Product design review

Product design review –

Laptop

This case study describes how simple design changes can increase durability, improve access to key parts for re-use and repair, and reduce manufacturing costs. Based on 100,000 unit sales per annum, savings were estimated to be:

- ~ £200,000 per annum
- ~ 373.3 tonnes of CO₂e per annum
- ~ 167.8 tonnes of material per annum

The Laptop

The product considered was a top-end lightweight notebook laptop with a price point around £950. It has positive feedback from customers as a product that it is well-built, well specified and aesthetically pleasing.

Key Opportunities Summary

The review identified the following changes that would reduce costs and improve performance:

- Simplify design with fewer components and screws to reduce assembly and disassembly times;
- Avoid the use of adhesive to facilitate recycling by using reversible fixtures such as snap-fits;
- Change the manufacturing process to reduce the need for machining and waste of materials; and
- Avoid unnecessary moving parts to reduce risk of mechanical failure.

This case study described these opportunities further below.
Avoid using adhesives by designing reversible fixtures such as snap fits

The back of the notebook was made of several materials bonded together. This makes the product more complex and expensive to make and harder to recycle. Manufacturers can reduce costs and improve recyclability by using single-material components.

The screen was also bonded to the lid by a film of adhesive around the edge which creates issues when separating parts for repair and recycling. Redesigning the lid to eliminate adhesives would allow recyclers to recover ~259g of aluminium per machine that may otherwise be lost, saving 29.5\(^1\) tonnes of aluminium in total.

Change the manufacturing process to reduce the need for machining

Machining the aluminium lid from a cast part with varying thickness to better fit the finished profile rather than from a single block of uniform-thickness aluminium would save ~455cm\(^3\) of material worth £0.26 per unit. Total savings are estimated at £26,000\(^1\)

Avoid unnecessary moving parts to reduce risk of mechanical failure

The product uses spring-loaded covers to protect some connector ports. These moving parts have quite fragile springs and so increase the chance of failure. Changing the design to have fixed ports, machined from the casing, would eliminate this risk.

Design Reviews and Buying specifications

Having undertaken 16 product design reviews WRAP are building on this work by developing buying and specification guidelines that will improve the durability of electrical products.

For further information, email: Clare.Ollerenshaw@wrap.org.uk

\(^1\) Per 100,000 units

While we have tried to make sure this information sheet is accurate, we cannot accept responsibility or be held legally responsible for any loss or damage arising out of or in connection with this information being inaccurate, incomplete or misleading. This material is copyrighted. You can copy it free of charge as long as the material is accurate and not used in a misleading context. You must identify the source of the material and acknowledge our copyright. You must not use material to endorse or suggest we have endorsed a commercial product or service. For more details please see our terms and conditions on our website at www.wrap.org.uk