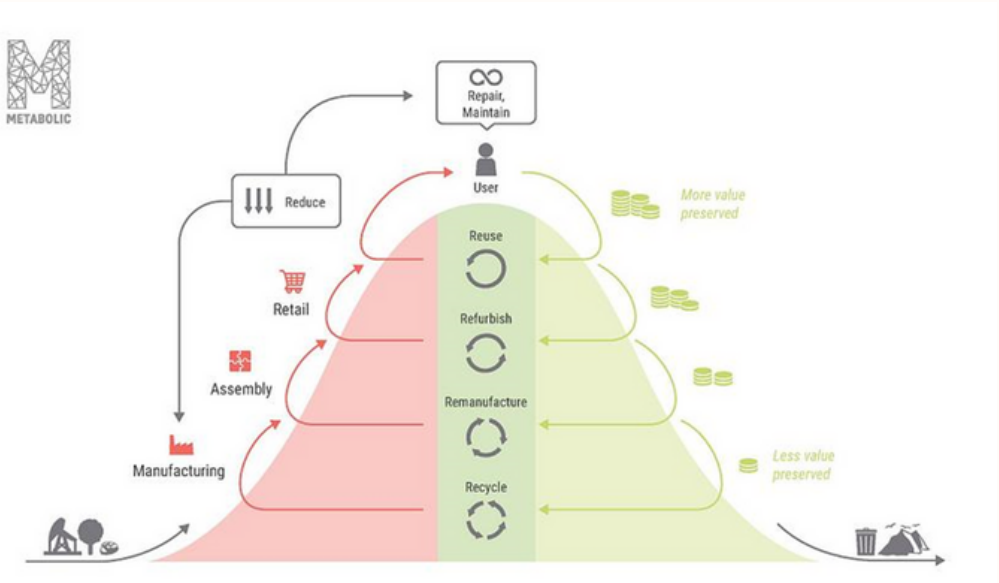
[2] Reference: http://eco3e.eu/regulations/weee-regulation/#1.1

Repair is needed in order to extend products life spans.

Modern societies are based on a linear model, in which we buy products and eventually dispose those at the end of their life spans. Transforming this model into a circular one has several challenges, namely it depends on the environmental responsibility of all those involved in the life cycle of electrical and electronic equipment (EEE), from the producers, passing to distributors and finalizing in the waste management operators.

Commercial repair is a well established as part of the global economy. Yet, it is essential to create incentives that go beyond this, especially since most commercial repair is only offered within the usual two years guarantee that all new products have at the moment they are bought.

In order to apply the principles of circular economy, the change of mindset is crucial: this also means raising awerness about the possibilities for repair beyond the usual two years guarantee, as well as fostering a culture of repair and autonomy for each individual not to be afraid to try and repair their household goods, before replace them with new ones.



An adaptation of the Value Hill Model to include the 9R Framework. Buren, N., Demmers, M., Heijden, R., & Witlox, F. (2016). Towards a Circular Economy: The Role of Dutch Logistics Industries and Governments. | Circle Economy, Het Groene Brein, Nuovalente, Sustainable Finance Lab, TU Delft (2016). Master Circular Business With The Value Hill. | Kirchherr, J., Reike, D. & Hekkert, M. (2017). Conceptualizing the Circular Economy: An Analysis of 114 Definitions. | Potting, J., Hekkert, M., Worrell, E., & Hanemaaijer, A. (2017). Circular Economy: Measuring Innovation in the Product Chain.

In the last decade, several movements from the civil society have appear, focusing on organizing local events in their respective communities, contributing to the changing of mindset and encouraging a culture of repair.

Those events can be called either “Repair Café”, “Repair parties” or “Restart Parties”.

The “Repair Café” is an event that is now disseminated all over Europe and that greatly contributes to foster the culture of repair. This is a free community event firstly created in The Netherlands in 2009, after which spread all over the world. Europe, for example is now hosting more than 1925 similar events.

This informal event is promoted as a fun and relaxed activity, where expert volunteers get together with people who have the will to repair and wish to learn, stimulating the joint repairing of objects. The objects that can be repaired vary from small household appliances to electronic devices, furniture and clothes, depending on the expert volunteers’ knowledge.

In the same year of 2009, the Amsterdam-based collective called “Platform21” proposed the Repair Manifesto (page 7), which calls for designers all over the world to produce goods that consumers can easily repair.

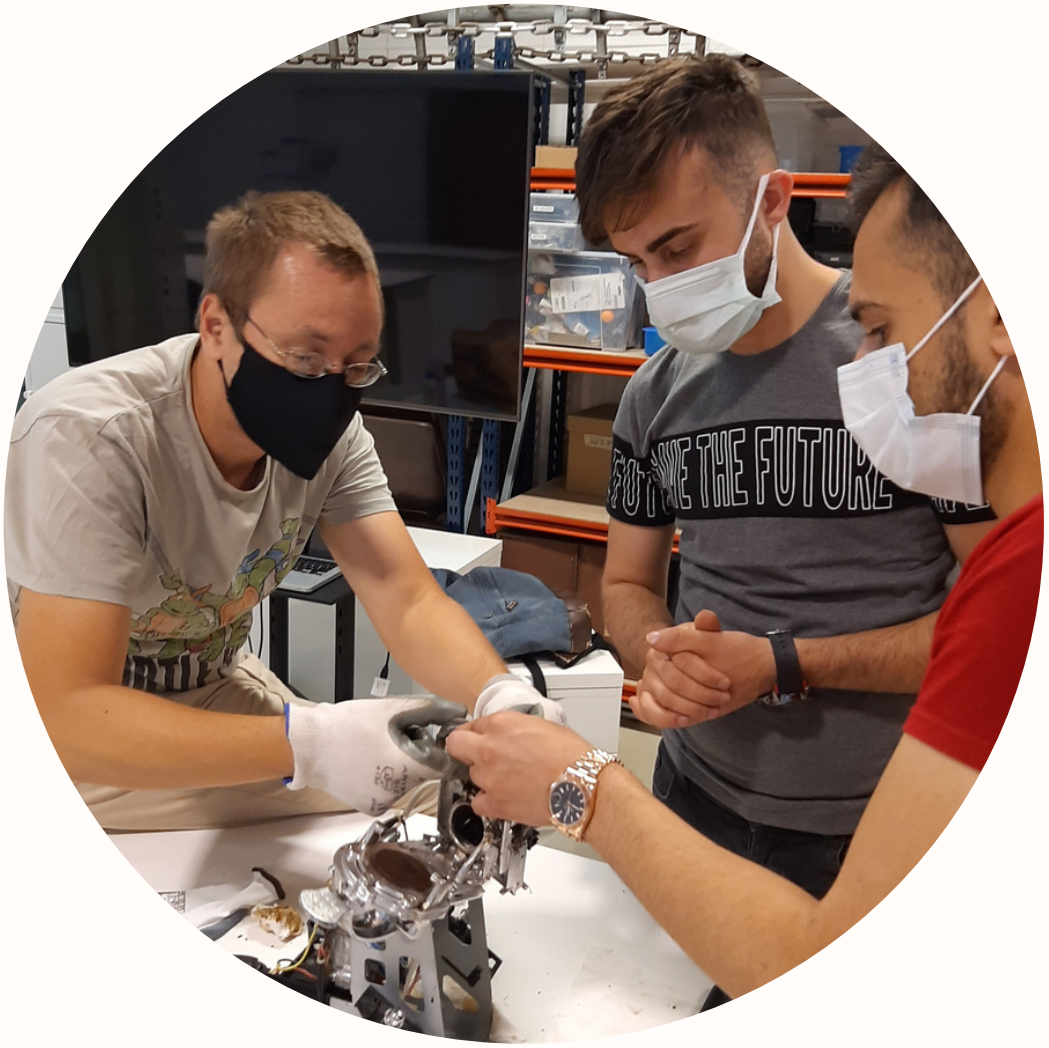
Similarly, in the month of September of 2009, the Right to Repair campaign was launched, with the goal to remove barriers to products’ repair, so that they can last longer.

In the month of March 2021, eventually the first ever “right to repair” laws were established in the European Union.

These new laws require electric and electronic goods to legally last for a decade, forcing manufacturers to ensure that those can be repaired up to that time limit.

Yet these new rules only cover electronic goods, such as washing machines and refrigerators, which means that many electronic goods are still not covered by these laws, posing a need to further include all the other existing electric and electronic goods.

The access and reuse of spare parts and extended lifespan of goods are two other issue that need to be further addressed, in order to allow repair to be embraced all over Europe and prevent e-waste, following the objectives of the Green Deal [3].



[3] Reference: https://ec.europa.eu/clima/eu-action/european-green-deal_en

Platform21's

Repair Manifesto

1. Make your products live longer!
Repairing means taking the opportunity to give your product a second life. Don't ditch it, stitch it! Don't end it, mend it! Repairing is not anti-consumption. It is anti- needlessly throwing things away.

2. Things should be designed so that they can be repaired.
Product designers: Make your products repairable. Share clear, understandable information about DIY repairs.
Consumers: Buy things you know can be repaired, or else find out why they don't exist. Be critical and inquisitive.

3. Repair is not replacement.
Replacement is throwing away the broken bit. This is NOT the kind of repair that we're talking about.

4. What doesn't kill it makes it stronger.
Every time we repair something, we add to its potential, its history, its soul and its inherent beauty.

5. Repairing is a creative challenge.
Making repairs is good for the imagination. Using new techniques, tools and materials ushers in possibility rather than dead ends.

6. Repair survives fashion.
Repair is not about styling or trends. There are no due-dates for repairable items.

7. To repair is to discover.
As you fix objects, you'll learn amazing things about how they actually work. Or don't work.

8. Repair – even in good times!
If you think this manifesto has to do with the recession, forget it. This isn't about money, it's about a mentality.

9. Repaired things are unique.
Even fakes become originals when you repair them.

10. Repairing is about independence.
Don't be a slave to technology – be its master. If it's broken, fix it and make it better. And if you're a master, empower others.

11. You can repair anything, even a plastic bag.
But we'd recommend getting a bag that will last longer, and then repairing it if necessary.

Stop Recycling. Start Repairing.

www.platform21.nl

II. BEFORE THE TRAINING

Before starting this training, we recommend you to:

1) Interview (or to select with the help of a form) the participants to create a cohesive group in terms of knowledge about the topic. If there is a big discrepancy within the group, the participants with a higher level of knowledge can help the others during the training;

2) Collect EEE that can be repaired during the training, such as coffee machines or vacuum cleaners. If you can´t find objects able to be repaired, use the ones you have to at least explain how to disassemble and diagnose the malfunction;

3) The trainer should do a diagnosis of all the material to be repaired and, if possible, all the necessary parts and materials needed to repair the equipment(s). If it's not possible to buy the parts and materials, the trainer should mention where they can be bought for a future repair.

MATERIAL NEEDED:

For the training, in case there is not enough material available, it is desirable to buy a basic set of tools, a pair of glasses and protection gloves for each trainee or inform the trainees in advance to bring it with them. In the following pages, you can see examples of the protection gloves and glasses used during the training that took place in Portugal.

About the training room, the ideal conditions for one Trainer and a group of maximum 10 participants are:

- Tables made of 2 or 3 people groups;
- All the tools needed to repair household appliances;
- Besides the tools, the following material also needs to be acquired, if you don't have it already:

- Soldering iron;
- Insulating tape;
- Fixing tape;
- Hot glue;
- Silicon glue;
- Paper towel;
- Light extensions for each table, preferably with a light switch;
- X-act.

BASIC KIT

- Hammer.
- Pliers.
- Screwdriver.
- Wrench.

III. BASIC CONCEPTS OF SECURITY

Safety equipment necessary during a repair

In order to decrease the risk of injure during a repair, the following equipment should be used at all times:

Gloves

Glasses

Face vissor

Shoe with steel toe

And remember, safety first always!

Warranty

Always remember:

Opening any electrical or electronic device voids the warranty!

III. TRAINING SESSIONS

FIRST SESSION

This is a description of a training organised for a group of 5 to 6 participants with A basic level of knowledge. Depending on the level of knowledge or experience, you can choose to increase or decrease the number of the training hours. We recommend having a person with some experience or knowledge conducting this training since it´s a very technical area.

Location: room with tables, chairs, computer and projector

Duration: 4h

Logistics: You need to have all the tools, equipment and materials.

09H00 - 09H30

Presentations:

- Information about the trainer.
- Sharing information about each trainee (country of origin, professional background, and previous experience on repair).

09H30 - 10H00

Basic concepts of security:

The first part of the training was focused on explaining basic concepts of security. The trainer should explain the most common types of potential hazards which can happen during a repair of an EEE. Here we mention the four main ones:

Electric hazards: it can happen when you are trying to find short-circuits, handle bare wires and/or identify electric current with a neon screwdriver and/or with a multimeter. To minimise the risks, it's necessary to use adequate gloves for electrical insulation (in good conditions) and to make regular use of the multimeter to check the passage and storage of energy.

Hazards with electrostatic energy: some equipment can store electrostatic energy. Most of the time, this type of energy will not bring risks to the participant. However, a discharge of static electricity can be uncomfortable and, can burn other electronics that are in contact with it.

Thermal hazards: the person handling the equipment needs to be careful and check parts that heat and cool down. If possible, the person should use a thermostat to check the parts that can have a wide range of temperatures.

Risk of getting cut: identify cutting and perforating parts (e.g. blades, needles, etc) and be careful with parts that potentially can also cut (e.g. panels or broken plastics). It's necessary to use protection gloves appropriate to the risk since some gloves can only help you avoid small cuts.

Mechanical hazards: several EEE have parts that move with great speed and strength. It's necessary to evaluate the risk and understand if the repair can be done with no risks to the person repairing it.

There are also some best practises participants can follow during a EEE repair:

- Always have the basic security material close to the location where the repair is going to happen. This will help you remember to use it at all times;
- The appliances must always be unplugged before being used;
- Keep a first aid kit close to the workplace and learn how to use it.

10H00 - 10H15

Basic concepts about the tools

Throughout the sessions, the trainer used a PowerPoint presentation to help participants to get know and identify the tools and their names. The name of the tools was written in the local language, but during the training the trainer used both languages (local language and English). Also, during the training even if the trainer speaks in English, he/she needs to repeat the name of the tools in the local language so the participants can start identifying and memorising them. If you have a group of participants that have difficulties with the local language and/or English, try to arrange a translator to help you during the training.

Besides the basic tools needed for different type of repairs, it's also essential to use a multimeter which is a tool used for various purposes, but the main ones are: measure electric current (AC and DC) in an equipment and test continuity and short circuits (See page 24 of the Annex).

10H15 - 10H45

How an EEE with an electric rotary engine functions

At this point, you should start explaining the concept behind electric rotary motors (See page 25 of the Annex) . In the vast majority, an electric current passes through a coil that generates a magnetic disturbance, which makes the shaft rotate. Knowing how to identify some parts (for example, if the person knows how to identify the coil, it is easier to identify the fault) and the characteristics of the motor, can help a lot with the repair. The condition of the magnets, the coil, the carbon brushes, and the contacts can indicate the source of the problem, and the possible solution.

One example of equipment with an electric rotary engine is a hand blender, a fan, or a vacuum cleaner.

10H45 - 11H00

Detect malfunctions and main types of problems

After the initial introduction, it's important to teach how to know and identify what are the most common malfunctions and main types of problems that can happen in this type of equipment. These are the most common ones:

- Short circuits in wires;
- Broken wires;
- Worn carbon brushes;
- Lack of continuity in the coil;
- Very dirty brush contacts;
- Broken switches.

11H00 - 13H00

Repair a hand blender or a fan

After this theoretical part, the trainer should encourage participants to try and practice opening, diagnosing, and repairing (in this case) a fan. The participants were divided in groups of 2 or 3 people to repair an EEE and, as previously mentioned, the participants with more knowledge can help and teach the others. The main goal is for participants to identify the malfunction of the equipment and propose possible solutions.

One of the most common damages is an equipment having a broken wire. In this case, the possible solution would be opening the equipment, remove the cable and replace it. The cable must support the same power as the original cable.

SECOND SESSION

Location: room with tables, chairs, computer and projector

Duration: 4h

Logistics: You need to have all the tools, equipment and materials.

09H00 - 09H30

How an EEE with a resistor functions

This day started with an explanation about how an EEE with a resistor operates. For this, participants need to know and identify the main types of resistors (ceramic, filament, metallic) and the main characteristics of each one (See page 26 of the Annex).

It should also be explained how to calculate the power of an equipment by using the formula: watts (power) = volt (tension) multiplied by the current (A). This is important to know and to explain because the power of an equipment defines what type of resistor or fuse you can use.

Two examples of equipment with a resistor are: toaster or a blow dryer.

09H30 - 10H00

Detect malfunctions and main types of problems

In this part, the trainer needs to explain and show (if possible) the main malfunctions that can happen in this type of equipment. One of the most common one is the resistor burning, meaning, the current stops flowing through the part.

10H00 - 10H30

Differences between types of energy (alternating current, direct current and static)

The trainer should start by explaining the differences between alternating and direct currents. Also, participants need to know that the voltage is different in some countries, therefore it's important to know what the local voltage is. [4] (See page 27 of the Annex).

Regarding static energy, the main risk is to burn some electronic components, also during a repair, and especially throughout wintertime due to the use of wool in people's clothes.

10H30 - 12H00

Repair a toaster

Once again, the participants can be divided into groups of 2 or 3 people to repair a toaster (in this case it was the object chosen). The goal of this task is to enable participants to learn and identify malfunctions and propose solutions to it. One of the most common malfunctions is that the toasting lever won´t stay down. A possible solution could be to open the toaster, clean with a brush the path to the lever because they might be crumbs and other type of dirt inside. After that, try to use the lever again and if it works you can assemble the toaster. This is also a good opportunity to explain the importance of maintenance and cleaning. Some equipment might not function due to lack of a regular cleaning so it’s very important to share this information with participants, so they are aware of this possible problem.

12H00 - 13H00

Repair of different types of EEE in groups

If you have time, you can propose participants to performed a full diagnosis and repair an EEE, alone or in groups.

[4] You can check the voltage around the world here:
https://commons.wikimedia.org/wiki/File:World_Map_of_Mains_Voltages_and_Frequencies,_Simplified.png

THIRD SESSION

Location: room with tables, chairs, computer and projector

Duration: 4h

Logistics: You need to have all the tools, equipment and materials.

09H00 - 09H30

Basic concepts of soldering

The main goal of this part of the session is learning about the soldering tin and how a soldering iron works. It's important to reinforce that the tin filament is highly toxic, so participants need to carefully wash their hands after the soldering process.

09H30 - 10H30

How an electronic circuit on an EEE works

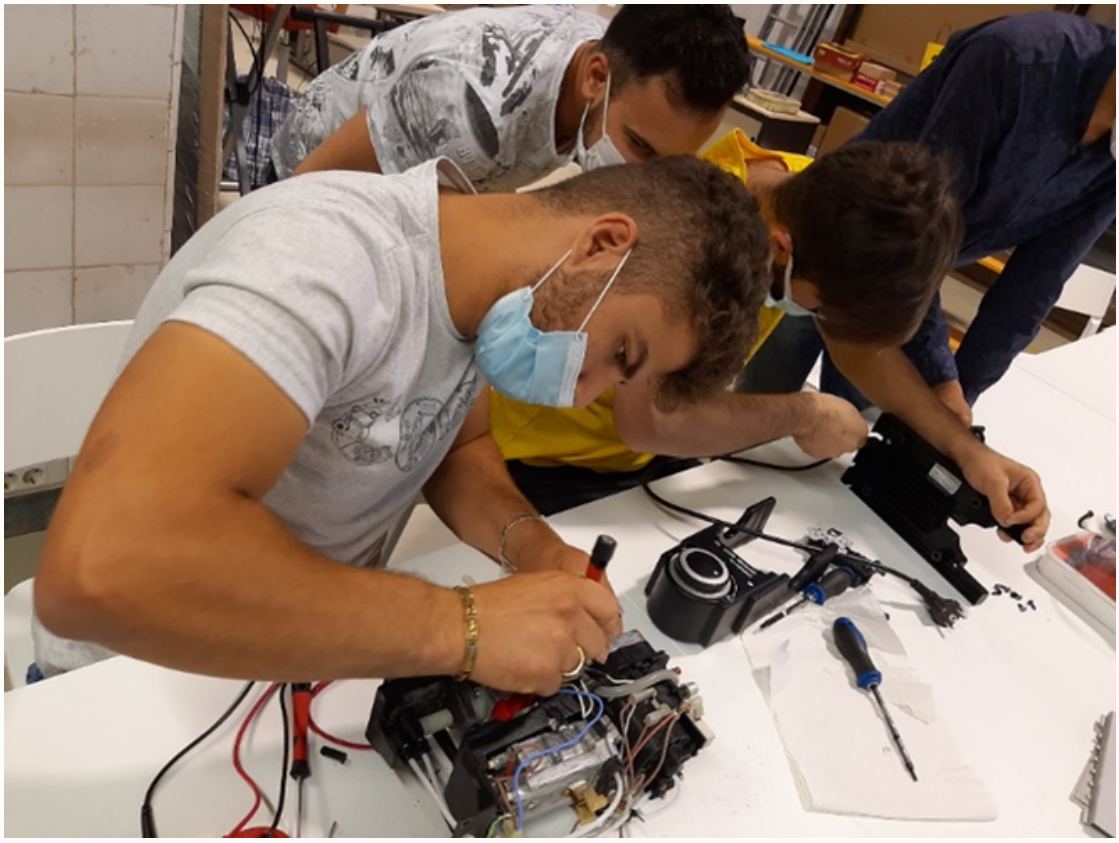
At this point, the trainer should teach the basic concepts of electronic circuits, but depending on the time available, it can only be done for the most basic and important ones (resistors, capacitors, diodes) and their main characteristics. If the participants don't have a basic level of English or of the local language and/or some knowledge about electronic appliances, these explanations can take a lot of time. However, it's crucial that participants know and understand these components so, don´t worry if you are taking too long in this phase.

10H30 - 11H30

Repair a coffee machine

The participants were divided in groups of 2 or 3 people to repair an EEE and the participants with more knowledge can help and teach the others. Once again, the main goal of this activity is for participants to learn and know how to identify a malfunction and to propose solutions to solve it.

Usually in coffee machines the most common malfunction is the leakage of water, inside the machine. If this happens, it´s recommended to open the machine, dry it, clean the machine, and try to make a coffee so you can identify where the leakage is. Most of the times, this can be solved by replacing the O-ring with a new one. After replacing this piece, try to use the machine again and then if it´s working properly you can assemble it.



11H30 - 13H30

Work in groups: perform a diagnosis, repair and present the process

In this activity, the trainer (or other person) will simulate a full repair process. This person brings a broken equipment and in groups of 2, the participants need to perform the repair in front of him/her. The participants are invited to ask questions to the owner of the object, using a checklist, in order to identify the possible solutions even before opening it. Here´s the checklist:

- Is the device out of the warranty?
- What is the behaviour? Does the device turn on or not?
- Does it make unusual noises?
- Did it fall?
- Is the problem always happening or not?
- When and on what occasion did the problem first appear?

After this, they need to try and repair the equipment. Make sure you choose in adavance objects that can be repaired, so participants can experience a full repair. After this, the participants need to explain to the trainer (and to the other person, if that´s the case) how they did the all process.

IV. LESSONS LEARNED

There are several lessons learned that should be taken into consideration and adjusted according to the reality of each hosting country, when needed.

✔ If there are participants with previous experience in repairing EEE, it is advised that the groups are composed of an experienced participant and participants with no knowledge, so that the experienced participant can help the others, promoting the learning from each other.

✔ When participants want to learn the name of the tools, materials and EEE in the hosting country's language, it is important to reinforce it several times during the training.

✔ Some of the content may be difficult to share and teach, due to the language barrier. If that happens, the use of powerpoints with images (of the tools, materials, etc.) helps to overcome the language barrier.

V. USEFUL LINKS

- **https://repair.eu/**
- **https://projeto-reparar.pt/**
- **https://repaircafe.org/**
- **https://www.platform21.nl/**
- **https://therestartproject.org/**
- **www.ifixit.com**

VII. ANNEXES

Necessary Equipment

Screwdriver

Pliers

Hammer

Fuses

Cable and plug

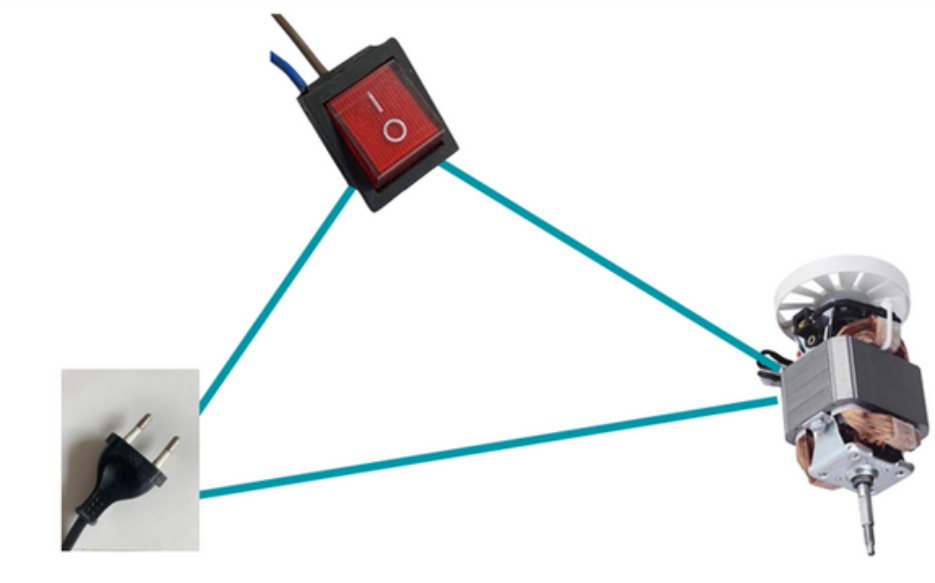
Insulating tape

Multimeter

Soldering iron

Platter

How an EEE with an electric rotary engine functions



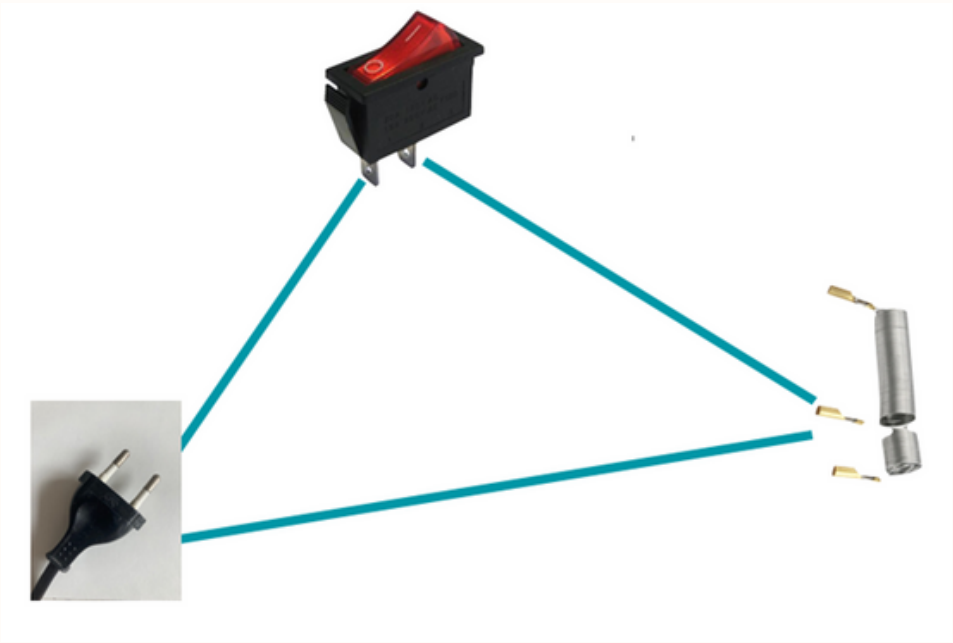
A few common malfunctions

Broken wire

Blown fuse

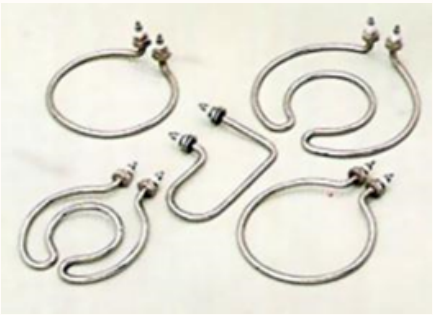
Worn carbon brushes

How an EEE with a resistor functions



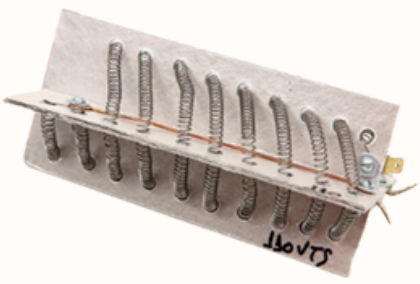
Resistor types

Resistor of an electric oven

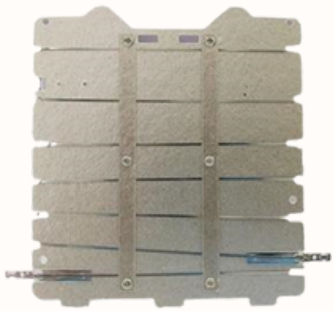


Resistor of a water kettle

Resistor of a hairdryer



Resistor of a toaster



Different Types of Energy

Alternating Current (AC) is the the electric charge flow that periodically changes its direction.

Direct Current (DC) is the electric charge flow that works in only one way.

CIRCULAR SOLUTIONS

for refugees' integration in Europe

Co-funded by the Erasmus+ Programme of the European Union