

## Social and Environmental Impacts of a Stapler By David Cyron and Veronica Spencer

Every year thousands of parents proudly send their kids to college for the first time, loaded down with fresh school supplies. Only the best parents remember to pack a stapler, perfect for finishing and submitting the too-common last minute assignments. Small staplers, like the Swingline Tot Mini Stapler, are extremely convenient, costing only \$5 in the US market.



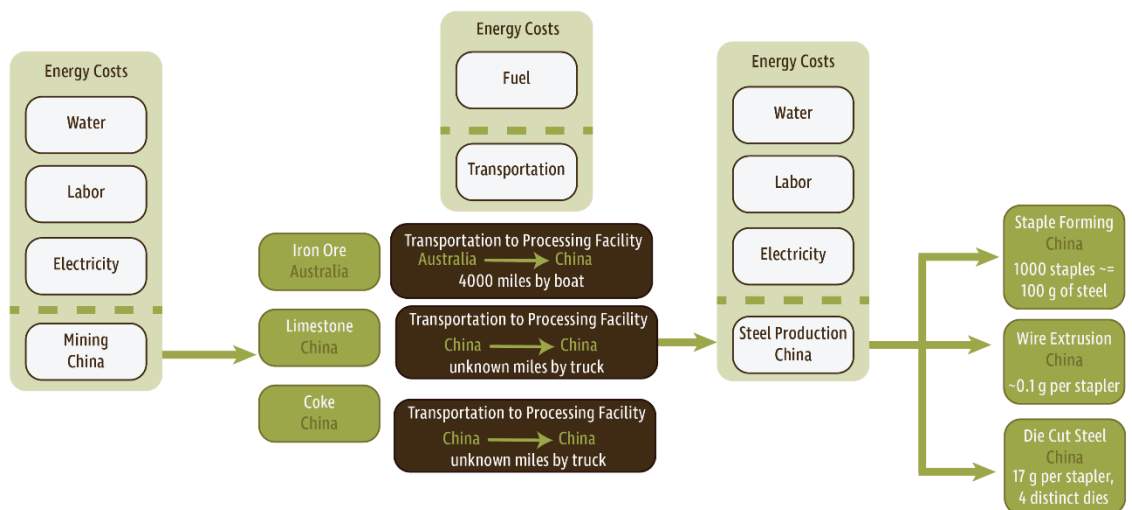
But there's a deeper cost to goods than the price tag on a shelf. We set out to calculate the worldwide influence of the annual production and distribution of staplers in the United States. To determine this, estimating impact by extrapolating findings of an environmental and social life cycle analysis on a single stapler.

We began by breaking down a Swingline Tot Mini Stapler into base components. All of the internal components of the stapler are made up of ABS plastic, rubber, and stainless steel. The staples are made of normal steel and the stapler includes 1000 staples in the package.

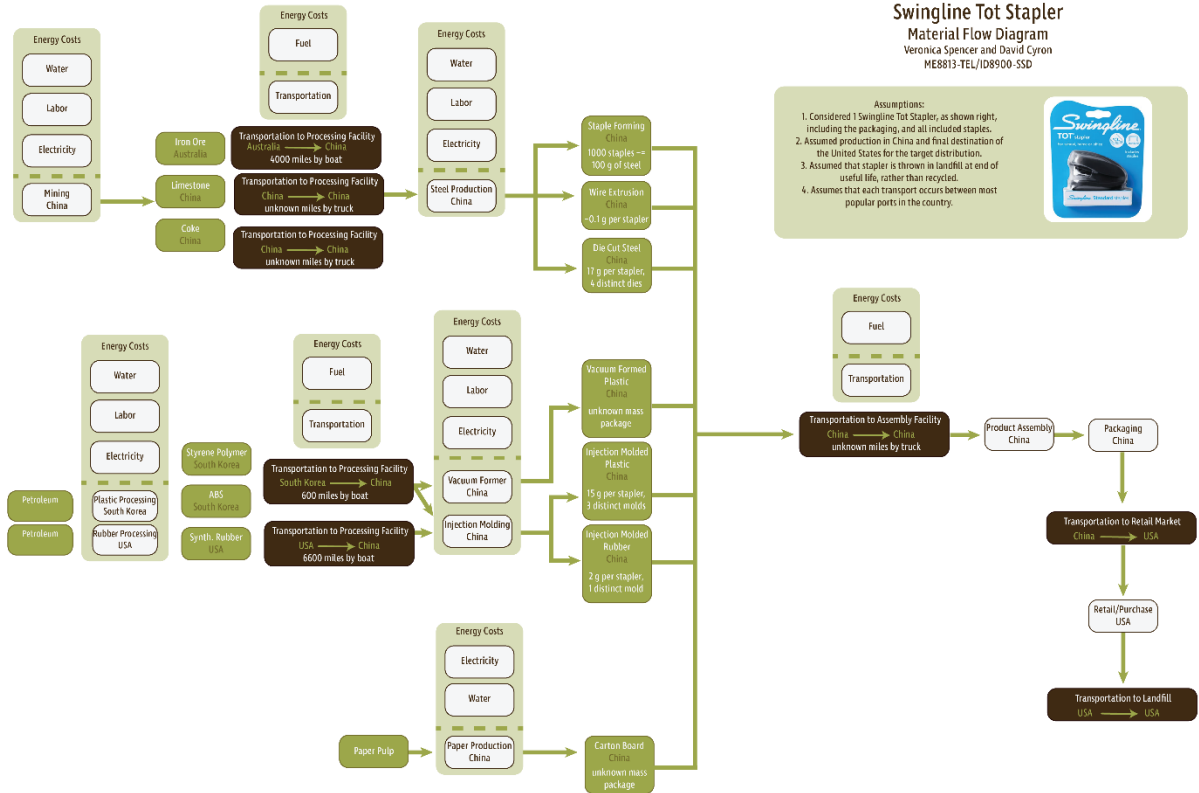
## Material Breakdown by Weight



Although the stapler was assembled in China, very few of the resources originated there. With a bit of sleuthing, we identified the primary exporters of plastics, steel, and rubber to China, as well as the sources for packaging materials. The processing of each raw material was further examined to find the energy transitions throughout the process. The steel refinement process is shown in detail below.



Eventually, the processed materials converge to a manufacturing hub in China, where they are shaped into the finished components of the stapler. After assembly and packaging, the stapler is shipped to America via boat; the staplers are then distributed to campus bookstores across the country via truck<sup>[2][3]</sup>. All of these processes are summed up into one final material flow diagram, as seen below.



Using our material flow diagram, a number of assumptions were made for the final analysis. 60% of carton board used in the packaging is made from recycled material. Therefore, that percentage as well as the density of carton board was used to determine the amount of wood needed to produce carton board.<sup>[4]</sup> The PE-Americas and Five Winds International reference was used to determine the energy input and the carbon dioxide emissions from carton board manufacturing.<sup>[5]</sup> Extrusion was assumed for all stainless steel parts because the effects of die cutting were not available. Assuming these boats/trucks would be shipped regardless of one stapler package, only the stapler's weight was factored into the environmental impact. Finally, we assumed that shipping would occur between the most active ports in each country.

## More than 7 countries work together to produce a humble Swingline Tot Mini Stapler.



We were able to summarize the overall energy involved in the production of the stapler. The environmental life cycle analysis found that the manufacturing phase of the stapler had the most environmental significance. Overall, one Swingline Tot Mini Stapler provides over 160 grams CO<sub>2</sub> equivalent to Global Warming. Just one \$5 stapler doesn't have much of an impact, but, when scaled to reflect the \$80 million worth of staplers sold annually in the US<sup>[6]</sup>, staplers contribute over 2 million kg of CO<sub>2</sub> equivalent of Global Warming Pollution. To put this in perspective, the stapler market accounts for over 500 passenger vehicles worth of emissions each year!<sup>[7]</sup>

The US stapler market makes \$80 million annually -  
which is 16 million mini staplers.



Producing all of these staplers has the same annual  
CO<sub>2</sub> equivalent of operating 500 passenger vehicles.

Alongside the environmental lifecycle analysis, a social LCA was performed to assess the potential for social impact of the stapler on the communities with which it interacts. Impacted communities were determined by the material flow diagram, and then investigated by industry sector with the Social Hotspots Index tool available on the Social Hotspots Database<sup>[8]</sup>. Before normalizing the social risk of each involved industry, manufacturing in China and oil extraction in both Canada and Saudi Arabia provided the largest risks. Using percentage of mass of different materials in the final product, the social risks were normalized, indicating that water transport and manufacturing posed the most risk to the community. Assuming ACCO Brands adheres to their Corporate Social Responsibility Policy<sup>[9]</sup>, which commits to low impact sourcing and manufacturing practices, production of each stapler is an overall low social impact risk.

Disclaimer: The results in this study are estimated using assumptions and available data. They do not claim to be definitive measures of any particular producer's impacts.

#### References:

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