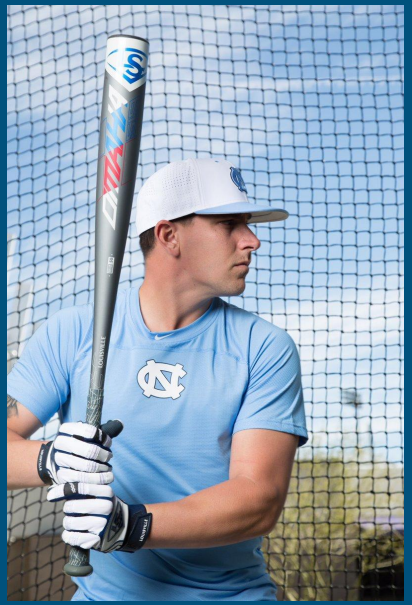
Life Cycle Analysis

Everyday objects and their impact on the environment

Environmental Sustainability class
Fall Semester 2021

LCA of a Metal and Wood Baseball Bat

Ethan Goldstein



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Proposed Alternative

So... Which is Better?

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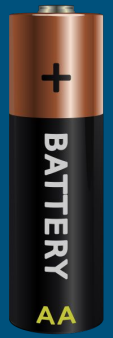
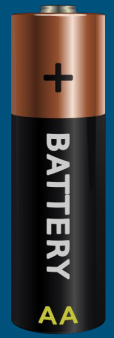
LCA of a AA (Alkaline) Battery





Rocco Pacchian

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What can change?

There are many ways to reduce the environmental impacts of AA batteries. I think the first thing is to use rechargeable batteries. These batteries may be a little bit more expensive, but they will still get the job done and can even save consumers money in the long-run. They have low self-discharge and you can let lots of recharges out of them. By using rechargeable batteries, fewer batteries will have to be produced and thrown out, drastically decreasing the impact on the environment. Also, if we could find a way to increase the lifespan of a AA battery, there would be a lower quantity supplied and an overall decrease of environmental impacts. Another improvement would be advancing the design and manufacturing process of AA batteries to reduce the impact that deteriorating batteries have on the environment when they sit at landfills. For the recycling process, consumers could get better habits of recycling their dead batteries so that there is enough of dead batteries for companies to have economic incentives to recycle them. This could be done through advertising campaigns. By recycling AA batteries more often, the environmental impact of the AA battery goes down by getting rid of the material extraction and production phase - the phase that uses the most energy and has the greatest carbon footprint.

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LCA of a Tennis Shoe

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Proposed Alternatives

The tennis shoe or any shoe can’t really be replaced. Though there are two things that can be done to reduce the carbon footprint of so many shoes. One is to not buy so many shoes. Of course we need to get a new pair every now and then but we shouldn’t be buying shoes for the sole purpose of putting them on the shelf never to use them. If they’re never used, then their carbon footprint won’t be equalized. The second method is for the companies that actually make the shoes to adopt more eco friendly methods of creating their products. Nike is already demonstrating this by changing the how their shoes are made and using better materials.

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LCA of a Cotton Shirt

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Proposed Alternatives

The current cotton industry has many harmful aspects like harmful chemicals; excessive water and electricity consumption; exploitation of workers; etc. However, organic cotton farming along with organic dye and renewable energy practices provides a much better alternative. Organic cotton does not use any synthetic fertilizer or pesticides. In a study of Eco T-shirts, shirts produced using a green dyeing in addition to organic cotton, compared to the typical cotton t-shirt and its production, “The results reveal that Eco T-shirts have lower impact potentials across all inspected categories, with the most dramatic reduction in aquatic eutrophication potential (up to 97%) due to elimination of nitrogen and phosphorus containing chemical based fertilizers.” Organic cotton farming has huge potential to create a more sustainable cotton and clothing industry, but organic cotton yields less usable cotton so farmers have to buy more land and cotton in order to make a profit. For this to work best, consumers need to buy less shirts or in other words purchase shirts they know will last and work for them in the long term. High demand for cotton shirts allows companies to continue using unsustainable practices but, by lessening the demand, organic cotton farming becomes a more viable option. Organic cotton farming also focuses more on reducing the use of harmful chemicals in fertilizers and pesticides, however, the amount of water used remains about the same. Although these changes are more expensive, the cost is well worth the reductions to the environmental impact. In another study of the life cycle assessment of cotton woven shirts and alternative manufacturing techniques, they found that, “Using organic cotton cultivation and renewable energy sources instead of the traditional techniques, decreased eutrophication potential, acidification potential and global warming potential by 48%, 52% and 70%, respectively.” Larger companies should switch to organic cotton in addition to improving their factory work conditions for the best results. Regular consumers should also try to make thoughtful purchases when choosing shirts and try to get as much use out of them as possible.

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LCA of Baseballs

Cradle to Grave

https://durhamacademy.padlet.org/tinabessias/thomaspollard

Proposed Alternatives

There are a few possible alternatives to baseballs and the way they’re made and packaged. A synthetic cover as opposed to leather would eliminate the most carbon intensive part of the process, along with possibly extending ball life. It may take longer to break down, but the benefits would likely outweigh the cons. Currently, there is very little research regarding synthetic ball covers.
Another possibility is biodegradable packaging. The plastic wrap does not biodegrade, and it would be a lot better for the environment if it did.

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LCA of Soccer Cleats

https://durhamacademy.padlet.org/tinabessias/elijahnambo

Proposed Alternatives

evoPOWER Vigor 1

These cleats were released by puma in 2017 and were one of the first cleats of their kind. They used waterborne polyurethane technology to make the shoes more environmentally friendly and sustainable. Waterborne Polyurethane is made up of polymer resins dispersed in water, this allows for a more environmentally friendly water based paints, coatings, and adhesives. these cleats were produced with 95%less water and over 50% less energy. They also had a 44%lower carbon footprint. Puma worked with Covestro and Trans-Textil to create the coating formulation and technology for the cleat. This is prime example of how sustainability can be incorporated with the design and manufacturing of football cleats and create high quality durable cleats. Not only does this show one of the possibilities where the design and production of cleats can go but it also shows how sustainability is considered and thought about in the production of cleats.

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