



Trashmagination Podcast #105 – Polystyrene Foam

Welcome to Trashmagination, a podcast about reimagining trash. I'm Carla Brown. Today's episode is about what is commonly called Styrofoam or more accurately called polystyrene foam. Before social distancing, there was a growing movement to bring your own containers to restaurants, but now many restaurants will not put food in people's personal containers. So it's a sad time for many people who want to reduce take-out food waste. Today we'll talk about what options exist for avoiding polystyrene. We'll also talk about efforts to recycle it. Of course I'll share stories about artists who make artwork from polystyrene and I'll share creative reuse ideas that you can do at home.

But first, what is polystyrene foam? There are two types – extruded and expanded. The most common extruded type is Styrofoam with a capital S, which is a brand name for a type of polystyrene foam made by Dow Chemicals. You might have seen these blue sheets that go up in the walls as insulations in buildings. The type of polystyrene foam that you probably encounter more often is called expanded polystyrene foam. That's what is used in to-go food containers and meat trays. Other materials made from expanded polystyrene foam are egg cartons, packing peanuts, coolers, body boards, crown molding and fishing equipment such as buoys and floats. All this foam is the type 6 plastic.

There are many reasons why polystyrene foam is popular across many industries. It has great insulating properties. It is lightweight and floats. It's inexpensive, waterproof and it can hold hot food so you don't burn your hands.

However, this material has lots of problems. It is made from petroleum and releases carcinogens when heated. It gets blown by the wind all over the place. When it breaks down over time, it becomes little tiny pieces of polystyrene which are a huge pain to clean up and which are eaten by wildlife. Recycling programs are not cost effective for this material.

Avoiding Polystyrene in the First Place

Some places have banned polystyrene to-go containers such as Maine¹, Maryland, New York² and Washington DC. Where I live in Virginia, there is a bill before the state legislature called House Bill 533 that would ban these containers, but it is currently stalled [<https://www.dailypress.com/virginiagazette/va-vg-wire-plastic-foam-0304-20200303-ylpcmemijfhstkamemyxr7p5um-story.html>].

If you are ordering food to-go and you want to avoid polystyrene or other plastic packaging, chances are good that you can't do it during social distancing. For now, you can patronize restaurants that use more recyclable packaging or ask your favorite restaurants to switch to better packaging.

Asking to have food put in your own container is daunting for most people, so I was excited to hear about a program in Durham, North Carolina called Green-to-Go [<https://durhamgreentogo.com/join/>] which started in 2017. I heard about this program on the podcast "Locals Share Green Action." This week's episode is an interview with Crystal Dreisbach who started the Green-to-Go program [<https://www.gogreenlocally.org/podcast/episode/27d9b6b5/crystal-dreisbach-greentogo-dont-waste-durham>]. The way the program works is that restaurants sign up to have these special Green-To-Go containers on hand. People subscribe to the program and when they order at the restaurant, they say, "I am a Green-To-Go subscriber." Then the restaurant will put the food in these durable plastic containers. The subscriber can then return the container to any participating restaurant. The Green-To-Go program then picks up the empty containers and

¹ <https://www.usatoday.com/story/news/nation/2019/05/01/maine-first-state-styrofoam-ban-food-containers/3646709002/>

² <https://www.dec.ny.gov/chemical/120762.html>

cleans them in a commercial dishwasher. They then supply the clean containers back to the restaurant. Each plastic container can be used hundreds if not thousands of times. This system originated on university campuses. Durham is the first city to implement the program.

To be a subscriber to the program costs \$25/year or \$3/month. That gives you one box at a time, although you can purchase larger subscriptions for multiple boxes. If you lose the box, it costs just \$5. I would gladly pay that fee to avoid creating trash when I order food from my local restaurants.

Another thing I like about Crystal's interview is that she says there are many organizations that focus on littering and recycling, but fewer that focus on not making trash in the first place. That is an excellent point. Even this podcast focuses on using trash after it is already made. But I really admire Crystal's focus on avoiding trash in the first place.

While it is great that governments are banning polystyrene to-go containers, it is not a trend to ban polystyrene meat trays or egg cartons. Bea Johnson in her book *Zero Waste Home* gives lots of advice on how to bring your own container to the grocery store and ask the butcher or deli clerk to put the item in your own container. When she published her book in 2013, most stores probably had never been asked for this service, and so there were many stories where shoppers were told no due to health regulations. However in the time since then, so many people have asked for this service that most stores will put your meat or cheese in your container.

Other ways that people avoid polystyrene is by creating alternatives that work just as well. In terms of packing pellets, whenever I have received polystyrene pellets in a package, I bring them to a shipping store and they were happy to take them for reuse. Luckily these types of pellets are becoming less common and are being replaced by cardboard shaped into cells to provide cushioning, or plastic bags filled with air. Neither of those are great environmental options either but they are better than polystyrene because they are accepted by most municipal recycling programs.

I have seen packing pellets made from corn, so if you want to see if your pellets are made from corn, just get one wet. If it starts to dissolve, it is made from corn. I once saw a fun activity at a Maker Faire where they had these corn packing pellets, and the kids were making sculptures from them by making them wet and sticking them together.

In terms of the thick blocks of polystyrene used in electronics and other fragile packages, a company called MycoBond has developed an alternatives made from growing mushrooms. You can learn about that in a TED Talk by Eben Bayer who invented this material [https://www.ted.com/talks/eben_bayer_are_mushrooms_the_new_plastic].

Recycling Polystyrene

Next let's talk about recycling polystyrene. And you know from listening to this podcast that I define recycling as centrally collecting the material in a community with the goal of remaking it for reuse, as compared with creative reuse, which means making it into something new right at home or in your business. Recycling is always going to use more resources because it requires collecting and transporting the material.

In general, most municipal recycling programs do not recycle polystyrene. It's like the glitter of plastic recycling. It breaks down easily and sticks to everything else, contaminating the waste stream. It's dangerous to put it in your recycling bin because the wind will blow it out. Even if it could be collected easily and safely, it is not cost effective. This material is so light is because it is mostly made of air, so when a truck carries a truckload for recycling, more than 90 percent of that truck is just filled with air, which is very expensive air. One way to reduce the cost of shipping polystyrene is to first treat it with a solvent that makes it collapse and release the air. One of these solvents is called limonene and it's made from orange peels. It dissolves the polystyrene into a goo that you can dry and thus fit more into a truck³. But as you can imagine, that's quite a process and most municipal recycling centers don't have programs for this.

³ <https://science.howstuffworks.com/environmental/green-science/polystyrene-recycling.htm>

There is a website called Home for Foam with a map which shows places in the United States where you can bring polystyrene for recycling. There are none anywhere near me but you could check [<https://www.homeforfoam.com/foam-101/foam-recycling-centers>].

If you get polystyrene coolers mailed to your home filled with medical supplies, there are some companies that will take those coolers back and reuse them such as JML Recycling [<https://www.homeforfoam.com/medical-coolers-get-new-life-mail-back-program>]. I wish all companies that shipped their products in these coolers would take them back and reuse them, especially medical suppliers and meat subscription companies. If you get those products and those companies don't take the coolers back, this would be a great opportunity for advocacy or switching companies.

I visited one place that accepts large polystyrene blocks like from electronics packaging or from construction sites. In Boulder, Colorado, the organization Eco-Cycle has a place called CHaRM or the Center for Hard to Recycle Materials. They do not collect food grade polystyrene such as to-go containers or meat trays. I saw how they would bale up the polystyrene to make it easier to transport and ensure it doesn't blow away. They take the polystyrene to a recycler who made CD cases, light switches and cover plates. They also bring rigid foam insulation to the construction industry where it is used to pour new building foundations.

So that's how polystyrene is normally recycled. There have also been some very creative examples in the news for how to break it down into other materials.

In December 2016, Ashton Cofer gave a TED Talk called "A Plan to Recycle the Unrecyclable" [https://www.ted.com/talks/ashton_cofer_a_plan_to_recycle_the_unrecyclable] which has since been viewed almost 1.5 million times. Ashton shared about a project he did with three other students for the LEGO robotics competition called First LEGO League. In addition to a robotics project, they also worked on a science project. According to his TED Talk, polystyrene fills 25 percent of landfills and in the United States, we produce 2 billion pounds of it every year.

Ashton's team hypothesized that they could transform the carbon in polystyrene to make activated carbon which is a material used in many water filters. Ashton's team tried many methods of heating the polystyrene but repeatedly it just exploded in a sticky mess. In the end, they were successful and won many awards. However, I cannot find any information about what this team has done with their findings since the 2016 TED Talk.

The next idea for breaking down polystyrene involves beetle larvae which eat polystyrene and transform it into organic material [<https://www.the-scientist.com/news-opinion/beetle-larvae-can-survive-on-polystyrene-alone-67251>]. The larvae were able to survive even when their only food was polystyrene. Scientists found that bacteria in the gut of the larvae broke down the polystyrene into carbon dioxide. Now they would like to grow the bacteria outside the larvae to break down polystyrene.

Organizations Making Products from Recycled Polystyrene

Next I'm going to share stories about organizations who are making products from recycled polystyrene.

The first story is about surfboards made by Sustainable Surf [<https://sustainablesurf.org/>] through a program called Waste to Waves [<http://wastetowaves.org/>]. At surf shops along the California coast, they collect the big chunky white polystyrene that you'll find in boxes when you buy a computer or a big-screen TV. They bring the polystyrene to the workshop of a company called Marko Foam. They have a machine called a densifier which is about the size of a refrigerator. At the top of the machine is a grinder that breaks down the foam into smaller pieces. Then it goes into a part called a "hot pot" which melts down the polystyrene into a goo. The goo is output into blocks. These heavy dense blocks are much smaller and cost effective to transport than huge bags of polystyrene packaging. They transport the blocks to their raw materials supplier who remakes the polystyrene into its original light density but in the shape of a basic surfboard blank. The people working with this material say it has the same quality as polystyrene that has not been recycled. So rather than being an industry that just makes something you can't recycle, they now remove polystyrene from the waste stream. Surfers who get so much enjoyment from nature can now purchase a surfboard that doesn't

harm nature. You can see a great video showing the whole process on their website or in my show notes [<https://vimeo.com/64499821>].

I searched for body boards made from recycled polystyrene and I found that the company Pride Body Boards in France has a line of body boards made from a minimum of 65 percent recycled polystyrene [<https://www.pridebodyboards.com/en/content/42-recycled-bodyboard-pride>]. They are sold at the same price as the non-recycled boards.

Artists Who Creatively Reuse Polystyrene

Now we'll switch gears from products made from recycled polystyrene to artists who upcycle it. Of course many artists make work from brand new polystyrene foam. It's like clay in that it can be formed into just about any shape. But this show is about creative reuse of trash, not using new materials. So let me tell you about artists who work with polystyrene diverted from landfill.

The first artist is Joyce Majiski [<https://www.instagram.com/jmajiski/>]. My friend Johanna told me about Joyce's current project - building a whale skeleton from salvaged polystyrene. Joyce's project highlights a big problem caused by polystyrene buoys which often breaks down in the ocean or get ripped off of anchors, becoming marine debris.

When I searched for green alternatives to polystyrene buoys, pontoons and floats, I found none. In addition, many fishermen use hundreds of polystyrene coolers called fish boxes to hold the fish that they catch for transport, and many of those degrade over time and become trash. Oyster farms and aquaculture rely on polystyrene buoys and are a big source of marine debris. I read a report by an organization called Fauna and Flora International which studied this problem [https://cms.fauna-flora.org/wp-content/uploads/2020/07/FFI_2020_Breaking-Down-Ocean-Polystyrene_Summary-.pdf]. Some of their recommendations were:

- 1) Pull in buoys and gear from aquaculture installations when there is going to be a big storm
- 2) Test alternatives to polystyrene fish boxes
- 3) Test stronger protective coverings on buoys so it takes longer for the polystyrene to break down
- 4) Set up disposal and recycling facilities for polystyrene at ports and harbors

So back to Joyce Majiski – her project is called Song of the Whale [<https://joycemajiski.ca/songofthewhale/>]. She started carving in September 2019 and finished in May 2020. You can look through her Instagram to see her process of sketching the real whale bones and then carving a replica from polystyrene. The model was a 25-foot long juvenile female whale who died after being caught in fishing gear. She borrowed the bones from the Beaty Biodiversity Museum located on Salt Spring Island in British Columbia. As she carved the bones, she learned that polystyrene is quite a diverse material. Some is much easier to carve than others, some is stronger than others. The plan is to exhibit the whale where she lives in the Yukon Territory in December 2020.

- <https://www.instagram.com/p/B3Ceb0DHsvT/> - drawing the bones
- <https://www.instagram.com/p/B3LaSAIHnv/> - carving vertebrae
- <https://www.instagram.com/p/B3vwzaNnxr6/> - initial carved bones
- <https://www.instagram.com/p/B38XEfUnXIG/> - with whale skull
- <https://www.instagram.com/p/B7w7sJPnfhZ/> - video of carving
- <https://www.instagram.com/p/B9CSyabnmAZ/> - bones hanging on a line
- https://www.instagram.com/p/B9o0IOjH_KK/ - shoulder blade
- <https://www.instagram.com/p/B-Alf89n6L/> - ribs
- <https://www.instagram.com/p/B-INQBpn9t2/> - jawbone
- Tumblr - jmajiski.tumblr.com
- <https://www.gulfislandsdriftwood.com/arts-entertainment/yukon-artist-works-on-salt-spring/>
- <https://www.nationalobserver.com/2019/04/18/features/sea-styrofoam-and-sustainability-art-joyce-majiski>

The next artist who works with polystyrene is Eveline Koliijn [KOH-jeen]. She carves polystyrene with very intricate designs so they look like lace and calls them “Sublime Waste” [<http://evelinekoliijn.com/?project=sublime-waste>]. She carved to-go containers – what are sometimes called “clamshell containers” – as well as larger cubes and panels made of thicker slabs of polystyrene. She grew up in the Caribbean where she saw how trash was damaging the fragile coral reefs. She connects the clamshell to-go containers with clams in the ocean, but while real clams filter out toxins, clamshell containers *are* toxic.

- <https://www.instagram.com/p/BKGzAQiBhbj/> - carved to-go packaging and cups
- https://www.instagram.com/p/By_QvuBBXzV/ - carved polystyrene from thicker slabs
- <https://www.youtube.com/watch?v=zvIrbnHxhsU> – lecture by Eveline

I think it’s interesting that both Joyce and Evelyn are interested in how art and science intersect, and they were both drawn to polystyrene as a material to explore that topic. They both have a deep knowledge in natural history and wildlife. Polystyrene is such an unnatural material. I suppose it attracts them because it is so antithetical to nature which they are both passionate to protect.

Next I want to tell you about the artist Ang Li [<http://www.angliprojects.com/>] who I encountered when I was research my episode about artist residencies at landfills. Ang was doing a residency in the RAIR program, which means Recycled Artist in Residency located in Philadelphia [<https://www.rairphilly.org/ang-li>]. She put together a few exhibits based on that residency including one called All That is Solid that was shown on the Chicago Pedway which is a series of underground tunnels and overhead bridges that allows pedestrians to walk more than 40 blocks around Chicago while indoors [<https://space-p11.com/all-that-is-solid>]. She made 9 bales that were each 8 feet tall of compressed polystyrene foam. They didn’t have a specialized polystyrene baler in the places where Ang was working, so she made a rudimentary baler by building a large box, lining it with plastic, putting in the polystyrene and effectively shrink wrapping it into a bale. The components of these blocks were all different shapes, so the bales have all these embedded interesting shapes. She put wheels on the bales so they could be moved around to reconfigure the space in the gallery. Even though the bales are very large, they only weigh about 15 pounds each. In a lecture about this project, Ang notes that recyclables are valued based on their weight normally, and thus that is part of the reason why polystyrene is not valued by the recycling industry⁴.

When Ang is not working with polystyrene, she is an architect and Assistant Professor at the School of Architecture at Northeastern University. She is very interested in the environmental impacts of the building industry.

- <https://www.instagram.com/p/BzJUb-HHrZ4/> - During her residency (experimenting with block making)
- <https://www.instagram.com/p/B1ykKT4J2Wm/> - how it looked on the Chicago Pedway
- <https://www.instagram.com/p/B1wPft8plnd/> - moving around the bales

Most of the time when I look at polystyrene, I feel very sad. However it’s hard not to find humor in the work by Michael Salter who makes giant robots called Styrobots. He has built these in galleries all over the world. He makes them from the same materials that Ang uses which are the polystyrene packaging from inside electronics or similar packaging. When you look at those forms, they are reminiscent of robot components in that they have lots of nooks and crannies that look very purposeful and mechanical.

The Styrobots are intimidating because they are so big but also humorous because they are so chunky. Michael was inspired to make Styrobots by the 1931 version of the film Frankenstein. He writes, “I can’t think of a better comment on the devastating American addiction of buying things than a giant beast made from the evidence of the act of buying. Yet these beasts are not scary or threatening, but they are docile, fatigued, resigned or misunderstood.”

- <https://michaelsalter.com/section/28631-STYROBOTS.html>

⁴ <https://www.youtube.com/watch?v=zeTTklheTtl> – lecture by Ang Li at the Knowlton School of Architecture Fulfilled Symposium (<https://knowlton.osu.edu/event/fulfilled>)

- <https://michaelasalter.com/section/43186-San-Jose-Museum-of-Art.html> -
- <https://michaelasalter.com/section/349524-GOCA-UCCS.html>
- <https://michaelasalter.com/section/123620-Ulrich-Museum-of-Art.html>
- https://www.instagram.com/p/BPOQoyoDs_T/
- <https://www.instagram.com/p/BEEh0OZGX8U/>

Creative Reuse of Polystyrene at Home

To finish this week's episode, I'll share project ideas so you can do creative reuse of polystyrene at home. Let's start with polystyrene coolers, like the ones that come with meat subscriptions. Many people use these to make shelters for feral cats from these coolers. They cut a door in the cooler and line it with hay⁵. This helps cats survive the winter.

Another project you can make with these coolers is a DIY foot stool or ottoman [<http://mattande.blogspot.com/2013/07/project-styrofoam-cooler-ottoman.html>].

Some people creatively reuse polystyrene coolers to make gravestones for Halloween decorations [<https://www.diynetwork.com/how-to/make-and-decorate/entertaining/how-to-make-styrofoam-tombstones-for-halloween>]. Most tutorials encourage you to buy new sheets of polystyrene, but I encourage you to creatively reuse a cooler instead or maybe you can get a sheet of polystyrene from a construction site that is tossing some away. The way they make very detailed gravestones is to trace on a pattern and then draw it from the polystyrene using a soldering iron. They make the surface of the gravestone look like stone by painting the carved foam with something called Monster Mud, which is a mixture of drywall compound and water-based paint.

The next project ideas are all for polystyrene trays. Of course it is very important to clean them extremely well before using them in crafts. They can be useful to teach basic printmaking. You can carve an image into the tray, color them with washable markers or paint and then make a print [<http://www.pinkstripeysocks.com/2020/06/easy-styrofoam-and-marker-printmaking.html>]. You can cut the trays into shapes, glue to them wine corks and use them as stamps [<http://www.pinkstripeysocks.com/2015/02/easiest-diy-wine-cork-stamps-ever.html>].

The most ambitious home recycling project that I saw for polystyrene was by Keya Lea. She wanted to see if polystyrene waste could be reused as insulation in a wall [<https://greenpassivesolar.com/2012/11/how-styrofoam-can-be-recycled/>]. She built a frame from wood and then filled in the gaps with polystyrene that she collected. It was quite challenging because a lot of the polystyrene was small and she had to find a way to make it fit together. But in the end, she did find it worked as an insulator, and many people who commented on her project said they found the same result.

Thank You for Listening!

Thank you for listening! If you have made something cool from polystyrene or you have seen art made from recycled polystyrene, please let me know at trashmagination@gmail.com. Also, thank you to my friend Angela de Burger who interviewed me on her new podcast called The Creative Pulse. It was so fun talking about why I love researching creative reuse. Angela is a great interviewer! Be sure to subscribe to both of our podcasts! Until next time, may you see trash as a source of art in your life!

<https://www.pinterest.com/Trashmagination/polystyrene-foam/>

⁵ <https://shawneemissionpost.com/2019/02/21/roeland-park-family-builds-cat-shelters-out-of-styrofoam-coolers-77184/>