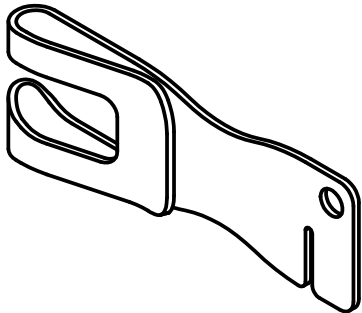


 LittleBonsai

The Clip | Environmental Report

Version 1, November 2011



 **Designed for environmental responsibility**
More at: www.littlebonsai.com/environment

This report provides information on the environmental impacts associated with the Clip. It presents the ecodesign strategies that we applied to reduce environmental impact at each stage of the Clip's product lifecycle. It complements our goal of environmental transparency.

Tools and Methodology

We made use of the Sustainable Minds (<http://www.sustainableminds.com>) single-factor Life Cycle Assessment (LCA) methodology to assess the environmental impacts associated with the Clip. Single-factor LCAs allow total environmental impact to be expressed as a single weighted number. We have followed an LCA framework outlined by the US Environmental Protection Agency (EPA) that considers product system scope/ boundary definitions, material inventory analysis, impact assessment and improvement analysis.

Environmental Claims

The Sustainable Minds single-factor LCA is intended to be used as an internal tool by designers to make informed environmental decisions; it cannot be used to make external quantitative and comparative environmental claims. We follow ISO 14021 standards to communicate environmental decisions related to the Clip.

As we continue to grow and gain access to more sophisticated LCA resources, we plan to conduct more rigorous and comparative environmental analyses.

Units and Data Accuracy

Sustainable Minds LCA analysis uses the point (or millipoint); a single-factor unit that applies relative weightings to environmental impact categories including ecological damage, human health damage and resource depletion. In the system, one point is defined as "the estimated impacts in each impact category to be produced by the average person in the United States in one year." (Sustainable Minds)

The analysis included in the following report is based on a number of clearly communicated assumptions, including data approximations where necessary.

What is an LCA?

Life cycle assessment (LCA) is a “cradle-to-grave” approach for assessing the impacts associated with our products. An LCA model considers the full lifetime of a product, which can be represented generally by the following stages:

Raw Materials

Almost every material we deal with on a day-to-day basis has been extracted and processed from its raw form. For example, metals are derived from metal ores, which in turn are extracted in large mines. Plastics are derived from crude oil.

Manufacturing

Raw materials are turned into final products through manufacturing processes, which often involve multiple stages, each with its own associated impact. Recycled materials, while environmentally favorable, still have an associated impact as they must be collected and processed/ manufactured into new forms.

Transportation

As a result of our complex global supply chain, many products have multiple transportation associated impacts. For example, raw materials are first transported to a manufacturing facility. Final products may then be transported to temporary warehouses, before reaching the customer.

Use

Many products generate environmental impacts when they are being used. Cars, for example, have a substantial use-phase impact due to the emissions they generate when they are driven. Electronics consume energy during their use phase.

Disposal

Ideally, a product's impact upon disposal would be reduced by recycling or reusing its materials. The reality, however, is that many products are difficult to recycle due to the materials they are made from or because it is difficult to separate these individual materials. In many cases, products are also incorrectly disposed of and end up in large landfills where they have a toxic impact on the environment for many years.

Ecodesign Strategies

We employed three main groups of ecodesign strategies when designing the Clip that helped to reduce the product's lifetime environmental impact.

Optimized Product Lifetime

- Design for durability
- Use high quality materials
- Design simple product forms
- Create emotional value

Efficient Distribution

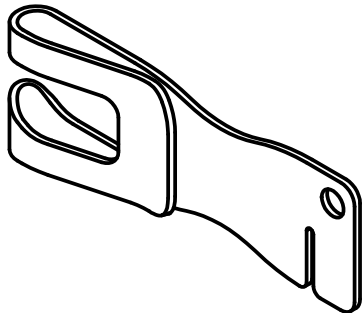
- Produce locally
- Minimize packaging

Optimized End-Of-Life

- Design for recyclability
- Communicate proper end-of-life treatment

System Boundary

LCAs require the definition of a system boundary that determines which parts of a product system are being considered in the analysis. Our system boundary is described below.



Inside System Boundary

The Clip and its associated material, manufacturing, distribution and disposal-related impacts.

Material impact of the special tooling that was manufactured to create the Clip.

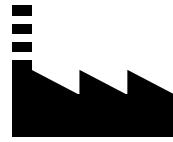
Outside System Boundary (not considered)

The impact associated with all other objects the Clip interacts with, including: bottles, credit cards, food packets etc.

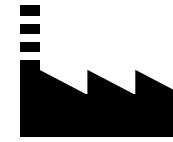
Product System



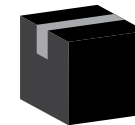
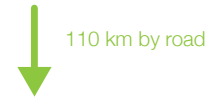
Raw Materials
Stainless steel
Wood/recycled cardboard



Manufacturing/Processing I
Metal stamping (turret punch)
Metal bending (press brake)



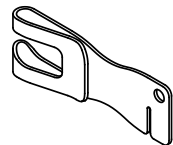
Manufacturing/Processing II
Steel hardening



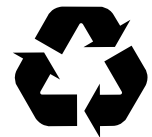
Packaging Assembly
Warehouse in Boston, MA



Delivery
Direct delivery to customer
(Variable distance by road or air)



Use
Use by customer
(No direct environmental impact)



End-of-Life
Recycled at appropriate facility
Landfilled in worst-case

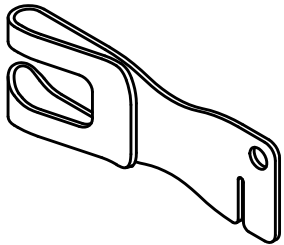


Product Concepts

Our LCA compared a number of product concepts with a reference case (the selected design) to assess the impact of various ecodesign strategies.

SELECTED DESIGN

Local Prod. & Recycled



Produced locally with locally sourced steel

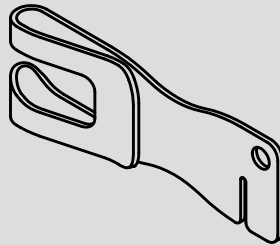
Delivered by road to a mainland US address

Recycled at end-of-life

5 year life time

ALTERNATIVE PRODUCT CONCEPTS

Incorrectly Disposed



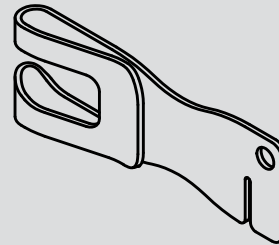
Produced locally with locally sourced steel

Delivered by road to a mainland US address

Incorrectly disposed (landfilled/incinerated)

5 year life time

Shorter Lifetime



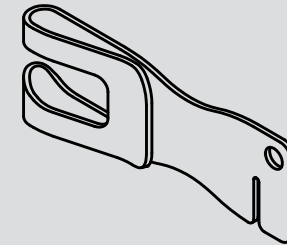
Produced locally with locally sourced steel

Delivered by road to a mainland US address

Recycled at end-of-life

2.5 year life time

Foreign Production



Produced in China with Chinese steel

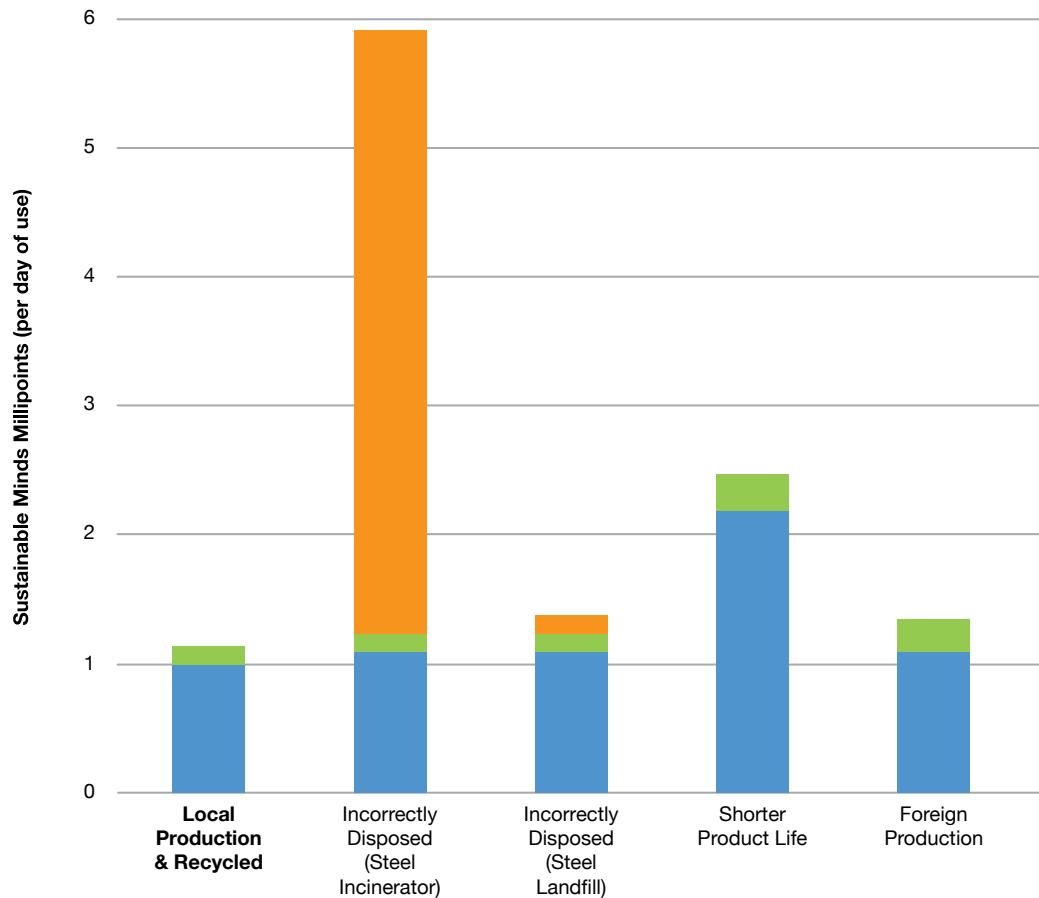
Delivered by ship and road to a US address

Recycled at end-of-life

5 year life time

LCA Analysis Results

Environmental impact of different Clip product concepts



Key (Lifecycle Stages):

- Materials & Manufacturing
- Transportation
- Use
- End of Life (Disposal)

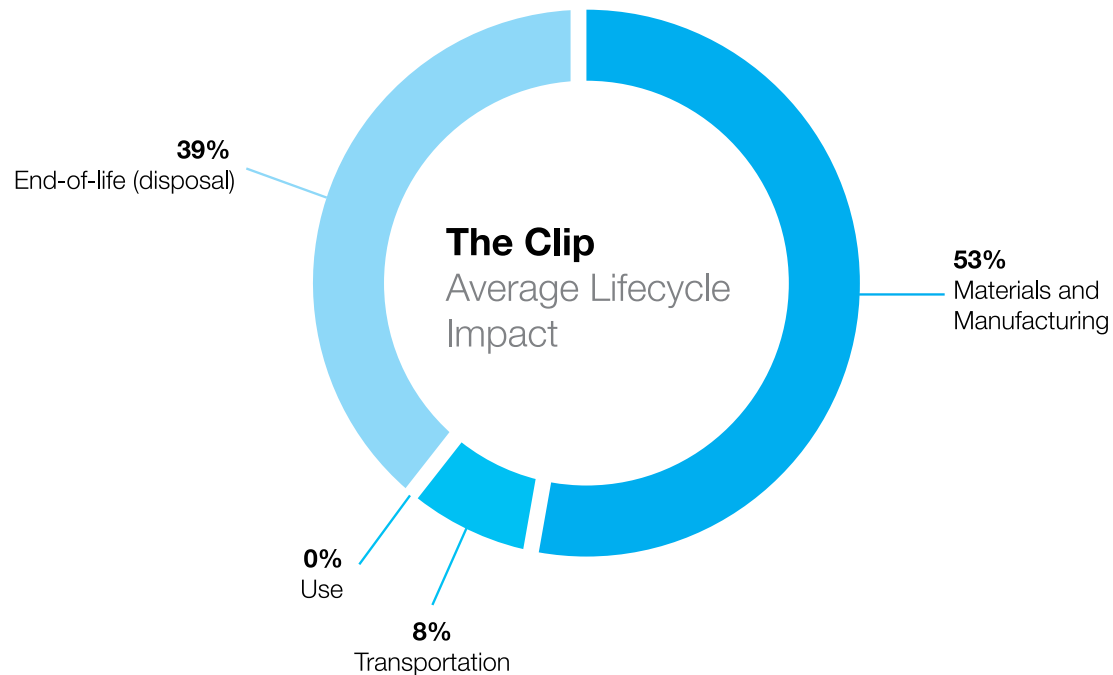
Notes

Our results are quoted in abstract millipoints, which allow us to compare the effects of various design decisions on the environmental impact of the Clip. Our results are not intended to be used for external comparative environmental claims.

The environmental impact associated with steel incineration of the Clip was compared to the impact associated with steel landfilling.

The data used to compile these results can be found at:
http://www.littlebonsai.com/downloads/clip_lca_data.xlsx

Conclusions



An approximation based on average values of the different product concepts considered in the environmental analysis.

- **Disposing of the Clip incorrectly can result in a significant increase in environmental impact.**

Please dispose of the Clip correctly by following the instructions included in the product packaging or at www.littlebonsai.com/theclip/end_of_life.php

- **Producing locally has reduced the Clip's environmental impact**

By producing locally, materials and components do not have to be transported over great distances before being redistributed to customers. In addition, we have more control over our production process, ensuring that our materials are sourced locally and the production waste is dealt with in the most environmentally efficient way.

- **Designing for optimized product lifetime has reduced the Clip's environmental impact**

Designing a simple product form from durable materials allows the Clip to be used for a longer period of time. As a result, the product's yearly impact is reduced.

Assumptions and Notes

The LCA Analysis is based on the following list of assumptions:

1. One production round involves the production of 600 Clips.
2. Accounting for the custom tools that were produced probably results in an over-estimation of the environmental impact of the product system. These tools are only produced once and, therefore, do not need to be reconsidered when assessing the impact of future production rounds of the Clip. In addition, Sustainable Minds already accounts for material/tool impact when selecting a manufacturing process.
3. The processes of turret punching and press braking were approximated as saw cutting and steel rolling in the Sustainable Minds LCA, respectively. More accurate manufacturing processes were not available in the database.
4. The impact associated with raw material extraction and processing is accounted for in the Sustainable Minds LCA procedure. Material impacts are quoted together with manufacturing impacts in the final results.
5. The process of electrical discharge machining used to imprint our logo into steel logo die was not accounted for in the analysis.
6. The analysis assumes that a given Clip is delivered by road freight/post from Boston, MA to San Francisco, CA.
7. All steel used to make the Clip is sourced from Macsteel in Nashua, NH (USA) and is assumed to have been produced by United States Steel Corporation (USS) in Pittsburgh, PA.
8. All metal scraps remaining from the the production process are recycled by Harding Metals, Northwood NH (USA). The custom tools will also be recycled at this location when they reach their end-of-life.

ISO 14021 – Self-declared Environmental Claims

From the ISO 14021 guidelines for self-declared environmental claims.

We follow ISO 14021 standards to communicate environmental decisions related to the Clip.

Self-declared environmental claims and any explanatory statements are subject to all these requirements. Such claims, including any explanatory statement:

1. shall be accurate and not misleading;
2. shall be substantiated and verified;
3. shall be relevant to that particular product, and used only in an appropriate context or setting;
4. shall be presented in a manner that clearly indicates whether the claim applies to the complete product, or only to a product component or packaging, or to an element of a service;
5. shall be specific as to the environmental aspect or environmental improvement which is claimed;
6. shall not be restated using different terminology to imply multiple benefits for a single environmental change;
7. shall be unlikely to result in misinterpretation;
8. shall be true not only in relation to the final product but also shall take into consideration all relevant aspects of the product life cycle in order to identify the potential for one impact to be increased in the process of decreasing another;
9. NOTE: This does not necessarily mean that a life cycle assessment should be undertaken.
10. shall be presented in a manner which does not imply that the product is endorsed or certified by an independent third-party organization when it is not;
11. shall not, either directly or by implication, suggest an environmental improvement which does not exist, nor shall it exaggerate the environmental aspect of the product to which the claim relates;
12. shall not be made if, despite the claim being literally true, it is likely to be misinterpreted by purchasers or is misleading through the omission of relevant facts;
13. shall only relate to an environmental aspect that either exists or is likely to be realized, during the life of the product;
14. shall be presented in a manner that clearly indicates that the environmental claim and explanatory statement should be read together. The explanatory statement shall be of reasonable size and in reasonable proximity to the environmental claim it accompanies;
15. shall, if a comparative assertion of environmental superiority or improvement is made, be specific and make clear the basis for the comparison. In particular, the environmental claim shall be relevant in terms of how recently any improvement was made;
16. shall, if based on a pre-existing but previously undisclosed aspect, be presented in a manner that does not lead purchasers, potential purchasers and users of the product to believe that the claim is based on a recent product or process modification;
17. shall not be made where they are based on the absence of ingredients or features which have never been associated with the product category;
18. shall be reassessed and updated as necessary to reflect changes in technology, competitive products or other circumstances that could alter the accuracy of the claim; and
19. shall be relevant to the area where the corresponding environmental impact occurs.
20. NOTE: A process-related claim can be made anywhere, so long as the environmental impact occurs in the area where the production process is located. The size of the area will be determined by the nature of the impact.



©2011 LittleBonsai
www.littlebonsai.com