Product design review – LCD Television

This case study describes a product design review of a 32 inch own-brand LCD TV for a major retailer. Various cost saving opportunities were identified and annual savings, on 100,000 sales per year, were estimated to be:

- ~£145,000 to £215,000
- ~470 to 775 tonnes of CO2e

These savings can be achieved through reduced product returns and ways to make the product in a more cost effective manner without compromising quality.

The Television
The television reviewed was an own-brand 32 inch HD-ready LCD flat panel screen with a cold cathode fluorescent lamp (CCFL) backlight. Returns data were available to help identify and understand key faults.

Key Opportunities Summary
During the teardown the following key actions were identified to improve the design and the environmental performance of the product:

- Modify injection moulding of the stand and case parts and improve QA procedures to ensure greater durability;
- Use more recycled plastic in the back of the case and concealed plastic parts such as the screen bezel;
- Strengthen the stand to TV and wall mount arrangements to reduce the risk of failure and product damage;
- Improve the design of the speaker mounts to avoid vibration and improve durability; and
- Simplify the design to reduce use of materials (e.g. metal plates) and fasteners and hence to facilitate assembly and repair.

Three of these opportunities are described in more detail.

Speaker Mounts
As part of the review the opportunity to improve the design of the speaker mounts was identified. This would bring the following benefits:

- Reduced vibration which caused sound quality issues and hence returns;
- Remove the need for the adhesive pad between the speaker and metal chassis; and
- Make the TV more robust to facilitate speaker replacement and repair.
Stand and Wall Mount
Other opportunities to improve the TV design were identified around the stand, wall mount and other plastic mouldings. Any weakness in these areas could lead to a rapid product return whilst the customer was installing the item, or failure in use leading to product damage.

Opportunities included:
- Designing the wall mount so that it is supported directly from the metal chassis of the TV;
- The use of additional recycled content within the plastic back panel, due to lower strength requirements allowed by the new wall mounting; and
- More effective injection moulding systems to reduce the risk of cracking and component failure.

Design Simplification
A range of design simplifications to reduce use of materials and improve design for assembly and reparability were identified, which included:

Back Panel
The back panel could be attached by using interlocking tabs and slots to reduce the number of screws by around half. Screw heads could also be standardised to simplify assembly and repair. This could save about 30 seconds per unit in assembly time with no additional cost.

Screen Assembly
Through design changes the number of screen and backlight components could be reduced. Better labelling of the diffuser and polariser sheets would also aid repair, allowing correct ordering during reassembly of the various sheets.

Wider opportunities
A range of other opportunities were also identified that would contribute to lightweighting of the circuit boards and other internal components, reduce packaging and improve transport efficiencies.

WRAP Product Design Reviews
WRAP is undertaking a number of product design reviews, which use product teardown to investigate opportunities where product re-design could reduce environmental impact, reduce costs and improve profit. This focuses on reducing product returns; material and production process savings; design improvements and packaging design.

If you are interested in learning more about these reviews, please email Clare.Ollerenshaw@wrap.org.uk