



Design Factors

Performance and Safety

Higher
Design & Manufacture

Performance

- *Performance is about how well a product fulfils its purpose – how it performs and how well it works.*
- *It can be divided into a few main areas...*
 - *Ease of Maintenance*
 - *Value for Money*
 - *Materials & Manufacturing*
 - *Planned Obsolescence*
 - *Safety*

Ease of Maintenance

- *Maintenance keeps a product working smoothly and safely.*
- *It will enable the user to:*
 - *Keep their product in good working order*
 - *Extend the life of the product*
- *The level of skill required to maintain a product should be considered carefully during the development of a product.*

Ease of Maintenance

- *Products that are easy to maintain are less likely to be thrown away.*
 - *This is a major benefit for the environment.*
 - *However, products that can be maintained indefinitely reduce the potential for repeat purchases, thus limiting the profit for companies*

Ease of Maintenance

- *During the design of a product the designer should consider different aspects of maintenance.*
 - *Who is likely to carry out maintenance?*
 - *Example: high-end mountain bikes are likely to be purchased by enthusiasts with a fair degree of skill and specialist tools.*
 - *Cheaper bikes may only require cleaning tasks and tightening of bolts etc.*
 - *Regardless of skill level: it is good practice to design to ensure that any maintenance is as simple as possible to carry out.*



Ease of Maintenance

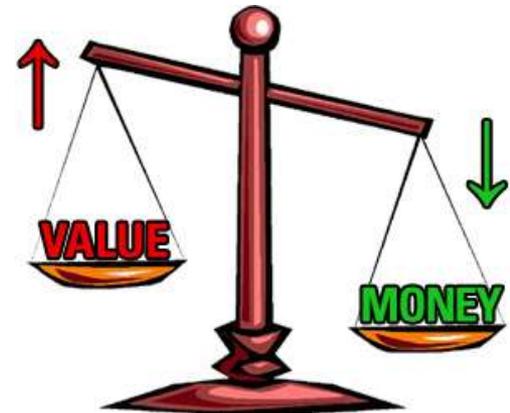
– *What type of maintenance should be carried out?*

- *Consideration must be given to the nature of the maintenance tasks.*
- *Examples:*
 - *Will the product need to be charged?*
 - *Will the product need to be filled/emptied/adjusted?*
 - *Will parts need replaced?*
- *The designer must ensure that access to perform these tasks is included in the design.*



Value for Money

- *All consumers want value for money.*
- *Companies attempt to design and manufacture products that are perceived as being better value, even when similarly priced to competitors.*
- *To ensure a 'good value for money' perception is achieved, the designer must take the expectations of the target market into account.*



Value for Money

- *Designers will research expectations prior to forming a specification and will try to find out:*
 - *What functions the market expects the product to perform*
 - *Which performance criteria are most important to the market*
 - *How long the market expects the product to last*
- *With these points in mind, the designer must strike a balance between fulfilling the customer's expectations and keeping costs to a minimum.*

Value for Money

- *Consideration must also be given to:*
 - *The selection of materials*
 - *The manufacturing processes*
- *These must be affordable to allow a profit*
- *Consumer must believe that the product has been well manufactured from quality material*
- *Today, consumers are better informed than ever: access to online reviews, social media, user's opinions, product comparisons etc.*



Planned Obsolescence

- *Products are not designed to last indefinitely*
- *There are obvious reasons for this:*
 - *Financial implications in the form of material and manufacturing costs*
 - *Difficult to dispose of*
 - *Likely to become unfashionable after a while*
 - *Best interest of the company to encourage consumers to make repeat purchases to increase sales volumes*

Planned Obsolescence

- *Planned obsolescence is a strategy used in the design of products to give a product a specific lifespan.*
- *This is to cause the product to be perceived as obsolete before it actually needs to be replaced.*
- *This encourages the consumer to purchase another version of the same product before it is needed.*



Task 1

- *Create a list of **5 products** you can think of that you have bought more than once.*
- *Do not include consumables e.g. food.*
- *Identify these products you think are designed with planned obsolescence in mind.*
- *Explain why you think this is the case for each product.*

Planned Obsolescence

- *Style Obsolescence*
 - *Products designed to be fashionable on their release are likely to fall out of fashion within the next few years.*
- *Product Evolution*
 - *Increasing rate of technological developments has resulted in a steady stream of newer models e.g. mobile phones*
- *Ease of Maintenance.*
 - *Lifespan of a product is influenced by how easy it is to maintain*

Safety

- *Safety is paramount for all products in their:*
 - *Design*
 - *Manufacture*
 - *Use*
 - *Disposal*
- *Designers have a key role to play identifying and eliminating potential hazards and reducing possible risks from hazards if elimination is not possible.*



Safety

- *Safety during design and development*
 - *Designers must consider how the product will be used*
 - *Understand how it will be used and how it could be misused*
 - *Selection of materials, finishes, ergonomic aspects, instructions and the user interface are just some of the aspects the designer may consider*
 - *Ensure the product is designed within regulations e.g. BSI and CE.*
 - *Rigorous testing can be carried out during development using machines and in extreme environments*

Safety

- *Safety during the manufacture*
 - *The production should be safe for those involved*
 - *Manufacturers need to protect workers from repetitive strain, gasses, fumes, falling objects, noise etc.*
 - *This can be achieved by maintaining machines, signage, training, alert systems, regular breaks, adequate lighting and use of PPE (personal protective equipment).*
 - *E.g. eye protection, hard hats, gloves etc.*

Safety

- *Safety for consumer use*
 - *The product should be easy to understand*
 - *Where risks cannot be eliminated, warnings should be clearly visible to alert the user of potential risk*
 - *Materials chosen should not cause any harm*
 - *Operation of the product should not cause any harm*
 - *Any special requirements related to the use, maintenance or disposal of parts should be clearly shown*

Safety

- *Safety and end of life*
 - *It is the designer's responsibility to consider any risk to society or the environment that may be caused by the disposal of the product*
 - *Designers must ensure products can be dismantled safely for disposal*
 - *Any toxic parts must be protected in sealed units to guard against accidental access*

Task 2

- *Safety and the Family Car*
 - *Consider a typical family car*
 - *Explain how safety considerations have influenced the design of the car*
 - *Come up with at least 10 points, for example, one aspects might be the speed at which the windows open and close. A slower speed would prevent the glass from shattering and potentially reduce the risk of people getting their fingers caught.*

