

CORE 1.14 CHALLENGES THAT INFLUENCE THE PROCESSES OF DESIGNING AND MAKING

What is Carbon Offsetting?

It is the action or process of compensating for carbon dioxide emissions arising from industrial or other human activity, by participating in schemes designed to make equivalent reductions of carbon dioxide in the atmosphere.

Carbon Offsetting Schemes.

These encourage companies or individuals to reduce their carbon footprint or become "carbon neutral." The government can help by:

- Taxing frequent flyers
- Encouraging people to use a bike rather than a car.
- Give tax cuts / grants to help companies reduce their carbon footprint.
- Planting more trees (subsidiaries to farmers / landowners).

Companies can encourage people to walk or cycle to work, or lease electric cars to employees rather than diesel/petrol cars.



Green Design Considerations

Use renewable energy sources

Design for energy efficiency when using a product

Use biodegradable materials



Reduce waste or use less materials

Use non-toxic materials / finishes

Use recyclable or reusable components and materials

Recycling & Reusing Materials / Products

If waste from the construction, use and disposal of a product cannot be eliminated, products should be designed to be recycled or reused.

Recycling means materials can be reprocessed. Reusing could involve things like using shopping bags, refilling ink cartridges, taking your own coffee cups to Starbucks etc.

Many supermarkets like Sainsburys are now trying to eliminate use of single use plastic.

LIFE CYCLE ANALYSIS

LCA is a systematic inventory that assesses environmental impacts relating to every stage of a product's life.

Designers need to calculate all the environmental cost of a product, from

- EXTRACTION
- TRANSPORTATION
- PROCESSING OF MATERIALS (RAW / RECYCLED)
- MANUFACTURE
- TRANSPORTATION
- DISTRIBUTION
- END OF LIFE / RECYCLING / LANDFILL



ADVANTAGES OF RECYCLING / REUSE

Less waste going to landfill

Reduces demand for new / raw materials

Reduces global warming caused by emissions from processing raw materials

Reduces need for mining

Money saved for manufacturer

Jobs can be created in recycling industry

DISADVANTAGES OF RECYCLING / REUSE

The recycling process can be complex when separating materials

Not always cost-efficient. Energy needed to transport, process and reassemble the recycled products

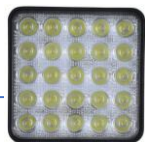
Still produces waste and pollutants, adding to carbon emissions.

Jobs in recycling industry can be low paid, possibly dangerous

Quality of the recycled material may be inferior

Designers must respect different social, ethnic and economic groups. Designers must consider environmental costs of designs, and not offend people. The capabilities of humans and manufacturing methods need to be understood when designing.

Figure ES 1: Population of the UK's five largest ethnic minority groups



MANUFACTURING CAPABILITY

The easier a product is to make, the lower the manufacturing costs. Factors include: materials used; the required quality of materials used; the required finish; whether the current machines can make it, or if the manufacturer needs to buy in more equipment.

DFM

Designers can then **Design For Manufacture** by: using standardised parts / reducing specialised parts; making it modular; simplify the design / use repeatable processes; reduce tolerance for parts where possible; design for disassembly / repair / servicing.

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- 1 What is carbon offsetting?
_____ [1]
- 2 Explain 2 ways a government can encourage people to offset their carbon footprint.
a) _____ [2]
b) _____ [2]
- 3 Give 2 advantages of recycling materials:
a) _____ [2]
b) _____ [2]
- 4 Give 2 disadvantages of recycling materials:
a) _____ [2]
b) _____ [2]
- 5 Explain the term "Life cycle analysis". Include all the stages of an LCA.

_____ [10]
- 6 Why would it be important that a design for an electric hand drill is easy to use for customers?
_____ [1]
- 7 Describe 4 ways that manufacturers could use a green design strategy for manufacturing their products:
a) _____ [4]
b) _____ [4]
c) _____ [4]
d) _____ [4]
- 8 List three ways that a designer can "design for manufacture".
a) _____ [3]
b) _____ [3]
c) _____ [3]
- 9 The mobius loop is shown here: What do you think it means when you see it on packaging?



Answer: _____

[1]

Total: / 26