



# ~~Unwanted~~ Furniture!

Long life for furniture



## **Amsa**

Amsa is an A2A group company providing environmental services for citizens and businesses in Milan, Bresso, Buccinasco, Cormano, Corsico, Gerenzano, Novate Milanese, Paderno Dugnano, Pero, Pioltello, Segrate, San Donato Milanese, San Giuliano Milanese, Saronno, Settimo Milanese, Trezzano sul Naviglio and Uboldo. It provides solutions designed to meet different user needs. Amsa manages cleaning for an area of 360 square kilometres, working for more than 2.6 million people: 1.4 million and 800,000 city users in Milan and around 430,000 residents in the other municipalities in the Milan metropolitan area and the province of Varese served by the Company. Amsa has about 3,000 employees and 12 recycling plants. The Company has a fleet of more than 1,300 vehicles.

[www.amsa.it](http://www.amsa.it)

## **OpenDot Fab Lab**

OpenDot is a research and open innovation hub, a space dedicated to rapid prototyping and digital manufacturing, open and accessible to everyone. OpenDot, was founded in Milan in 2014 by the design studio Dotdotdot and initiates changes where open source and technological knowledge are opportunities for growth in education, design and production.

OpenDot develops projects and research in various fields, including digital manufacturing, healthcare, circular economy and edutainment.

It creates training programmes and co-design processes involving stakeholders to create innovative solutions that generate a positive social impact.

[www.opendotlab.it](http://www.opendotlab.it) | [info@opendotlab.it](mailto:info@opendotlab.it)



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# Unwanted Furniture!

**Unwanted Furniture** is an OpenDot project for AMSA - A2A Group. It is designed for those who want to reduce waste and believe in repairing broken objects. The project aims to raise awareness about furniture reuse.

Furniture is discarded for functional or aesthetic reasons. However, much of it does not need to become waste and can be simply fixed, refurbished or transformed into new objects.

**Unwanted Furniture** is an open-source digital catalogue which provides ten step-by-step circular and sustainable design strategies which extend the life cycle of old, broken or obsolete objects.

The catalogue is divided into four categories:

- \***CARE**, i.e., furniture care techniques which prevent damage and extend life;
- \***AESTHETIC CHANGE**, i.e., strategies for aesthetically renewing objects;
- \***FIXING**, i.e., repair strategies that maintain their function;
- \***UPCYCLING**, i.e., strategies that alter their function for circular and creative recycling.

Each strategy has a gallery of other inspirational design objects and a section that combines innovative projects, platforms and tutorials to explore circular and do-it-yourself techniques and processes.

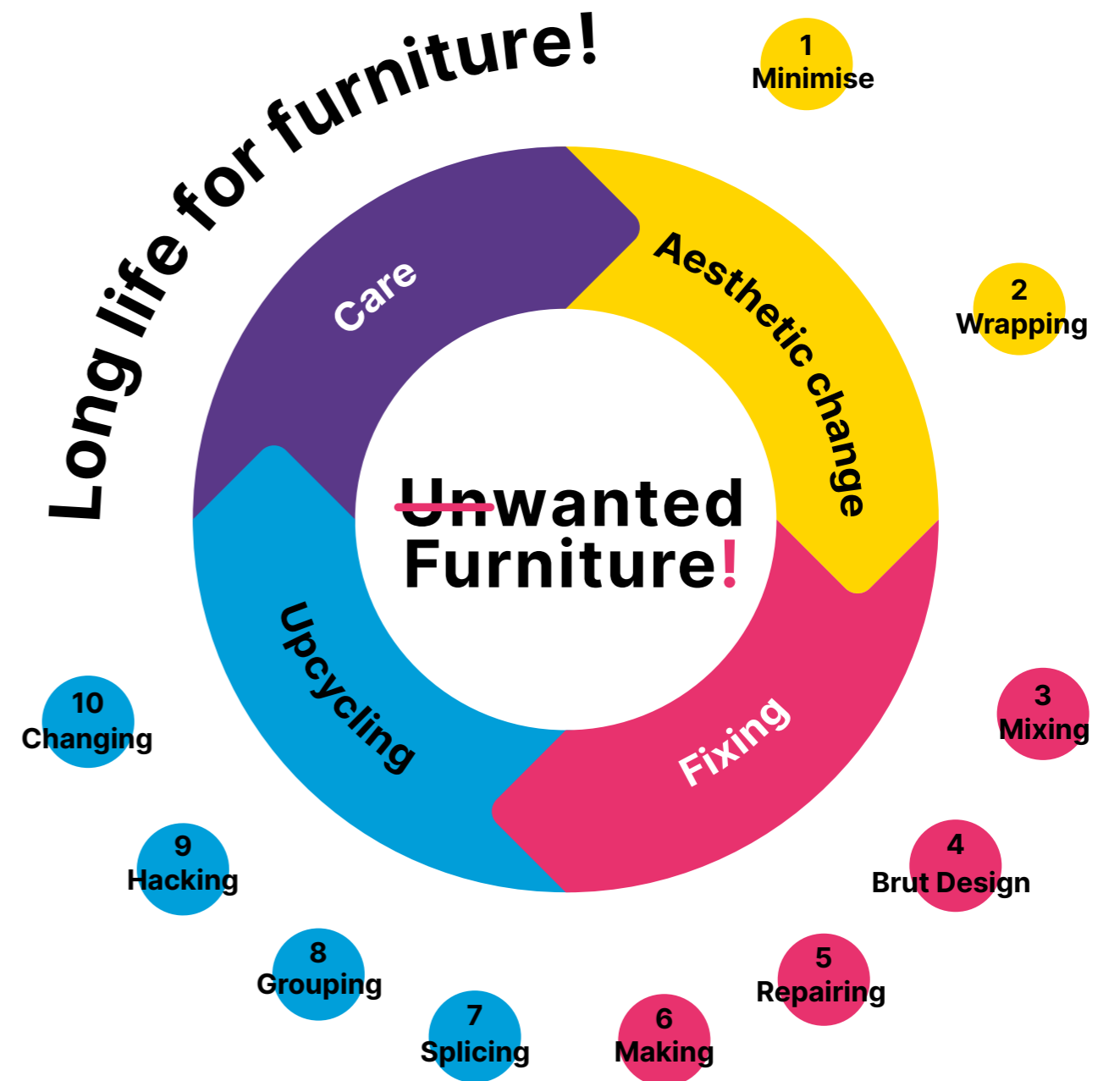
Some strategies are more complex and may require using tools or machinery. OpenDot made the objects in this catalogue.

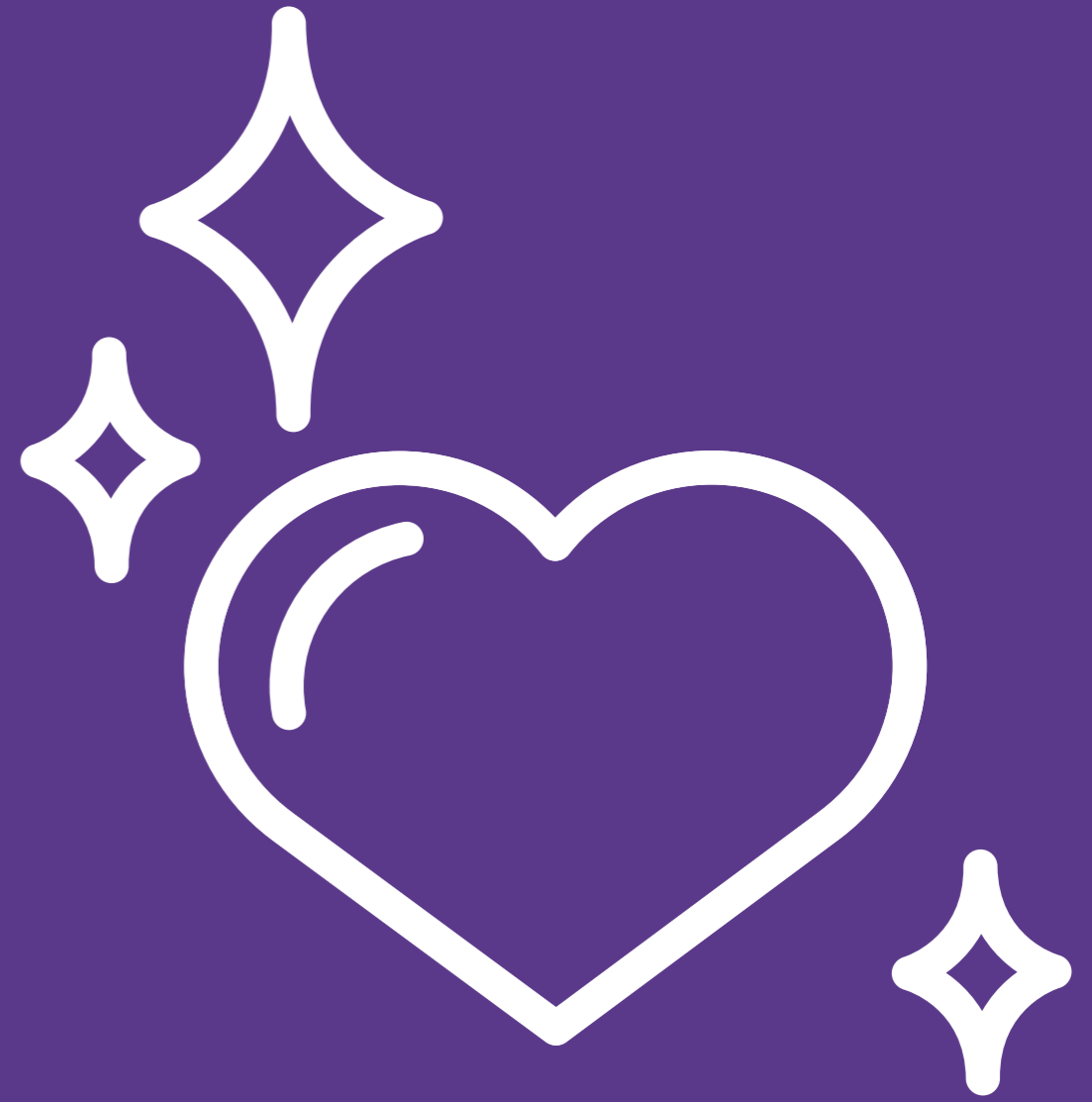
OpenDot is a Fab Lab, i.e., a digital fabrication lab accessible to anyone and

equipped with numerically controlled technologies such as 3D printers, laser cutters, a CNC milling machine and a carpentry workshop. It is a place where you can design and prototype your ideas, research, experiment, and train continuously. It is part of a global network (Fab Lab Network) that has more than 2000 labs worldwide, a distributed and interconnected community that shares the goal of democratising technologies, digital manufacturing and knowledge.

*"I believe that if 'doing' does not create awareness it is useless."*

Enzo Mari





**Care**

# Care

Prevention is better than a cure. We have heard this since childhood, and it can be applied to repairs. Objects wear and break over time, and minor damage can lead to situations that make them more complex to repair. Case studies are endless, and it is impossible to make an exhaustive list, but some more frequent cases are worth highlighting.

## SURFACE TREATMENTS

Many materials are coated or treated to last longer and protect them from light, cold and water (especially salt) damage. If you notice the paintwork is peeling or damaged, it is best to act immediately. This is noticeable, particularly in iron objects (where rust can cause damage underneath the paint if a part is unprotected) or wood derivatives (such as MDF, chipboard, plywood or multilayer sensitive to water that can damage the binding glue).

Each material needs different treatments and products. Generally, the rule is to remove damaged or peeling paint, clean

using sandpaper and cover with several thin coats of paint (it must be compatible with the previous layers and suitable for the treated material).

Fortunately, there are many online sources to learn how to sand and paint professionally. It is more difficult to find out which is the ideal product to use. How to do it? It is better to ask an experienced seller.

## JOINTS

The first warning sign is a squeak that was unheard before or an unusual movement of a part of the object. When this happens, a joint is “loosening”, i.e., it moves when it shouldn't. Without quick action, the joint will deteriorate and eventually break.

Usually, the parts are glued or screwed together. When they are glued, it is essential to look for glue compatible with the material and use. According to their water resistance, glues for wood are divided into “indoor and outdoor” use. Some plastics can only be glued with special glues, etc. A suggestion from a reputable seller can solve the situation.

If the parts are screwed together, the screws only work if they are adequately

tightened. What holds the parts together is not so much the screw but the friction between the two parts, which is guaranteed by the screw.

If slightly loosened, the pressure between the parts is lost, and consequently, its tightness, the parts start to move slowly and the material breaks, making repair much more difficult.

These small repair problems are the ideal training ground to search for tips, tutorials and information online, practising and acquire manual skills.

#### LINK

Tutorial → [General](#)  
[Glues](#)  
[Screws](#)  
[Wood maintenance](#)  
[Metal maintenance](#)



# Aesthetic change

# Aesthetic change

Sometimes an object is thrown away just because it is just out of fashion, becomes boring or no longer fits in with the rest of the décor.

This section describes two strategies to prevent this from happening. For example, we can minimise the shapes, standardise or change the colour, cover or hide baroque lines and particular forms, and cover no longer liked materials or fabrics.

Aesthetic change

**Minimise**



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### IDENTIKIT

**Antique wooden moulded bedside table, with turned legs, riser with bevelled frame and small central shelf.**

**Problem:** obsolete aesthetics and wobbly riser

**Year:** First half of the 20th century

**Origin:** Sesto San Giovanni, Milan

### TOOLS

- \*chisels
- \*hammer
- \*spatulas
- \*wood filler
- \*sandpaper (80, 120, 180 grit)
- \*white water-based primer
- \*spray can (pink, gold)
- \*masking tape

### REPAIRING

- \*brass tape hinge
- \*3×20 screws

### TOP

- \*brass foil 1.5 mm thick
- \*two-component glue
- \*flex cutter (with cutting and finishing discs)
- \*200 grit sandpaper
- \*black synthetic fabric tape
- \*3×20 screws
- \*washers 3 mm diameter

## Minimise

By minimising, we mean a process of reduction and removal, i.e., working by subtraction. Anything aesthetically too much, excessively flashy, rich in detail and over processed, linked to an aesthetic trend or a historical period (e.g., kitsch, baroque) can become boring. The strategy emphasises functionality and simple forms, the balance of shapes and colours, and the object in its necessary elements. "Less is more" is the Minimal Design mantra taught by Mies van der Rohe.

### RATING

- ★★★★☆ **Difficulty**
- ★★☆☆☆ **Circular impact**
- ★★☆☆☆ **Processing cost**
- ★★★★☆ **Time**
- ☆☆☆☆☆ **Fab Lab**

### YOU HAVE

furniture with ornaments, inlays, mouldings or unnecessary details that have become dull or no longer match the rest of the furniture

### YOU WANT

simplicity, functionality and minimalist result that can work with the surrounding space and existing furniture.



## 1\*

Identify the unnecessary elements to be removed.  
In antique furniture, decorative elements are applied later, so they are easy to remove. Mouldings, fretwork, decorations, handles, etc.



## 2\*

Using a chisel, pry between the structure and the frames to begin.  
Be careful not to damage the furniture structure. You can use a spatula or cardboard to protect the surface.



## 3\*

Continue with the removal of the parts.  
You can use other tools such as saws and screwdrivers to remove the feet.



## 4\*

Sand using coarse grit sandpaper (80 grit) to even out the surfaces. If you have a sanding machine the work is faster and more precise. This prepares the surface for filling and painting.



## 5\*

Use wood filler to fill woodworm holes, dents or cracks. After filling, wait for it to dry and then sand. Repeat this step until you get a smooth, even surface.



## 6\*

Depending on the paint used, it may be necessary to apply a white primer to bring out the final colour.



## 7\*

Start painting the furniture interior.  
You can choose to have an entirely monochrome piece of furniture, inside and out. Alternatively, you can choose two colours that match. If in doubt automatic palette generators can be found online.



## 8\*

As a handle you can use a 2cm x 9cm cord or fabric ribbon. Fold it in two and pierce the open end. Using a lighter, heat the fabric until it melts to join the two parts. Make two equal handles, one for the drawer and another for the door.



## 9\*

Before painting the outside, make the cut-out that will house the handle. Centre the handle on the upper edge of the drawer front and mark the measurements before removing the wood with a chisel.



## 10\*

Start masking the already painted interior parts with masking tape. Follow the edges and stay flush with the corner. The greater the precision, the better the result.



## 11\*

After placing the tape, cover the rest of the openings with film or old newspaper. This will protect the inner surfaces from the final painting stage.



## 12\*

Choose a colour that matches your taste to create your monochrome furniture. Avoid "trendy" colours that might bore you quickly. Use a spray to make horizontal passes (left to right). The start and direction changes should be outside the object so as not to have excess paint on the edges.



## 13\*

Use a brass sheet to coat the top. We suggest making a cardboard template to get the exact shape before cutting it to size with the flex cutter. Sand the top with fine sandpaper (200 grit) and protect it with a specific metal protection product to avoid oxidation.



## 14\*

Spread a thin, even layer of two-component glue on the underside of the brass sheet with a spatula and place it on the furniture top, pressing it over the surface.

### LINK

Tutorial → [Filler and its use \(ita\)](#)  
[Filler and spray painting \(eng\)](#)  
[Automatic colour palette generator](#)

### REFERENCES

Donald Judd

Superstudio

Maison Margiela





Aesthetic change

**Wrapping**



# Wrapping

Sometimes all you need to do is cover up scratches and marks of time or revive colours to have products as good as new. Replacing fabric, redoing chrome plating, or repainting a surface is sometimes more difficult, and expensive than it seems. Wrapping is an excellent alternative and involves creating a “new skin” without excessively altering the shape. This maintains the dimensions, but renews the colour, style, material, and decoration, through the wrapping technique. Wrapping can be done accurately over the object surface, or more roughly by incorporating parts together.

## IDENTIKIT

**Walnut armchair with curved machined backrest and upholstered seat covered in brocade fabric.**

**Problem:** obsolete aesthetics

**Year:** remakes of early 20th century chairs

**Origin:** Caronno Pertusella, Varese

### YOU HAVE

working objects, perhaps slightly damaged and that no longer reflect your needs or aesthetic taste

### YOU WANT

to customise, change or add a touch of colour to the object

## TOOLS

- \*Scissors
- \*Cutter
- \*Coloured Kinesiotape (six rolls of 5m x 5cm)

## RATING

- ★☆☆☆☆ **Difficulty**
- ★★★★☆ **Circular impact**
- ★☆☆☆☆ **Processing cost**
- ★★☆☆☆ **Time**
- ☆☆☆☆☆ **Fab Lab**



## 1\*

There are many ways to wrap a piece of furniture, one is by using kinesio tape. It is readily available in many colours and is cheap.



## 2\*

Cut the tape rolls into equal parts. The back of the tape already has cutting lines. A good size is 10 cm. For our chair we used 5m x 5cm rolls.



## 3\*

Avoid stretching the tape too much, especially where there are heavily worked surfaces. The risk is that it will come off the surface after a few days.



## 4\*

To wrap the frame, remove the upholstered seat. Start with the object's simplest parts. To achieve a pleasant effect, do not use conventional inclinations, such as 45 or 90 degrees. The more random the placement the more pleasing the result.



**5\***

When the tape meets three corners at the same time, cut it further to avoid unsightly creases.



**6\***

To wrap curved parts, make small cuts in the tape to make it adhere well to the surface. Then cover the flat surface to hide the uneven cuts.

**LINK**

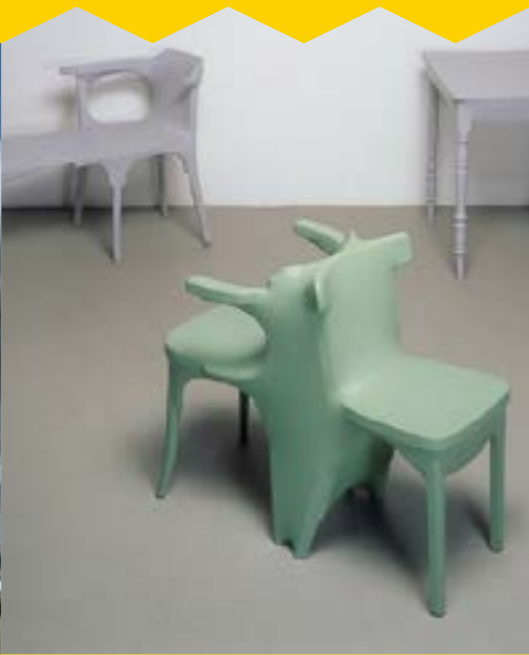
Tutorial → [Cross-hatching tips](#)

**REFERENCES**

Christo

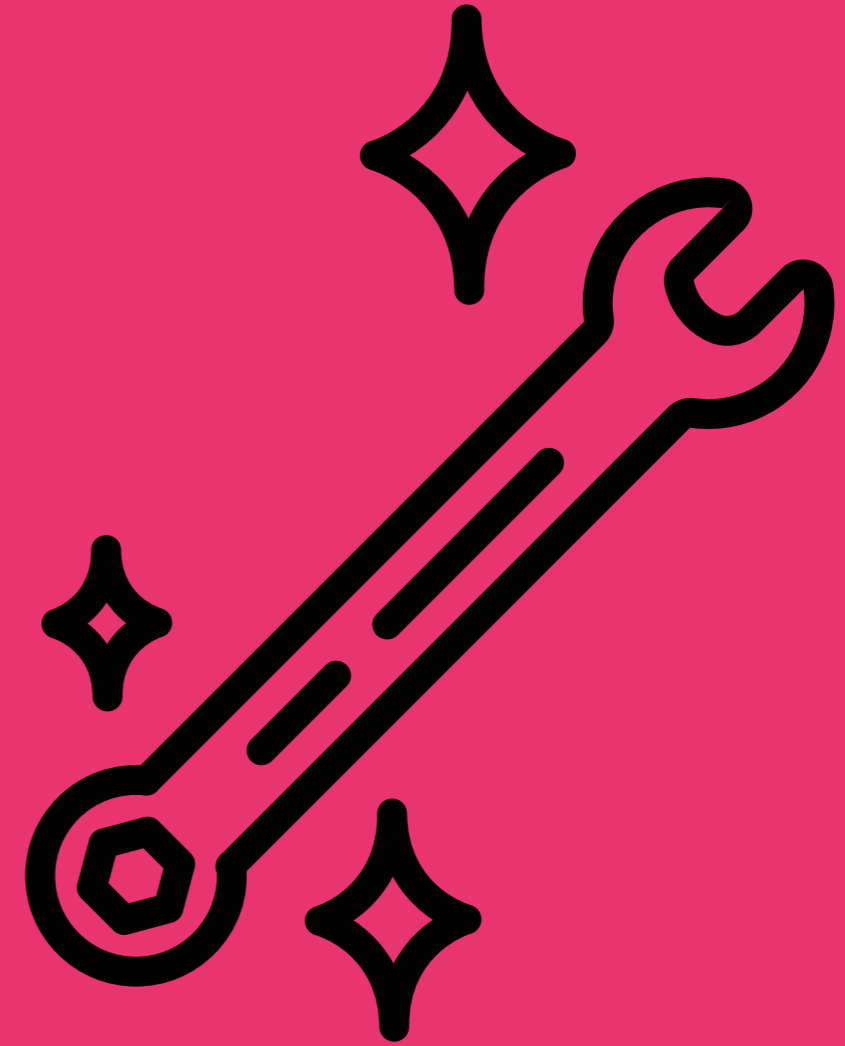


Jurgen Bey



Pepe Heykoop





**Fixing**



# Fixing

Even if a product breaks, it does not mean that its life is over. The strategies gathered in this section maintain the original functionality and give aesthetic and design dignity to the repair. They are not restoration works that hide the defect but methods that highlight the work and make it even more visible.

Fixing

**Mixing**



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# Mixing

You can use this strategy when you have two or more objects that no longer fulfil their function, using the still-functioning parts of one to replace the broken parts of another. This can be done between the same objects or between those with different functions. It is a functional repair, but leaves room for creative mixes, combinations that are aesthetically like the ready-made but without depriving them of the original object's function.

## IDENTIKIT

Two painted and decorated glass lampshades + lamp holder structure (Armani casa) in grey painted steel with square base.

**Problem:** Lampshades without a lamp holder or vice versa

**Year:** 1970s-1990s-2000s

**Origin:** Gorla, Milan

### YOU HAVE

two or more partially broken objects with functional and recoverable parts

### YOU WANT

a new functional object that reflects your taste

## TOOLS

- \*electrician's scissors
- \*heat-shrinking tube
- \*Italian plug
- \*switch
- \*screwdrivers
- \*spanners

## RATING

★☆☆☆☆ Difficulty

★★★★★ Circular impact

★☆☆☆☆ Processing cost

★☆☆☆☆ Time

☆☆☆☆☆ Fab Lab



## 1\*

The lamp holder could be used as it is. The lamp holder could be damaged, so it must be replaced. The electrical cable is malfunctioning.

## 2\*

Start by dismantling the casing on the bottom of the lamp stand. Although it looks like a single piece, there are often screws hidden somewhere (e.g., under the feet). Unscrew them to access the electronics.

## 3\*

Inside you can find a clamp that holds the electrical cable in place and a bolt to secure the upright tube. This is a common technique used to hide the junction elements. Dismantle the clamp and bolt to simplify the electrical cable and burnt-out lamp holder replacement.

## 4\*

Once the upright tube has been removed, pull the cable first from the base and then from the tube.



## 5\*

If possible, replace the lamp holder by recovering it from another lamp. If the connections are incompatible, buy a new one.



## 6\*

Re-establish the connections. First run the cable through the base tube, remove 2 cm of the outer sleeve and then peel off the first 5 mm of the wires. Plug them into the terminals of the lamp holder.



## 7\*

Put the upright tube back in place and lock it at the base with the bolt. Lock the cable in its terminal. Put everything back including the casing and the feet, screw it to the frame.



## 8\*

As the power cable has been replaced, it is necessary to reposition the socket and switch. Remove the first centimetre of tubing and peel off 5 mm of each cable, plug them into their terminals.



## 9\*

Depending on how many lampshades you have available, make several matching tests, considering shape and colour. The hole in the centre of the lampshades has a standard diameter, so you can experiment without worrying about changing the hole.



## 10\*

If you want, add flat elements to increase the composition's value. For example, a plexiglass circle is decorative and protects the two glass lampshades. Place the second lampshade. A ceiling lampshade can be used to direct the light upwards.



## 11\*

After placing the last lampshade, close the ring nut of the lamp holder. Tighten it by hand to secure the composition.



## 12\*

Complete your lamp by choosing a bulb. The bulb should be selected depending on the lamp type. It can be a warm or cold light and with glass in different finishes: transparent, glossy or matt white, or a partially silvered bulb.

**LINK**

Tutorial → [Switch](#)  
[Electrical socket](#)  
Project → [Creative cables](#)

**REFERENCES**



**Martino Gamper**



**Pierre Castignola**



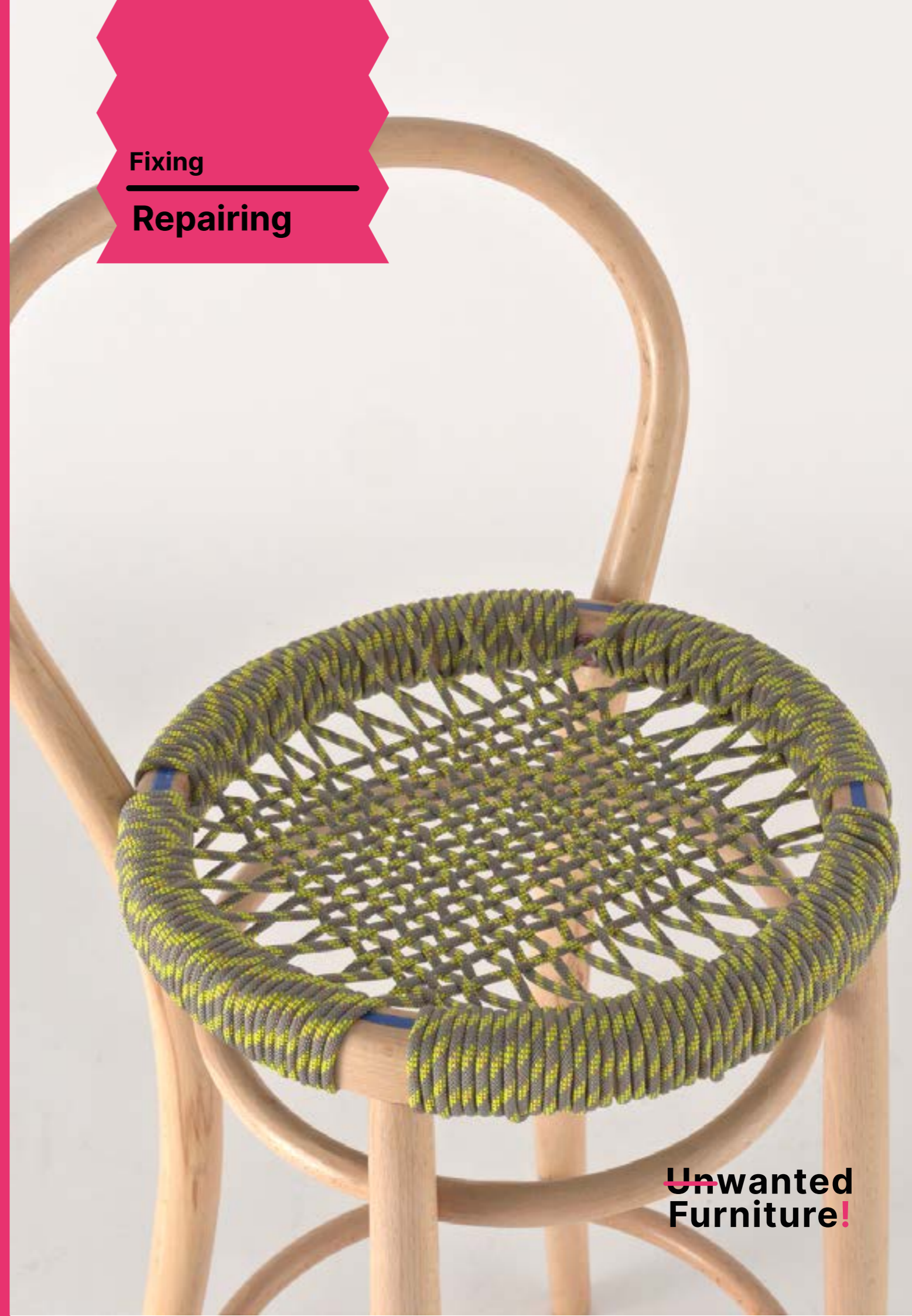
**BreadedEscalope**



Fixing

Repairing

~~Unwanted~~  
Furniture!





# Repairing

Many people think that repair work is difficult because they want the object to look as "good as new." But what really matters is that the object can still perform its function, perhaps proudly displaying the signs of the repair as in Kintsugi - the Japanese ceramic restoration technique where the broken lines are joined with gold lacquer. The techniques and materials that can be used are many and depend on the product. You can find online suggestions which can be technical (e.g., type of glue), and aesthetic (weaving a rope to replace a stuffed seat). Repairing is noble - don't hide it, show it off.

## IDENTIKIT

**Viennese-style bar stool with red lacquered curved beech frame and a Viennese straw seat.**

**Problem:** Broken straw seat and damaged rings

**Year:** 1960s

**Origin:** Calvairate, Milan

### YOU HAVE

A broken object that no longer works properly.

### YOU WANT

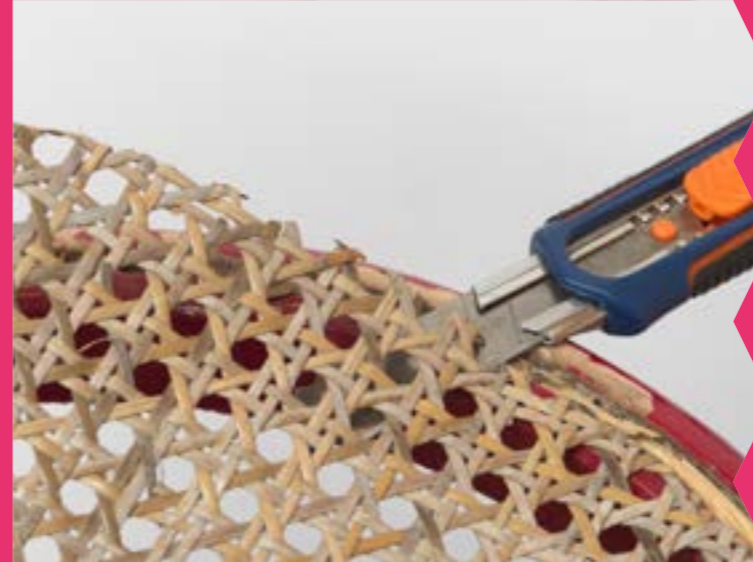
to recover the object and restore it

## TOOLS

- \*two-component resin
- \*powder dye
- \*syringe
- \*masking tape
- \*clamps
- \*nails
- \*rope
- \*120 grit sandpaper
- \*transparent wood preservative
- \*sanding machine

## RATING

- ★★★★☆ **Difficulty**
- ★★★★☆ **Circular impact**
- ★★☆☆☆ **Processing cost**
- ★★★★★ **Time**
- ☆☆☆☆☆ **Fab Lab**



## 1\*

Check the broken parts and plan your work. This stool has broken straw, a loose frame, and damaged paint.

## 2\*

Remove the stuffing and clean the edges of straw and glue residues. You can use a box cutter and a fine wood chisel.

## 3\*

Remove the material from the groove and use this space to fill it with dye resin.

## 4\*

Quickly and roughly sand the chair using coarse-grit sandpaper. If you have a sanding machine the work is faster and more precise.



## 5\*

Finish sanding with finer tools:

- Fine sandpaper strips (220 grit)
- Dremel
- Fine files
- Cutter



## 6\*

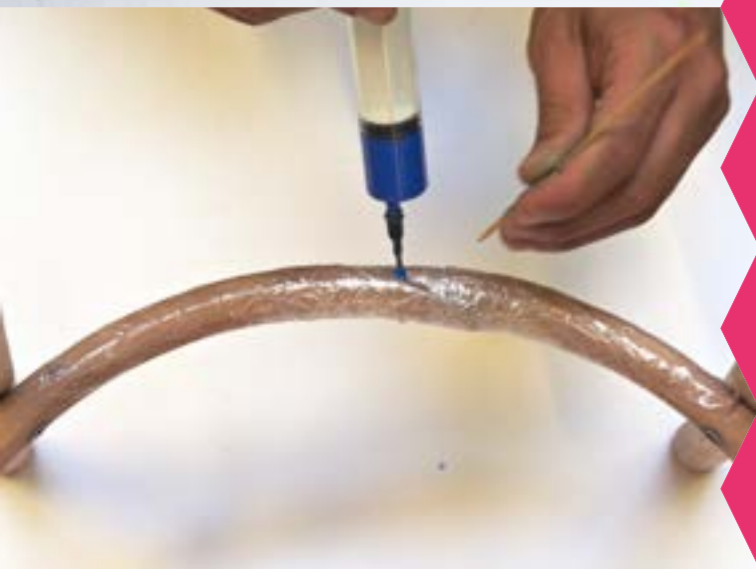
Prepare the bonding of the broken parts with resin:

- Clean and round the edges to create a channel for the resin
- Join the parts to be glued with a clamp
- Seal everything with transparent tape



## 7\*

Prepare the epoxy resin: weigh out component A, add the dye powder and mix well. When the dye is ready, weigh and add component B in the correct proportions. Mix everything well.



## 8\*

Inject the resin with a syringe by making a hole in the top of the taped joint, filling the entire joint. Be careful not to spill any resin!



## 9\*

Use the same resin to fill the gap left by the Vienna straw, and any other damaged parts. Mask the edges with tape to prevent unwanted dripping. Allow the resin to harden within the time specified by the manufacturer.



## 10\*

Remove excess resin using a wood chisel, cutter and finally sandpaper. If any gaps remain, you can coat with resin again.



## 11\*

Check the strength of the glued joints by trying to push them out of place. If they resist, you can paint the wood with a water-based impregnating agent.



## 12\*

When the varnish is dry, start repairing the seat. Choose a strong non-elastic (static) rope of 5-6 mm, ~30 m are needed. Fasten it with a staple gun or a wood screw.



## 13\*

Weave in the first direction: Two turns around the frame, change direction, cross under the frame, two turns forward, then cross the seat going from top to bottom, and repeat until the rope runs out. Do not make it too tight, it will increase with the second pass.



## 14\*

Fix the rope and start the second direction. The weave is the same as the previous step, but this time it also goes through the perpendicular ropes. Tighten well and secure the end of the string with a screw.

### LINK

Tutorial → [Tutorial how to weave](#)

### REFERENCES

Seletti



Studio 5.5



Jasper Morrison





Fixing

Making



~~Unwanted~~  
Furniture!



# Making

Sometimes it is easier to buy the whole item than finding spare parts. This is true for products that are a few years old. Recreating missing parts extends an object's life cycle and is an opportunity to give it a personal touch. A missing part can be made "by hand" or using 3D printing, milling and laser cutting, technologies that are easily accessible in Fab Labs and makerspaces. There are various online platforms where you can download the file of the part you want to produce for free - long live open source!

## IDENTIKIT

**Turntable with broken plastic cover and missing elements.**

**Problem:** broken cover joints, knob and 33/45 rpm reducer missing

**Year:** 1980s

**Origin:** Romolo, Milan

### YOU HAVE

a broken component and can't find replacement part or does not exist.

### YOU WANT

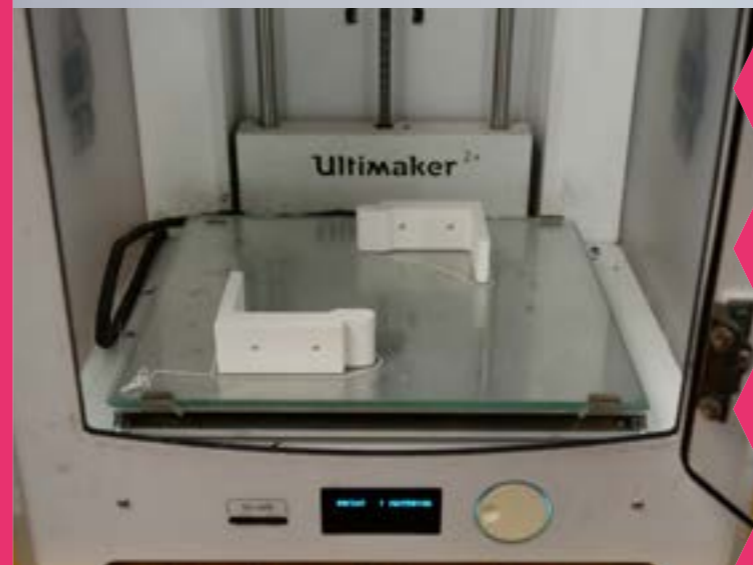
to restore just the missing part without having to repurchase the product.

## TOOLS

- \*gauge
- \*M3 screws
- \*M3 square nuts
- \*plexiglass
- \*superglue
- \*3D printer
- \*laser cutter
- \*3D modelling software

## RATING

- ★ ★ ★ ☆ ☆ **Difficulty**
- ★ ★ ★ ☆ ☆ **Circular impact**
- ★ ☆ ☆ ☆ ☆ **Processing cost**
- ★ ★ ★ ☆ ☆ **Time**
- ★ ★ ★ ★ ★ **Fab Lab**



## 1\*

Disassemble the turntable cover hinges by figuring out how they fit to the plastic casing (crankcase). Often all it takes is a screwdriver to pry them apart.

## 2\*

Analyse the damaged part. The hinge is not completely broken, so replace only one piece. The easiest and cheapest way to recreate the part is via 3D printing.

## 3\*

Use 3D modelling software and redesign the broken parts. Redesign the larger joint to facilitate assembly. The L-shaped foot allows the cover to be positioned vertically to the turntable platter.

## 4\*

For a cleaner and more functional design, measure the necessary hardware, such as the square nut recesses and the diameter of the screws that will connect the new hinge part with the original.



## 5\*

To replace the cover, design your own 3 mm plexiglass box. To easily create the joints, there are box generators on the internet that export the files in a format suitable for laser cutting.



## 6\*

Pre-assemble the box with masking tape to prepare for the gluing stage.



## 7\*

Use normal superglue (there is special plexiglass glue but is more difficult to use). Tape the places where the glue should not drip. Turn on a fan to harden and prevent the superglue from creating halos.



## 8\*

As soon as the glue has dried, screw the hinges to the cover using an Allen key or screwdriver. Do not over-tighten the screws as you risk cracking the plexiglass. Put the hinges back.



## 9\*

3D printing can recreate missing parts. In this case, an adapter to read both 33 and 45 rpm records, was printed.



## 10\*

To give it a personal touch, you can add new elements such as stickers, puppets or model figurines.

### LINK

- Tutorial → [Repairing with 3D printing – Instructables](#)
- Project → [iFixit](#)
- Project → [Sharepair](#)
- Project → [Toy Rescue](#)
- Platform → [Generator for creating laser-cut boxes](#)
- Platform → [Open source archive of electronic object part](#)



Fixing

**Brut design**



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# Brut Design

Brut Design takes inspiration from Art Brut (Raw Art) - i.e., artistic productions outside conventional norms. It is based on the unusual juxtaposition of broken or partially functioning objects and materials. Without following trends or aesthetic rules, it is possible to achieve results that are spontaneous and fascinating because they are unconventional.

## IDENTIKIT

**Industrial desk lamp with a clamp.**

**Problem:** Broken clamp and scratched lampshade.

**Year:** 2017

**Origin:** Piola, Milan

## YOU HAVE

one or more partially functioning objects that you would like to recover and give them new life.

## YOU WANT

to retain part of the function of one or more objects and create one that is customised to your taste and style.

## TOOLS

- \*clamps
- \*ceramic plaster
- \*rubber sheet
- \*EVA sheet
- \*iron rod
- \*bulb
- \*sealant

## RATING

- ★ ★ ★ ☆ ☆ **Difficulty**
- ★ ★ ☆ ☆ ☆ **Circular impact**
- ★ ★ ☆ ☆ ☆ **Processing cost**
- ★ ★ ★ ★ ☆ **Time**
- ★ ★ ☆ ☆ ☆ **Fab Lab**



# 1\*

Dismantle the lamp head to replace the damaged cable. Customise it with a coloured cable.



# 2\*

Cut the old cable before the switch so you can pull it from the frame. Replace it with the new cable and reassemble.



# 3\*

Measure the diameter of the lamp attachment cylinder. Choose a metal rod of the same size or find a tube that fits the housing of the lamp rod.



# 4\*

Scratch the rod on the outside to make it easier to grip to the plaster. Glue it to the bottom of a plastic or metal bowl that will be the template for the lamp base.



## 5\*

The bowl should be shaped so that the piece can come off once hardened, like a jelly mould. You can mix scraps to achieve the "terrazzo effect."



## 6\*

Fill the bowl with bits of wood, metal, stones, plastic beads that you have around the house to customise the mould: Fill the bowl according to the height you want to achieve for the lamp base.



## 7\*

Mix a generous amount of scagliola or ceramic plaster. Make more than you need as plaster shrinks when you add water. Weigh the plaster to calculate the amount of water needed.



## 8\*

Weigh the water. For ceramic plaster, 28g per 100g water is sufficient. Scagliola does not require the same precision as ceramic plaster.



## 9\*

Add the water and mix well until the lumps disappear. Pay attention to the mixing time, you must be quick.



## 10\*

Pour the plaster into the bowl a little at a time. The plaster will seep into the empty spaces without increasing the volume excessively



## 11\*

Mix well. If there are any dry areas left, add more plaster. Mix.



## 12\*

Level the bottom and give the bowl a little tap to bring out the bubbles. Stand for a few hours. The plaster heats up until the reaction takes place, then it will start to cool.



## 13\*

After the plaster has cooled wait a little longer, then take it out of the mould by giving the bowl a tap with a hammer.



## 14\*

Out of the mould. The plastic granules will not be visible when you take the mould out. To highlight them, sand the surface.



## 15\*

The grains will begin to show. To speed up this step, you can use an orbital sanding machine or coarse sandpaper. As a final step polish and protect the surface with a clear spray.



## 16\*

If you wish, you can add a handle or create a custom-made one by bending a metal rod.



## 17\*

Scratch out the parts of the handle to be glued and mark the parts to be cut out on the base. Hollow out the marked areas, fit the handle and glue it using a two-component epoxy glue.



## 18\*

To avoid scratching the table, add rubber buffers or cut a rubber circle of the same diameter and glue it with sealant. Press firmly to make it stick.

### REFERENCES

Rikkert Paauw

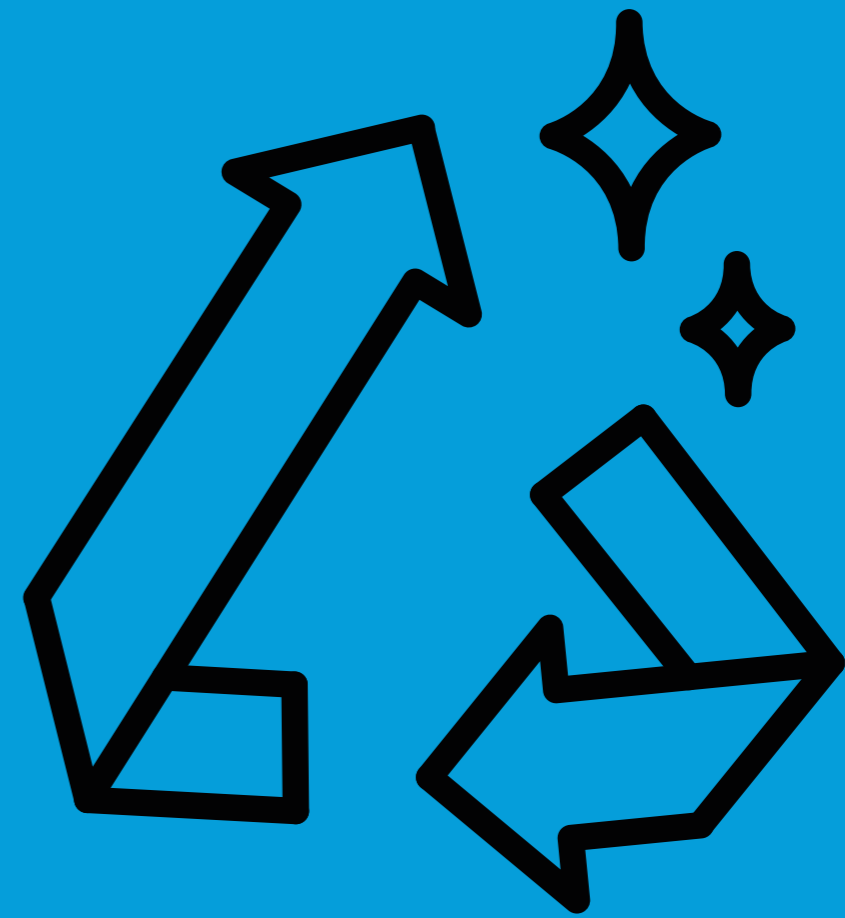
Paulo Goldstein

Fratelli Castiglioni









**Upcycling**

# Upcycling

Even if saving an object is impossible, this does not mean that it is entirely useless. Its components can be used to create something new, unusual, creative and circular. The upcycle design strategy involves saving and reusing elements to give them a new life, often different from the one they were originally intended. This will provide them with a higher quality which is real or perceived by the end user.



Upcycling

Splicing

~~Un~~wanted  
Furniture!



# Splicing

Sometimes we must throw away perfectly intact shelves, doors of wooden furniture that could have a new life and function. One way to recover material is to use it as modules to create new furniture using DIY joints. There are many inexpensive elements on the market that, if combined functionally and creatively, can become joints to create new objects from discarded panels.

**YOU HAVE**  
panels,  
shelves, doors,  
flat surfaces in  
good condition

**VUOI**  
a new custom-  
made piece of  
furniture

## IDENTIKIT

**Black extensible dining table made of chipboard with black painted ash veneer.**

**Problem:** Broken table legs, damaged edges.

**Year:** Contemporary

**Origin:** Cassina de' Pecchi, Milan

## TOOLS

- \*circular saw
- \*hand saw
- \*tape measure
- \*pencil
- \*masking tape
- \*wood preservative
- \*sponge roller
- \*8 mm wooden dowels
- \*wood filler
- \*3x20 screws
- \*ratchet straps
- \*80 and 120 grit sandpaper
- \*sanding machine
- \*180 grit abrasive sponge
- \*wood rasp

## RATING

- ★ ★ ★ ☆ ☆ **Difficulty**
- ★ ★ ★ ★ ☆ **Circular impact**
- ★ ★ ☆ ☆ ☆ **Processing cost**
- ★ ★ ★ ☆ ☆ **Time**
- ☆☆☆☆☆ **Fab Lab**



## 1\*

Disassemble the table and design your custom furniture according to the flat surfaces available. You can draw the cuts directly on the panels or make a scale drawing.

## 2\*

Cut the pieces to the desired dimensions. On the short side of each module leave a 2 cm gap to make the 45-degree cut. The slanted cut serves to achieve an even appearance at the joints.

## 3\*

Sand the edges and corners with sandpaper. This step has an aesthetic purpose - it smooths the panels' veneer and avoids chipping.

## 4\*

To join the panels, use carpentry 'L' joints. The chosen panels have a central rib. It is necessary to create a recess with a wood rasp to make the joint flat to the panels.



## 5\*

The joints are large, made of tropicalised metal, and have rounded corners. You can choose to paint them with a spray can or keep them as they are.



## 6\*

Furniture panels are often made of chipboard. To bring out the texture, you can sand the wood with 80 grit sandpaper or a sanding machine.



## 7\*

If there are surface holes or imperfections, fill them with wood filler. A quicker way is to glue wooden dowels of the same hole diameter, cut them out and sand them down.



## 8\*

Use a transparent chipboard protector: apply it with a sponge roller. To avoid dripping, protect the surface edges using masking tape.



## 9\*

Once dry, sand the panel with a P120 grit abrasive sponge to make the surface smooth. Repeat the painting and sanding two or three times.



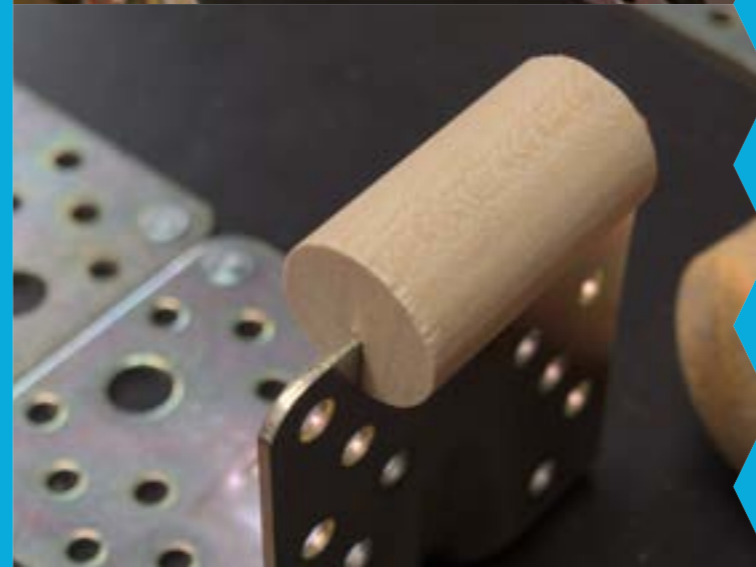
## 10\*

No glue is needed to assemble the cabinet. Use straps (or a rope) to hold the panels together. Hold the panels in a square position and tighten the strap.



## 11\*

Position the L-joints at the grooves and screw them to the panels. Do not screw them in completely but adjust them gradually to enable the most correct position of the panels.



## 12\*

Large L-shaped joints such as the ones you have chosen can have an elevation function. To avoid damaging the floor, you can use cork, rubber, or wooden structures, making a central groove equal to the joint thickness.

**LINK**

Tutorial → [45-degree cut](#)  
Project → [Open Structures](#)

**REFERENCES**



**1 plinth studio**



**Playwood**



**Aldo Rossi**



Upcycling

Grouping



~~Unwanted~~  
Furniture!



## Grouping

We adopt this strategy when we have many objects of the same type but different shapes, regardless if they are obsolete objects, machining waste, textiles, pallets, slats, and even books or old magazines. These elements, when grouped together, can create a structural material, an element or a whole product with a different meaning and function.

### IDENTIKIT

#### **Wooden pallet**

**Problem:** received as packaging for a shipment, unnecessary and to be disposed of

**Year:** Contemporary

**Origin:** Crescenzago, Milan

**YOU HAVE**  
a significant amount of scrap which is similar for material, or size

**YOU WANT**  
a new object

### TOOLS

- \*saw
- \*tape measure
- \*ratchet straps
- \*handle
- \*plexiglass

### RATING

- ★ ★ ☆ ☆ ☆ **Difficulty**
- ★ ★ ★ ☆ ☆ **Circular impact**
- ★ ★ ☆ ☆ ☆ **Processing cost**
- ★ ★ ★ ☆ ☆ **Time**
- ★ ☆ ☆ ☆ ☆ **Fab Lab**



# 1\*

Dismantle the pallet to get the boards. Remove nails, screws or metal pins. If the boards are too big, cut them into three lengthwise. The result will be smoother.



# 2\*

To cut the boards the same length, make a template. In this case 60 cm, to make a coffee table.



# 3\*

Add a handle to make it easier to carry the coffee table. You can attach a handle or create one with a metal rod to two of the boards. Be careful to position it parallel to the boards. The handle will remain locked with the others.



# 4\*

Start assembling the structure. Lay the central part with the handle and start assembling the first boards around it. A base with the outline of a circle of the desired size helps to visualise the final shape to be achieved, e.g., 30 cm.





## 5\*

Make the first bunch large enough so you struggle to hold the pieces with your hands.



## 6\*

A good method is to tie two elastic cords around the structure. Do not tie them tightly, they must be able to stretch.



## 7\*

With the help of the ropes, insert the slats from above in the places where there seems to be a lack of material. Proceed in a circle to keep the handle in the middle as much as you can.



## 8\*

Pre-assembly is complete. Move the board assembly so that it is compacted and rounded. Check that sides are perpendicular to the ground.



## 9\*

Mark notches at the height of where you want to place the tensioning straps that will hold everything together. Place the supporting straps to help you tighten the final straps that will be part of the final look.



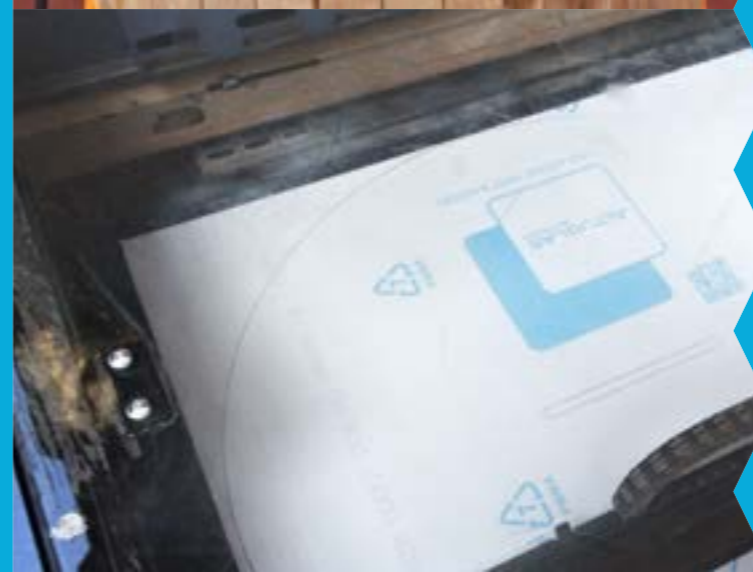
## 10\*

Add the final straps. Check the height on each side before pulling them so that they are perpendicular. Dismantle the supporting straps and check that all the boards are tight. A coat of glue on the top and bottom helps to hold everything together.



## 11\*

Level the surface, hammering the boards or, if possible, using a sanding machine. For a more finished effect, alternate coats of impregnating agent with passes of sandpaper.



## 12\*

Recover a wooden or plexiglass top. Cut a circular shape and create a central recess for the surface to pass through and fit the handle.

**REFERENCES**



**Droog**



**Giulio Iacchetti**



Upcycling

Hacking



Unwanted  
Furniture!



# Hacking

From an early age we learn that a box can be a fort to hide in or a spaceship to command. Hacking a broken object means looking at it with a child's eyes, seeing new functions that it did not have initially. The contrast between the lost original and the new unexpected and creative function makes it unique!

## YOU HAVE

objects that you no longer need, broken, malfunctioning or simply no longer reflect taste or function

## YOU WANT

to unleash your creative streak and make a brand-new object with a unique, customised function and aesthetics

## IDENTIKIT

**Audio speaker and moulded sideboard riser with bevelled frame and central shelf**

**Problem:** Obsolete speaker aesthetic, broken piece of furniture with no practical use

**Year:** Contemporary

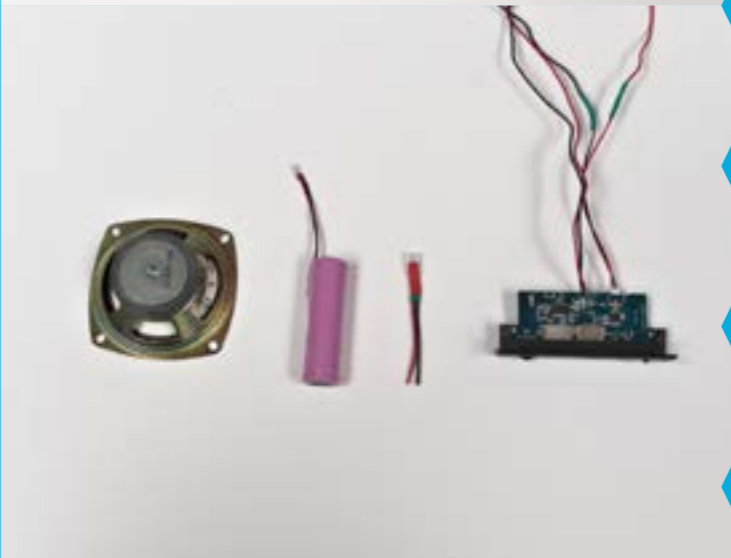
**Origin:** Calvairate, Milan

## TOOLS

- \*Chisel
- \*wood rasp
- \*screwdriver
- \*3×20 screws
- \*plywood slats 15 thickness
- \*wood drill bit 10 mm diameter
- \*wood hacksaw
- \*masking tape
- \*plexiglass mirror
- \*laser cutter
- \*hot glue
- \*electronics bench soldering iron
- \*tin
- \*electric cables
- \*colour spray can
- \*quick glue
- \*heat-shrinking tube

## RATING

- ★ ★ ☆ ☆ ☆ **Difficulty**
- ★ ★ ★ ★ ★ **Circular impact**
- ★ ☆ ☆ ☆ ☆ **Processing cost**
- ★ ★ ★ ☆ ☆ **Time**
- ★ ★ ★ ☆ ☆ **Fab Lab**



## 1\*

Disassemble the components of the bluetooth case: buttons, speaker, LEDs, battery etc. taking care to maintain each individual component (screws and cables etc.).

## 2\*

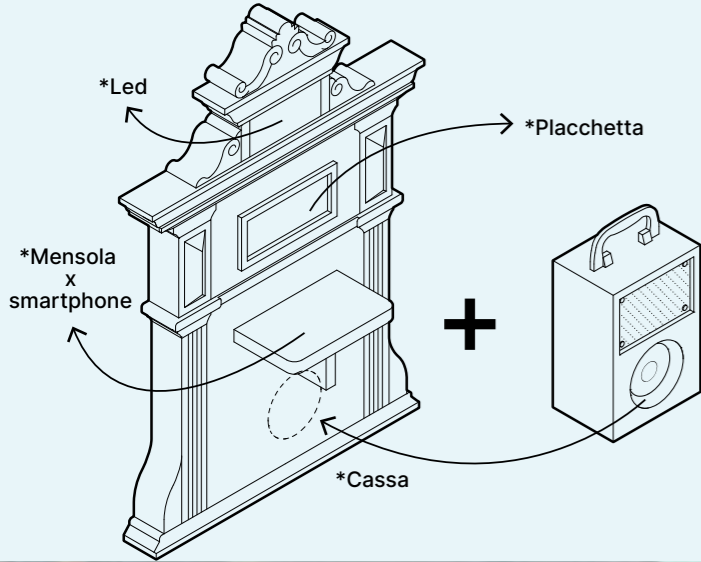
Be careful when separating the components. The first thing to disconnect is the power supply or battery. Then disconnect the rest gently to avoid damaging the board connections.

## 3\*

The riser of an old bedside table was removed during the minimisation process, why not turn it into something else?

## 4\*

The object has a small shelf the size of a smartphone and rectangular mouldings that could accommodate speaker elements.



# 5\*

Design your object. The Bluetooth speaker will become an altar for music to hang on the wall.



# 6\*

Choose where to place the electronic elements on the riser. Use masking tape to draw the exact position of the components and screws. These drawings will serve you as a template.



# 7\*

To cut out the component housings, follow the drawings and start drilling holes with a drill, as close to each other as possible. With a saw, remove the material for the speaker housing.



# 8\*

Finish the edges with a wood rasp.



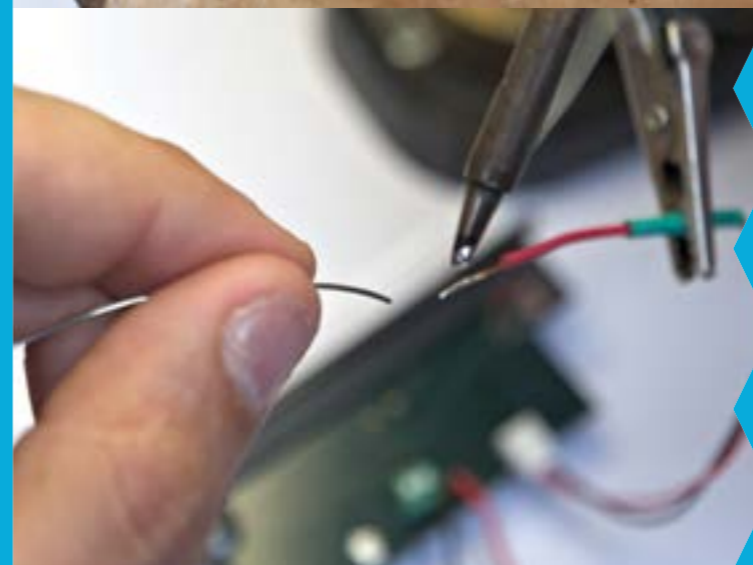
# 9\*

Repeat this process for the remaining wooden recesses, which will accommodate the speaker LEDs and buttons. If necessary, adapt the frames to the elements' dimensions, or create masks with other materials of your choice.



# 10\*

Insert the electronic components and modify the connections between the circuit board, LED, speaker and battery to fit the size of the riser.



# 11\*

Cut the cables 5 cm longer than the required length, but if they are too short, add cable by tin soldering the two ends. Cover the soldering with a heat-shrinking tube.



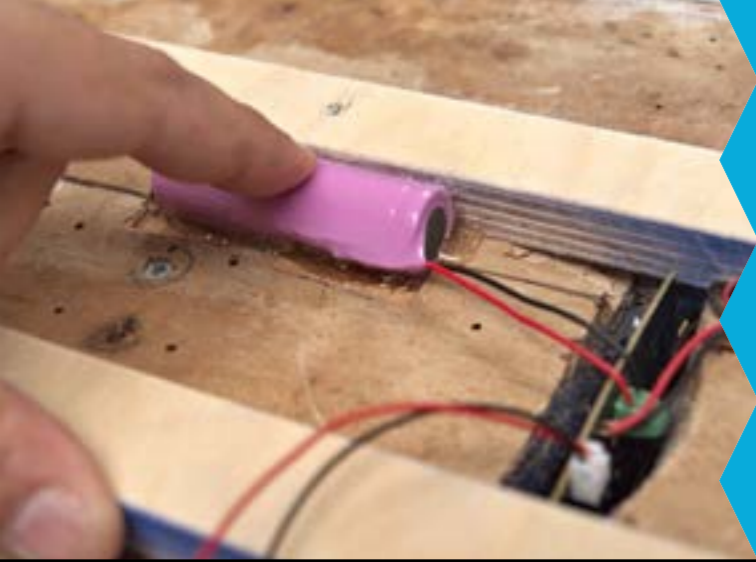
# 12\*

To protect the electronics and prevent them from touching the wall once the final object is hung, place wooden elements on the back to create a shim.



## 13\*

Customise your object by painting it with a spray can. Maintain a distance of at least 30 cm and cover the gaps evenly by spraying from different angles. Repeat several times for an even result.



## 14\*

Once the paint is dry, insert the electronic elements. Use hot glue to secure the battery, buttons and keep electrical cables in order.

### LINK

Tutorial → [IKEA Hackers](#)

### REFERENCES

Bhoite



Campana Brothers



Enzo Mari



Upcycling

Changing

Unwanted  
Furniture!



## Trasformare

The material used to make a product is often underestimated. Even after the functionality is no longer recoverable, the material is still an asset. The most obvious case is solid wood, which can easily be cut and glued to recreate new objects. Less obvious when it comes to plastic, which is normally only recyclable in large industrial plants. Today it can be processed with small, self-building machines. An extreme example is biomaterials which are made from easily purchased products, they are composed of biopolymers and inert waste including coffee grounds, dried and chopped orange peels, eggshells, and sawdust obtained from wood processing.

### IDENTIKIT

#### **Waste plasticl**

**Problem:** why discard when you can transform it?

**Year:** Contemporary

**Origin:** Superstudio.xyz  
Sant'Agostino, Milan

#### YOU HAVE

inert waste material that can be used as a primary material

#### YOU WANT

to create a material with new properties, or experiment with the production of biomaterials

#### TOOLS

- \*recycled plastic sheet
- \*CNC milling machine
- \*superglue
- \*3D modelling software

#### RATING

- ★★★★☆ **Difficulty**
- ★☆☆☆☆ **Circular impact**
- ★☆☆☆☆ **Processing cost**
- ★★☆☆☆ **Time**
- ★★★★★ **Fab Lab**



# 1\*

Filament 3D printed objects are difficult to recycle. Some local companies (such as Superforma in Milan), following the example of Precious Plastic, have equipped themselves with shredders to treat this material.

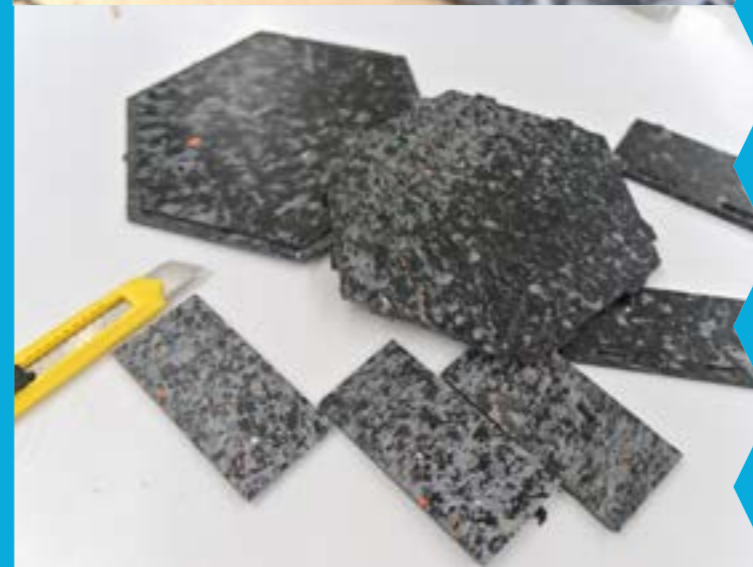


# 2\*

These flakes are sorted by colour and pressed into hot sheets, creating a new material (second raw material). A box can be created from the sheet, using a CNC milling machine.

# 3\*

To create the hexagonal sides, the edges are cut at 60 degrees by making several passes.



# 4\*

Once the cut pieces have been removed from the CNC milling machine, clean the filaments' edges with a cutter.





## 5\*

Using masking tape, pre-assemble the box without gluing it to check that everything fits together, temporarily blocking the pieces.



## 6\*

The sides fit, but the bottom has some gaps. This is due to the uneven thickness of the sheet, a common issue in self-made materials.



## 7\*

Turn the box on its bottom and seal the gaps using clear packing tape. Make sure no gaps are left.



## 8\*

Mix a small amount of two-component epoxy glue, quickly and evenly.



## 9\*

Put small drops into the larger spaces to fill them. The glue will run down to the clear tape, forming a flat surface.



## 10\*

For joints that fit well, you can use a quick superglue. Use just a few drops to avoid white halos and leave to rest in a ventilated place.



## 11\*

Once the resin has hardened you can remove the tape and fill in any other gaps using bodywork filler. Mix the two components with a spatula.



## 12\*

Spread the filler along the edge then remove excess with the spatula and wipe off with a tissue.

## LINK

Archive → [Materiom](#)

Project → [Precious plastics](#)

Generator for creating laser-cut boxes → [MakerCase](#)

## REFERENCES



**Max Lamb**



**Orange fiber**



**Duccio Maria Gambi**

