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D2.5

ELIMINATING WASTE
THROUGH DESIGN

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Introduction

This essay will touch on the issue of waste, showing figures of how much is produced and the percentages that are sent to landfill or incinerated and the problems that arise from these methods. It will look at why so many items are discarded by looking at the different types of obsolescence, including recent survey findings.

There will be a section about human needs, why this is fuelling consumerism and the concerns surrounding it. There will be an explanation of how designers are tackling the problem using different strategies and the conflict between these approaches with page six showing two different examples of designs that have been created specifically to address the issue of waste.

There will be a brief overview of how a change in consumption may affect the economy and if there needs to be a change in consumption or materials. This essay will not look in depth at the issues of energy usage and waste as the main focus is on physical waste.

The aim is to determine a guideline for designing in the future.

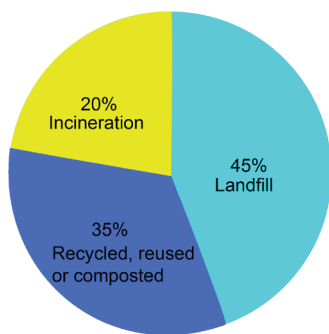
What is the problem with waste caused by consumption?

Why is waste such an issue?

One of the main issues caused by consumption is waste; 228 million tonnes of waste are produced each year in England (Paterson, 2013)

From this waste, currently 45% is recycled, reused or composted with a 20% incinerated the rest is sent to landfill. (DEFRA, 2013)

What happens to the stuff that we throw away?



Landfill produces huge amounts of methane and often contains and emits toxins, which can contaminate the soil. Even when the site is no longer in use and has been sealed there is a risk of chemical leakages contaminating the water supplies and surrounding areas. (Environment Agency, 2013) With so many products ending up in landfill, another issue is that many items which could be reused or recycled are now sealed in unused sites that would be dangerous to open; this is particularly worrying when the products discarded are made from non-renewable resources, such as plastics made from oil.

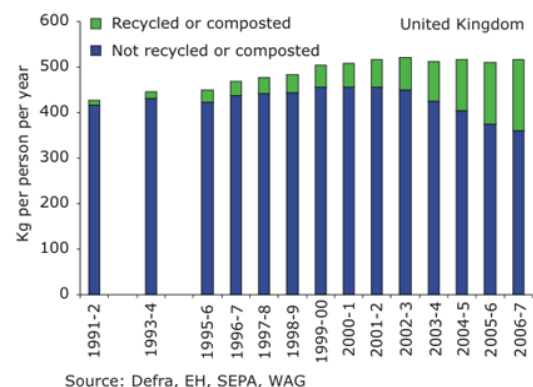
It is a common assumption that given enough time all materials biodegrade but Chapman (2005) says that there are old items in landfill which are still recognisable because the conditions in the landfill are not right for supporting the bacteria that breaks them down.

The Local Government Association estimated that current landfill sites in the UK will be full by 2018

and in 2009 the EU set a target of a 50% reduction in the amount of waste being sent to landfill by 2013. In order to meet this target and to avoid huge costs in landfill tax, waste incineration is seen by some as the way forward.

Incineration drastically reduces the volume of material sent to landfill but there are concerns about the amount of toxic fumes and greenhouse gases released into the atmosphere and the production of unsafe ash. (UKWIN, 2011)

Paul Andrews, MD of Enviropower states that incinerators cause less pollution than cars (Hickman, 2009) but this raises the question of whether processes that create more pollution should be accepted without issue because it is comparatively better. Incinerating valuable material resources and releasing toxic fumes just replaces one problem with another rather than trying to fix the cause of the problem, which is why UKWIN are trying to encourage a zero waste scheme without the use of incineration. They are pushing for better reuse and recycling systems as they argue that only a small percentage of waste is not recyclable and with more items being designed with their end of life in mind this percentage will continue to decrease over time. (UKWIN, n.d)



“Over 90% of the resources taken out of the ground today becomes waste within only three months”

– Johnathan Chapman,
Emotionally durable design

Why are so many item discarded?

At the beginning of the 20th century many families lived in poverty, there was little to go around and people had to use whatever resources were to hand reusing and repairing when necessary. Any new materials or items were appreciated and well maintained.

Shortly after the war, consumerism and obsolescence were pushed as a way to boost the economy (Cooper, 2010) and with the rise of mass production, spread of globalisation and an increase in disposable income came the age of consumerism.

Products were made cheaply, durable items were made disposable for the users convenience and landfill sites became a convenient way to discard unwanted items, this further propelled over-consumption, with wasted items being out of sight and therefore out of mind.

Because it can be cheaper and easier to buy new products rather than getting old ones repaired many items sent to landfill still function. (Chapman, 2005) There are many reasons why items are discarded but Adam Robinson, MD of Disruptive Innovation said in a recent interview that obsolescence falls into these four categories:

Technology

This is when an item is no longer used because new and better versions are available. The new version may be more energy efficient, have up-to-date technology and more features. Technological obsolescence also occurs when the parts or software available are no longer compatible with old products.

Fashion

Products are discarded simply because they do not have the current style or fashionable features.

Wear and Tear

Wear and tear is inevitable but if cheap materials or materials that damage easily are used the process is speeded up. In the case of new shiny gadgets, the user

grows tired of it when it gains a few blemishes and stops looking new.

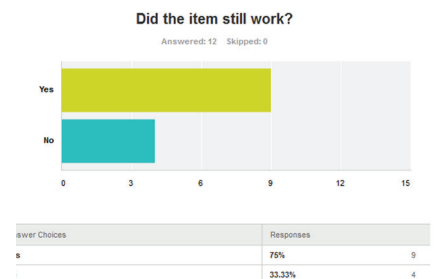
Legislation

Items become obsolete through legislation when rules about materials, processes or activities are changed.

A survey was conducted recently to find out more information about why items are discarded or not used anymore.

58% of the people questioned had recently discarded electrical household equipment, 33% shoes and 9% baby equipment; although the survey is not conclusive, the results do coincide with Chapman's statement that many of the items discarded are still functioning as 75% of these items in the survey still worked when.

80% of the electrical items that still worked were made obsolescent by new technology. They were replaced by new versions with better memory, more accuracy, or new features; in comparison 75% of shoes were no longer used because they were worn out.



100% of people asked, said that they would pay more for products that last longer but that does not always happen.

Stores such as Ikea and Primark are cheap, easy accessible and have a wide variety of styles to choose from so while consumers say that they want quality, they have got used to paying very little for items. Over time consumers buying cheap products are likely have to buy more replacements because the old one is worn suggesting that if they were made aware of the expected lifespan they could make better decisions.

“Affluence is driving consumerism faster than population growth”

– Tim Jackson,
Prosperity without growth

Causes of the rise in consumerism

Why is so much consumed?

In terms of basic human needs, consumption is a natural process and if it is done in response to needs rather than wants and done responsibly then it does not cause problems. (Jackson, 2009)



Mazlow's hierarchy of needs shows the different levels of needs that humans naturally strive to achieve; once one level has been satisfied the one above is concentrated on. At the bottom of the scale are needs such as food, water and oxygen followed by safety and security

Since the basic needs are met through consuming, it is easy to assume that all human needs can be met in the same way but this way of thinking leads to over-consumption. (Chapman, 2005)

The acquisition of items is seen as a sign of affluence and therefore success, everything purchased is a symbol of individual personality, personal achievement and aspiration (Chapman, 2005. Cooper 2009) and due to the constant pursuit of personal improvement there is a perpetual cycle of consumerism. For example, to satisfy the social need, consumers are persuaded to purchase items to get them noticed and liked but because this is a superficial adjustment that follows the ever-changing trends, the satisfaction does not last long.

Economist Tim Jackson says that the pursuit of happiness has been focused on consuming rather than finding a purpose in life and that prosperity needs to be measured less by material items and more by personal satisfaction and interactions in life.

Is this really such an issue?

Papanek's concern about consumerism is that when consumers fail to place value on what they have and are happy to discard all of their items with every passing trend it may only be a matter of time before we consider every aspect of life as disposable.

Although having plenty is usually seen as positive, Jackson discusses how more is not always better, even when it comes to food and water, consuming more than you need is not beneficial and can actually cause health problems; having more of something also means that it is appreciated less. The current system is creating a lack of appreciation and value and also a skewed idea of wants and needs.

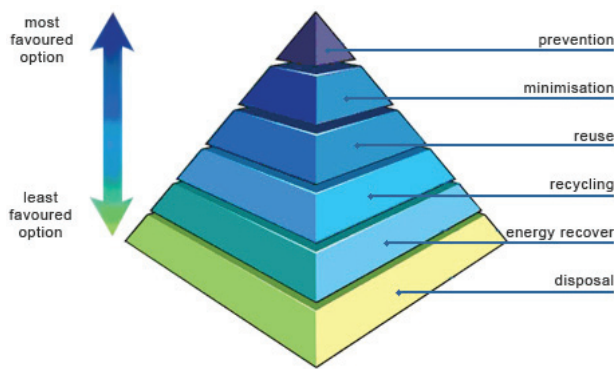
Chapman talks about wants and needs in Emotionally Durable Design, saying that no one would question the 'need' for a vacuum cleaner but points out that plenty of people in less developed area of the world manage without one. This is not to suggest that products should not be made or that we should go back to the days without technology but rather that these items should not be taken for granted and that they should be designed and produced in such a way that it does not cause damage to the environment.



“Much recent design has satisfied only evanescent wants and desires, while the genuine needs of man have often been neglected.”

– Victor Papanek
Design for the Real World

How are designers tackling the problem?



Designers are trying to prevent waste by using less material, using recycled material and waste, making sure that the materials used can be recycled after use, designing an item so that it can be taken apart to be repaired, reused or recycled or designing a product that improves with age and should therefore not be discarded.

Less Material

Buckminster Fuller spoke about doing more with less; by using the material in the most efficient way through structural design he found that less material is needed. (Baldwin, 1996)

Waste Material

Products made from recycled material and waste prolong the life of the material but if it is the only form of waste prevention the material will ultimately end up in landfill.

Disassembly

Designing items that can be taken apart to be repaired, reused or recycled works well at preventing waste providing that practical systems are in place such as take back schemes or collection systems to ensure that the items are reused and recycled. (Braungart, M., McDonough, W., 2009)

In recent years, designers and manufacturers have made new products almost impossible to open up meaning that users are unable to repair or upgrade

products unless they have specialised skills.

75% of people said that they would still use the old item if it could have been repaired or upgraded which suggests that this is an area for development in order to prevent waste.

Recyclable Material

Designers are also creating products from materials that can be recycled after use.

Emotional Durability

Products are designed to be physically durable but with the acknowledging that wear and tear is inevitable. With forward planning, the wear and tear is something that can be incorporated into the design. Emotionally durable items are designed to engage the user so that a connection is built up over time leading the item to be kept for longer because the user cherishes the item. (Chapman, 2005)

Combinations of these strategies are used but there can be conflict and confusion, for example the conflict between keeping an old item, preventing it from being sent to landfill, against purchasing a more energy efficient item as technology progresses. One study found that the energy used in production of household electrical items uses considerably more energy than when they are in use. (GEA, 2012) Obviously it makes sense that the user wants better efficiency to save them money in the long run but there is doubt whether this method is saving energy overall especially if the new item is lower quality and only works for a few years.

There is a recent trend for 'Shabby chic' and although this seems to be more about the aesthetic than giving new life to old, aged items, this could be a good way to get consumers interested in up-cycling; if everyone desired shabby chic would more people buy reconditioned items? The only issue with this lies in the fact that it is based on a trend so is highly likely to change which would lead to the shabby chic items being unwanted.

“Negligence is described as doing the same thing over and over even though you know it is dangerous, stupid, or wrong.”

– Michael Braungart/William McDonough
Cradle to Cradle

Design for disassembly

Herman Miller

Mirra chair



Herman Miller's Mirra chair has been designed for disassembly. Each part of the chair can be taken apart meaning that parts can be reused repeatedly and broken parts can easily be replaced and recycled.

The Mirra chair is also a good example of using multiple sustainable approaches in one design; Not only is the chair designed to be taken apart but the materials used have been carefully selected to be the most environmentally friendly and non-toxic.

42% of the material used to make the chair is recycled and 96% of the chair can be recycled after use, less material has been used to make the chair but the flexibility and support in the chair has been increased due to the material and structure and even the energy needed for production comes from wind power and landfill gasses.

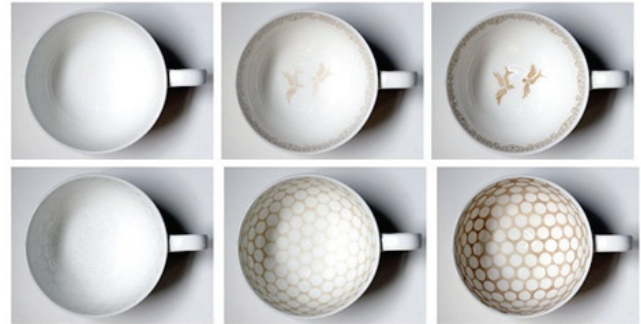
Bill McDonough has credited the design as being the best example of cradle-to-cradle ever made which led to the design being Cradle to cradle certified.
(Herman Miller, 2007)



Emotionally durable

Bethan Laura Wood

Stain cup



Stain is a design that works with the idea of an item improving over time, it is a cup that gradually reveals a pattern over time and the more it is used the quicker the pattern builds up. Tea and coffee stains are not always desirable but this design turns the stain into an attractive pattern.

The pattern builds up gradually and is partially dependant on how the user uses the cup. This user dependant design is what Chapman accredits for creating an attachment between the object and the user thereby preventing it from being discarded so easily

The ageing process of any product is inevitable but this design embraces it and turns it into a fun and desirable feature, challenging the idea that wear and tear of an item is a negative aspect.

Once the cup is thoroughly stained, the user can remove the stain so that they can start the process again and have the novelty of revealing the pattern again.
(Woodlondon, 2007)

Is Over-consumption really the problem or are the wrong materials being used?



In Cradle to Cradle, Braungart and McDonough say that it is not so much over-consumption that is the issue but more the materials that are used. The idea is that any materials used should be seen as ingredients that can be processed indefinitely using renewable energy and leaving no waste, technical nutrients can be reused and recycled over and over again and biological nutrients will biodegrade after use. (Braungart, M., McDonough, W., 2009)

Chapman argues that over-consumption is an issue and should be slowed down. Designers should produce items that are physically durable and also emotionally durable, meaning that the user forms an attachment with the item and therefore doesn't want to discard it.

A combination of using the correct materials and slowing down consumerism would be a good way forward but slowing consumerism is seen as being

detrimental to the economy?

Do we need the constant flow of consumerism?

While the idea may appear to be about slowing down the rate of consumption it is more about changing what it is that's being consumed.

For businesses to ensure an ever-increasing income, to the detriment of the consumer, the rate of production has increased but this has led to quality items being replaced by quantity. (Jackson, 2009)

To combat this issue production should be slowed down to produce higher quality products and to provide an aftercare system for maintenance, repair, upgrading and replacement thereby creating revenue from services and building a better relationship with the customer. (Jackson, 2009)

Savage Chickens

by Doug Savage



“Advertising has us chasing cars and clothes, working jobs we hate so we can buy s*** we don’t need”

– Jonathan Chapman
Emotionally Durable Design

Where does this leave the designer?

What is the role of the designer?

The ideal situation for the future is one where, primarily, items are valued and looked after. Systems should be set up for maintenance, repair, upgrade and return with recycling as a final resort.

For this to happen there would have to be huge changes in both, consumer attitudes and business revenue systems and until this point is reached designers need to design for the transitional period.

Waste prevention is the objective rather than trying to deal with the build-up of waste further down the line; therefore it is the designers responsibility to plan, not just for the product's lifespan but also for its end of life as these are determined early on in the design process; this is something that Cooper (2010) calls 'planned for obsolescence'.

To achieve this each design should be made from either materials that can be reused, recycled or biodegraded with a greater emphasis on reusability. The design should be easy to disassemble and separate the materials so that it can be repaired and upgraded with the discarded part being reused or recycled/composted.

The chosen material should be appropriate for the products function or job, for example, it would currently be beneficial to make disposable items from biodegradable material. Ideally, further into the future and with a change in consumer attitudes many disposable items could be made durable instead.

Systems need to be in place for maintenance, repair, upgrade and return to prolong the life of the product, create a stronger relationship with the customer and generate revenue. There is not just the product lifespan to consider but also the whole system, down to the equipment and energy used for production and distribution.

It should be remembered that design is not just about physical items; if the focus of the designer is to solve

a particular problem then it will not always be necessary to design a physical item; on occasion, it may be better to design a new way of working for the client.

Encouraging change

Where appropriate the design should be something that the user forms an attachment with and wants to keep, The survey suggests that consumers want longer lasting products and would pay more for these, therefore they need to be supplied with knowledge about the products expected lifespan.

Designs to combat waste should not rely on being sought after for their eco credentials; they have to be designed in such a way that the customer inadvertently chooses it. It has been suggested that recycled or recyclable items have been seen to encourage people to buy more because they feel as though they are doing their bit for the environment (Westervelt, 2012) so this is not something to be used as a main focus or selling point.

Stephanie Simon, reporter in The Wall Street Journal writes that while taxing consumers to get them to choose more eco-friendly options works well, the best way is to tell them that their peers are doing their bit for the environment. In the experiment signs were put in hotel bathrooms asking customers to reuse their towels, one said "Help Save the Environment by reusing your towels while the other one said "Join Your Fellow Guests in Helping to Save the Environment"

Guests confronted with the second sign were 25% more likely to reuse the towels.

Currently putting these guidelines into practice is not possible in every case but should still be aspired with the hope that small improvements will be made with each design iteration. A completely waste free, sustainable system is a long way off but as Lao Tzu said, "A journey of a thousand miles starts with the first step"

“The same design that fuels mass overconsumption also holds the power to repair the world.”

– David B. Berman,
Do Good Design

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