



Reduce Your Plastic Waste

Learn the Art of Repair



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The complexity of plastics eludes most of us, especially when it comes to repairing items made out of plastic. Plastic has become an integral part of our lives. Many products are made entirely out of plastic. Other, larger items have components made of plastic such as vacuum cleaner nozzles, refrigerator shelves, handles, cases and dolls. Plastic can be a useful material, being lightweight, mouldable, and durable but for items with a short lifespan the durable becomes a real problem. When broken, the majority of these items can't be recycled, so they are usually just thrown out with the general waste collection.

Plastic items are not as easy to understand and fix as traditional old school wooden toys and furniture. Often the item still works (like a fan, heater or hedge trimmer), but the aesthetic parts, stand, or handle may break so the item is thrown out. Unlike most packaging, household plastic items don't always come with an identifying category number (1-7), so how do you tell what can be recycled?



The reality is that it likely isn't recyclable at all! In most regions of New Zealand, plastics type 1 (PET), 2 (HDPE) and 5 (PP) are recyclable. But the ability to recycle depends on further factors. If contaminated with dyes or plasticizers only, that plastic may be made into more food grade packaging. Or, if contaminated with other chemicals, it goes to janitorial grade. However, for things designed to last longer like appliances, other materials may be added for safety and functionality, such as flame retardants, paints, layers of different plastics, metal, electronics, fiber and more. The more materials combined in one product the harder it is to recycle, and the more toxic it may be.

Moreover, plastics pose a greater problem than just creating waste, they can have a significant contribution to resource depletion in the use of fossil fuel to create them but also in the energy and fuel use for manufacturing, freight, and packaging resulting in further carbon emissions. The best-case scenario is to avoid plastics, especially cheap items that break easily – but for situations when plastic is an integral component, or you already own something that contains plastics, repair can change give broken items new life and enhance their circularity!

One of the more common plastics used in appliances and homeware is polystyrene, not to be confused with the lightweight squeaky white stuff. Polystyrene (PS) or similar material ABS is often found in a high-density form, which appears no different to recyclable plastics. Yogurt containers, fridge shelving, or plastic casings for e-waste are common examples of polystyrene in our everyday lives. Polystyrene is easily recyclable, however, there are no

recycling facilities for it in NZ due to the economics involved. The upside of this is that PS is technically easy and cost effective to repair, with the properties to be easily bonded back together through plastic welding.

A niche group of people around New Zealand are highly skilled in the dying art of plastic welding using in hobbies such as model making. Model maker Ian Robertson is a volunteer at the Palmerston North Repair Café and has been teaching the tricks of plastic repair. He is self-taught from making model trains and trams, and even has models at MOTAT. Ian uses a combination of chemical welding and glues to repair items.

Plastic Welding

Heat can be used for larger items and is easy to do with a soldering iron or lighter, but is more unpredictable to work with, can damage items more, and can sometimes release hazardous chemicals. Be aware that plastics are highly flammable and may contain toxins, so open flames or high temperatures can be dangerous.



Melting plastics together can achieve a good bond, but the plastic may become thinner, more rigid, and less durable. Adding an additional layer of plastic to the bond in a similar fashion to soldering metal could add reinforcement.

Solvent

Strong solvents like methyl ethyl ketone (MEK) can be painted onto a crack or break to meld plastics together in seconds without any heat. To test whether the solvent will work, paint a small patch. If it changes texture and becomes shinier, the solvent will work.

The item should be clamped and left to cure for 24 hours before use. The welding will produce a bond stronger than heat but will often still be a weak point (e.g., a joint) on an item so reinforcement is a good idea, either using metal or adding extra plastic to the joint.



Glues, Screws & More

Not all plastics can be welded together chemically or with heat, such as thermoset plastics, but they can still be repaired with a bit of clever kiwi ingenuity. Glues, screws, and adhesives can be used to fix many larger sturdy items or small intricate items. Loctite (can be purchased from most hardware stores) is a strong epoxy that will can be applied to cracks or breaks to create a lasting bond for most plastics and restore it to its original quality and strength.

Steel screws, mesh or brass wire can be used to reinforce small fragile items or anything weightbearing, with brass being particularly good due to its malleable properties. Gluing cracks or breaks with a strong epoxy is often all an item needs to restore it to its original quality and strength.



Learn More Online From The Community

Many YouTube videos and tutorials can show you how to use these methods. Make sure you always work in a well-ventilated area and be aware that there are risks working with heat or solvents.

For items with electrical components, always ensure cables and insulation have not been damaged during the repair. With any of these methods, the final product can either add character or make it look badly repaired. Giving it a quick file, sand and light paint with craft paint, nail polish or even a permanent marker can make it look good as new!

In an ideal world, quality would always be chosen over price. Quality products last much longer and are replaced less often so can end up costing you less in the long run. Locally made quality items also have a much lower environmental impact, support your community, and can possibly even be fixed by the people who made it.