



Improving workforce environmental behaviour: A case study of the
construction industry

Submitted for the Degree of Master of Philosophy
At the University of Northampton

January 2010

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ACKNOWLEDGEMENTS

I would like to start by acknowledging the excellent opportunities that were made available to me by undertaking a Knowledge Transfer Partnership (KTP) position within Tingdene Homes. Without this position I would not have had the opportunity to undertake this research degree and I would not have gained the management and business experience that I have today. With that in mind I would also like to thank Dave Earl from Tingdene Homes and Margaret Bates from the University of Northampton who made the KTP possible and ultimately decided to take me on as their KTP associate. I would also like to acknowledge all the staff at Tingdene Homes who participated in this research, including the environmental team and the directors for agreeing to my placement and the undertaking of my research within the company.

When it comes to completing this thesis, my biggest thanks go out to Janet Jackson and Terry Tudor my research supervisors. You really kept me on track and motivated, when at times it felt like there was no end in sight.

Finally I would like to thank my husband who helped me through the hard times by keeping me laughing.

Thank you all.

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ABSTRACT

With businesses under increasing legislative and public pressure to improve their environmental performance, this research sought to address the issues surrounding changing employee environmental behaviour. Tingdene Homes, a park home manufacturer in Wellingborough, Northamptonshire was the case study company for this research. The research made use of different interventionist techniques to influence employee behaviour namely; formal training session, the formation of an environmental team and environmental posters. The impact from this blended approach was measured through a mixture of quantitative and qualitative research methods. Questionnaires were utilised at the beginning of the research to determine baseline attitudes and behaviours, and towards the end of the research to see if attitudes and behaviours had changed. Qualitative measures such as ethnography and narrative interviews were also used to give a more in-depth view of employee attitudes and behaviours. In order to validate the impact from the interventionist techniques, waste data along with recyclables recovered and electricity and gas consumption figures were used. What was found was that the interventionist techniques had positively influenced employee behaviour, resulting in reductions in waste production, increased recyclables recovery, and reductions in gas and electricity consumption. This resulted in the case study company experiencing cost savings in excess of £55,000 over the course of the research. It is argued that the blended interventionist techniques approach was successful at improving employee environmental behaviour, and is a cost effective approach that could be utilised by other businesses.

CHAPTER 1 – INTRODUCTION

Environmental issues are increasingly becoming more prominent, with the UK Government producing their first ever Climate Change Bill in 2007, which commits the UK to reducing its carbon emissions by at least 80% by 2050 (Defra, 2009a). Waste production is also on the agenda, with licensed landfill space predicted to run out in 2016 as 400 million tonnes of waste are being produced annually within the England alone (72 million tonnes of this from the construction sector) (LGA, 2007; NetRegs, 2009). The impacts from these environmental issues are increasingly being felt at the local level, with businesses and individuals being expected to take responsibility for the part that they play. For example, the UK Government is introducing the Carbon Reduction Commitment (CRC), which will affect large businesses that do not fall within the Emissions Trading Scheme, which only caps the emissions from most intensive industries, such as electricity generation (BIS, 2009). The CRC will commit these large, but not energy intensive businesses, to purchasing carbon credits for every tonne of carbon they produce from the use of electricity, gas and other fuels. This will see those businesses that work to reduce their carbon footprints financially rewarded for their efforts, and those that do not financially penalised (Defra, 2008a).

Local Authorities are also focussing on raising awareness for waste through initiatives such as 'Recycle Now', which works to educate and facilitate recycling and waste reduction in the home. For businesses, a more stringent line of fiscal incentives and increased environmental legislation has been implemented to encourage them to take greater responsibility for their waste production (Defra, 2009b). For example, the construction sector has seen the recent introduction of legislation that makes it a legal requirement for all building projects started after 6th April 2008, and with a value of greater than £300k, to have a Site Waste Management Plan (SWMP) in place. This reduces the impact on the environment by increasing uptake of reuse and recycling of materials, and reduces the risk of fly tipping incidents (NetRegs, 2009).

The Government has also implemented many Advisory Bodies to help facilitate the reduction in carbon emissions and waste from business through the introduction of a range of support agencies including the Carbon Trust, the Energy Saving Trust, WRAP (Waste and Resource Action Programme), NISP (National Industrial Symbiosis Programme) and Envirowise.

The Carbon Trust and the Energy Saving Trust both work towards helping businesses to reduce their carbon footprints through identifying areas for improvements within energy consumption and management of fleet vehicles. They will undertake free audits within businesses and make recommendations on where improvements can be made (Carbon Trust, 2009; Energy Saving Trust, 2009). WRAP, on the other hand, works with local authorities, developing new markets for recycled materials, and investigating ways to reduce waste. They also provide information to the public and to businesses on waste issues free of charge, as they are largely funded by revenue from the Landfill Tax (WRAP, 2009). NISP's focus is on setting up partnerships (symbiosis) between businesses, where resources, expertise or assets are shared. For example, one business's waste, might be another's raw material (Defra, 2009b; NISP, 2007). Envirowise also offers free independent and confidential advice to businesses, highlighting practical solutions that will help the business to minimise waste and reduce their environmental impact (Envirowise, 2009a). In order to get best value from these support functions, in 2010 it is expected that NISP and Envirowise will fall under the banner of WRAP, which will become the single resource efficiency body (Letsrecycle, 2009).

Overall, the businesses that comply with the environmental legislation and utilise the support functions, will not only experience improved environmental performance, but will see cost savings as a result (NISP, 2007; Envirowise, 2009a; Carbon Trust, 2009). However, Envirowise (2009b) describe how gaining employee buy-in and engagement are key to the above being achieved.

1.1 Aims and Objectives

The principal aim of this study was to investigate practical and cost effective means of improving workforce environmental behaviour, leading to increased environmental performance, within the construction sector. This was done using Tingdene Homes as the case study company.

The three main empirical objectives to this study were to:

- a. Determine baseline levels of pro-environmental behaviour at Tingdene Homes (see Chapter 4)
- b. Evaluate the influence of selected interventionist techniques on the behaviour of Tingdene's staff (see Chapters 5 and 6)
- c. Suggest recommendations for change (see Chapter 7)

1.1.1 Determine baseline levels of pro-environmental behaviour

The main purpose of this objective was to examine baseline data on environmental behaviour of staff at Tingdene Homes before it underwent a programme of implementing interventionist techniques. The following research questions were posed:

1. What were the existing environmental and resource efficiency behaviours displayed by employees in the case study organisation?
2. What influence did factors such as socio-demographics, environmental attitudes, beliefs and senior managers have on pro-environmental behaviour amongst staff?
3. What strategies could be put in place to encourage improved environmental practices amongst the workforce?

The objective was met through the use of questionnaires and an ethnographic study (see Chapter 4).

1.1.2 Evaluate the influence of selected interventionist techniques on the behaviour of staff

The purpose of this objective was to identify/validate whether the selected interventionist techniques employed had a positive impact on workforce

environmental behaviour. This objective was achieved through two separate approaches:

First, by obtaining qualitative data on the impact of the Environmental Team through the use of Narrative Interviews (see Chapter 5). The research questions posed were:

1. What factors had influenced the Environmental Officers to take on the voluntary role?
2. How did the workforce react/interact with the Environmental Team?
3. What barriers/drawbacks were there to the Environmental Team?

Second, by validating the overall impact and cost effectiveness of the interventionist techniques through the collection of quantitative data, such as waste arisings, electricity consumption and the use of a second questionnaire (see Chapter 6). The research questions posed were:

1. Had the attitudes of employees changed in the 12 months since the first questionnaire was conducted?
2. Did the data on waste generation and energy consumption verify behavioural change in employees?
3. Had the interventionist techniques been a cost effective method for changing behaviour?

1.1.3 Suggest recommendations for change

Once the factors that influenced positive environmental behaviour within the workforce had been identified and the impact of the various interventionist techniques had been assessed, recommendations for further change were made (see Chapter 7). The recommendations for change covered:

1. How Tingdene could make continued use of the interventionist techniques to sustain the improvements made.
2. Where further effort was required to progress the improvement programme.

CHAPTER 2 – LITERATURE REVIEW

2.1 The beginnings of sustainable development

Sustainable development was recognised as a significant issue by the United Nations when it was detailed in the Brundtland Report (1987). It defined sustainable development as development that (United Nations, 1987):

“Meets the needs of the present without compromising the ability of future generations to meet their needs”

Later, in 1992 at the United Nations’ Earth Summit, in Rio de Janeiro, Agenda 21 was produced, to detail the actions to be undertaken to achieve sustainable development. It was referred to by the Conference as:

“The most comprehensive, and if implemented, effective program of action ever sanctioned by the international community”

Agenda 21 has since influenced all subsequent UN Conferences, including the World Conference on Human Rights in Vienna in 1993 where the concept of a healthy environment was seen as a human right for the first time.

The importance of sustainable development was further set out in the Treaty of Amsterdam in 1997. This led to already existing treaties, such as the Treaty on European Union and the Treaties establishing the European Communities, being revised in order to have sustainable development as their overarching objectives (European Communities, 1997; Ocana, 2003). It is now a requirement of the European Union that sustainable development be integrated into all European policies. Following on from this, the UK Government was one of the first countries to set out a Sustainability Strategy in 1994 (WRAP, 2007). From this, the UK Government signalled ‘sustainable consumption and energy’ as one of

its top priorities that needed to be addressed, by developing the UK Government sustainable strategy: *Securing the Future* (Defra, 2005). In order to drive forward sustainability within UK businesses, various legislative mechanisms have been introduced to provide both carrots (e.g. financial incentives) and sticks (e.g. fines). The Landfill Tax escalator charges businesses and local authorities greater amounts of money each year for the waste they send to landfill (Defra, 2007). This is to encourage more recycling and reuse of wasted resources. The Climate Change Levy works by providing taxation incentives; it puts greater costs on energy consumption, encourages greater energy efficiency and increased renewable sources of energy (Carbon Trust, 2009). The UK is set to implement a new initiative called the Carbon Reduction Commitment (CRC). The CRC requires all large users of energy to buy carbon allowances at an initial £12 for every tonne of CO₂ they produce as a result of energy use for that year. Organisations could be rewarded for their energy reduction by receiving carbon credits, or punished by having to pay more, depending on how well they do in comparison to other organisations (Defra, 2008a).

2.2 Factors outside of legislation driving forward the uptake of positive environmental performance in business

Whilst there is legislation in place to regulate organisations' environmental performance, other factors such as consumer behaviour are also potential drivers. For example, research has shown that some consumers prefer to purchase products with the least environmental impact, and show even greater favour to those products that result in positive environmental outcomes (Leire and Thidell, 2005). As such increasing numbers of organisations are taking advantage of this opportunity by promoting their 'green' credentials, such as ASDA, Innocent and Ecotricity. However, engaging staff in environmental improvement is essential for any business aiming to become more resource efficient (Envirowise 2009b).

2.3 Factors that influence environmental behaviour

2.3.1 Internal and external factors that influence behaviour

Previous researchers have examined some of the major factors that influence pro-environmental behaviour. McDonald and Ball (1998) found that understanding how individuals are motivated to recycle and examining what de-motivates them is extremely important, in order to encourage pro-environmental behaviour. They also stated that raising awareness is vital in the development of recycling schemes (McDonald and Ball, 1998).

Fujii (2006) found that different internal and external factors affected different types of pro-environmental behaviour. For example, the perceived ease of implementation was a factor in all aspects of pro-environmental behaviour. However, specifically for waste minimisation and more efficient use of energy two different factors were influencing the behaviour. For waste minimisation, environmental concern was the biggest driver, whilst for gas and electricity reduction it was the desire to be frugal that most greatly influenced an individual's behaviour. Hawthorne and Alabaster (1999) also explored other factors that contribute towards positive environmental behaviour amongst individuals. The authors proposed that individuals need to attribute environmental problems to their own behaviour, and to have a sense of personal responsibility in order to change (Hawthorne and Alabaster, 1999). They also suggested that factors such as personality and socio-demographics play a part in becoming an 'environmental citizen'. This model of the 'environmental citizen' was further supported by the research of Tudor *et al.* (2006a), as well as Steg and Vlek (2008). They found that underlying beliefs and values were important drivers, with individuals with more altruistic values being more likely to engage in pro-environmental behaviour than those without. Often individuals will make a reasoned choice on whether or not to undertake a certain environmental behaviour depending on how the benefits compare to the costs of undertaking it (Steg and Vlek, 2008).

Research into whether or not socio-demographics play a part in environmentally responsible behaviour has had mixed outcomes. A study by Steel (1996) identified that there was a significant difference in the behaviour of men and women towards waste minimisation, with women far more likely to participate than men, with this difference increasing with age. However, an earlier study by Schultz *et al.* (1995) found that neither age nor gender could be used to predict recycling behaviour. More recent work by Clarke and Maantay (2005) also stated that socio-demographics could not be concluded to influence recycling behaviour. Instead Maantay (2005) suggest that internal feelings and attitudes, along with external penalties for not recycling were far greater motivators.

2.3.2 Factors that influence pro-environmental behaviour in organisations

Judge and Elenkov (2004) investigated the relationship between organisational capacity for change (OCC) and environmental performance. They found that as the views of senior managers and front line workers got increasingly different, the OCC fell, as did the organisation's environmental performance. Tsui *et al.* (2005) found that creating a common purpose/culture within an organisation was dependent on the management. They argued that company culture was strongest when directors, senior managers and middle managers shared the same vision as the CEO. This shared vision helped to facilitate the passing of information from all levels, aiding the diffusion of the new culture. Similarly, when a single individual was promoting a cultural shift, it was much harder and slower to achieve.

In conjunction with cultural change, senior management support has been shown to be a critical success factor in promoting sustainable practices (Young and Jordan, 2008). The incorporation of environmental initiatives in business can benefit from the backing of senior management, especially in construction companies where senior management support has been found to impact on other improvement processes such as supply chain

management (Lozano, 2006; Akintoye *et al.*, 2006). In addition to facilitating improved sustainability, companies with highly involved senior managers have been found to have increased sharing of information amongst their workforce, as well as increased financial stability (Papke-Shields and Malhotra, 2001).

2.3.3 The Theory of Planned Behaviour - setting implementation intentions

In business as well as in the public realm, research has shown that there can be a gap between the positive intentions of an individual and their actual environmental behaviour (Hooft *et al.*, 2005; Holland *et al.*, 2006; Tudor *et al.*, 2006b). Hooft *et al.* (2005) asserted that 'goal intentions' were not enough for the intended behaviour to be carried out, as they were often too vague. Instead the authors recommended 'implementation intentions' are set, as they state not only how the behaviour will be carried out, but also when and where. In business, there are likely to be two clear benefits from using this method:

1. if senior managers demonstrate intentions then there is a clear message of support for planned changes,
2. implementation intentions provide a framework for the workforce to work with, so they know what is expected of them and when.

2.4 Interventionist techniques

2.4.1 Formal environmental training

Businesses may choose to implement an environmental training programme as a means by which to educate and encourage involvement of employees in environmental initiatives. Whilst there has been mixed results on whether formal training programmes are effective, McDonald (2004) found that traditional methods such as formal presentations were more effective at providing lasting knowledge when compared to other methods, such as computerised learning systems. However, Grodzinska-Jurczak (2005) described how knowledge alone had no impact on environmental behaviour. Perron *et al* (2006) also noted that

environmental training in several businesses has not had a lasting impact on the workforce.

2.4.2 Environmental teams

Research by Remmen and Lorentzen (2000) showed environmental teams to be useful in driving forward environmental projects in business. They found that teams were able to draw upon their knowledge and experiences, and put forward proposals on how to reduce the company's environmental impacts. The authors argued that as a result of this it is not essential for members of an environmental team to have specific environmental knowledge. Rather, a good understanding of their organisation and enthusiasm to learn and participate was found to be more beneficial (Johansson and Magnusson, 2006).

Putting individuals who have already "bought" into the idea of environmental improvements in place as an environmental team can result in what Lozano (2006) described as the 'multiplier effect'. The environmental team helps to spread positive support for environmental improvements to other members of the workforce. The knowledge of team members can also be used to help in the development of environmental policies, targets, action plans, procedures and technologies (Remmen and Lorentzen, 2000).

2.4.3 Awareness campaigns

Awareness campaigns have been found to influence the attitudes of individuals, but the impact of these can be short lived. Sampei and Aoyagi-Usui (2008) showed that regular media coverage of an environmental issue such as climate change does have a significant impact on attitudes in the short term. However, once coverage of the issue stops, then this concern will often fade. These authors suggested that the benefits seen from regular coverage of environmental issues warrants the incorporation of an ongoing environmental update programme.

Grodzinska-Jurczak *et al.* (2006) supported this theory of awareness as a motivator. They examined the effect of an education campaign on the behaviour of the public, using 'face to face' advisors, and found that the public were more environmentally conscious as a result and participated in more environmentally positive behaviour, such as recycling.

2.5 Conclusions

Researchers have proposed various theories behind why individuals do or do not undertake certain positive environmental behaviours. Some suggest awareness is key (McDonald and Ball, 1998), where as others state the influence of beliefs and values to be a significant factor (Steg and Vlek, 2008). In business Judge and Elenkov further suggest the impact that senior management have on employee behaviour (2004). Overall the literature review suggests that there is no single factor inhibiting positive environmental behaviour, rather it is likely to be a combination of many factors, especially in the case of a workforce.

When it comes to changing the behaviour of individuals in the home or at work there have been mixed outcomes to interventionist techniques. Benefits have been seen from the use of poster campaigns, environmental teams and formal training, however all come with their own limitations. The support function Envirowise promotes the benefits of using a mixture of these interventionist techniques as a means to engage a workforce in positive environmental behaviour (Envirowise, 2009b). However, there is limited literature quantifying the benefits from this blended approach.

CHAPTER 3 – METHODS

There are two components to this research. The first is the undertaking of the research within the UK construction sector. To date, the majority of research into environmental behaviour has been focussed primarily on the public sector. Within the construction sector, one study focussed on the production of construction and demolition waste (Rodriguez *et al.* 2006), but did not deal with the issue of workforce behaviour towards energy conservation and the reduction of waste through more efficient use of materials. The second component is the use of a blend of interventionist techniques to initiate behavioural change within the workforce of the construction company. (section 3.2 outlines when these techniques were utilised during the research).

3.1 Introduction to the case study company: Tingdene Homes

3.1.1 Background to the case study company: Tingdene Homes

Tingdene Homes was established in 1969 and has grown to become one of the largest manufacturers of off-site modular buildings in the UK (Tingdene, 2007). The company is situated on a 16 acre site in Wellingborough, Northamptonshire (figs. 3.1 and 3.2), with two large manufacturing lines, as well as a large enclosed exhibition centre. Tingdene's core business is the manufacture of modular buildings, such as bungalows and log cabins (fig. 3.3). At the time of the study (2007-08), the company employed around 300 individuals, and had an annual turnover of £30 million in 2008.



Figure 3.1 and 3.2 Maps of Wellingborough, Northamptonshire
Source: Ordnance Survey (2009)



Figure 3.3 Example of a Tingdene home (J. Jones)

3.1.2 The construction of the modular home

Tingdene's structures are mainly built with wood based products. Stage 1 of the production process involves the simultaneous construction of the home's floor, internal and external walls (partitions) and roof (fig. 3.5). Timber framed and boarding are manually assembled, using compressed air tools. The floors are marked out with the home's dimension, including positions for the walls, fixtures and fittings and electrical outputs.



Figure 3.5 Construction of a Tingdene roof (J. Jones)



Figure 3.6 Suspended roof with electrical wiring (J. Jones)

Stage 2 brings the other components together. The internal partitions and external walls are affixed to the rolling base of the home. The shell of the home is then moved along the production line and the roof is suspended above and affixed. Simultaneously electrical wiring, which has been pulled down from the roof, is pulled through the walls of the home to where it is required (fig. 3.6).

Stage 3 involves decorating the home. External rendering is applied to the home (fig. 3.7)(or wood cladding for the log cabins) along with internal artexing (i.e. plastering) of the ceilings. The walls are wallpapered and painted (fig.3.8), and windows and doors are fitted. The shells of the kitchen and bedroom units are installed within the home at this stage, with the doors being attached at a later stage. The bathroom furniture is also fitted. During this process the home is gradually moved along the production line to allow for other homes to be worked on.

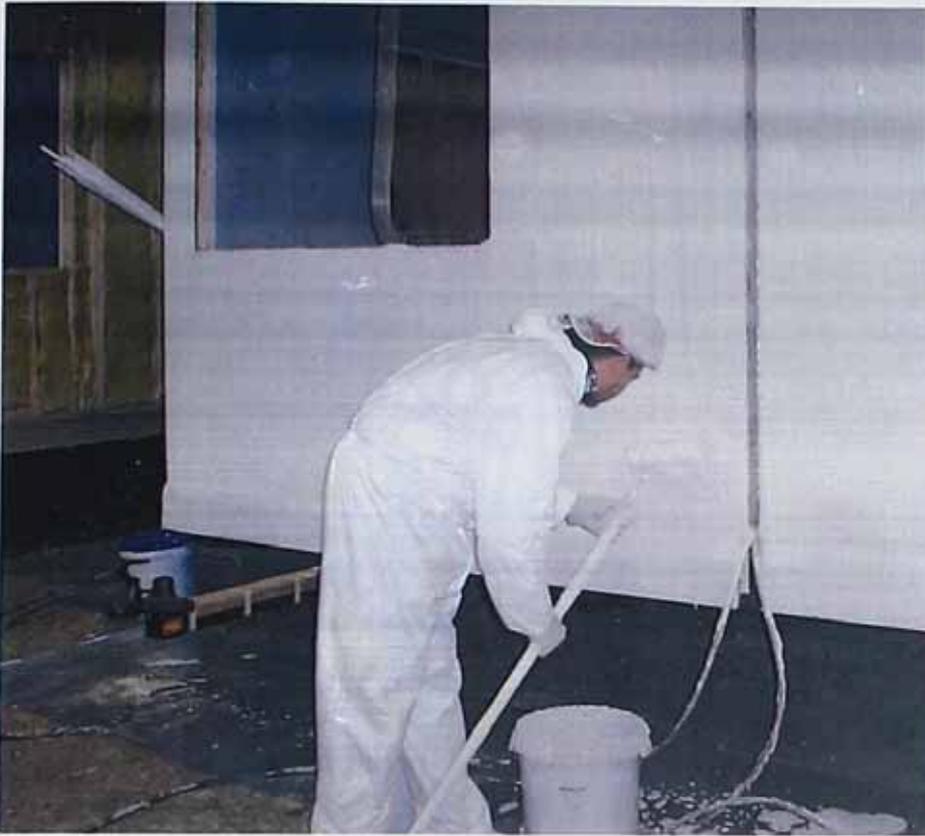


Figure 3.7 Exterior of a Tingdene home being rendered (J. Jones)



Figures 3.8 Interior of a Tingdene home being decorated (J. Jones)

After stage 3 has been completed, the home is moved out of the manufacturing line, to a clean line, called the Pre Dispatch Inspection (PDI) line.

Stage 4 within the PDI line applies the finishing touches to the home. Light fittings and plug sockets are affixed and kitchen and bedroom unit doors are attached with door handles.

Stage 5 sees the final inspection of the home take place. Inspectors ensure the quality of the work and that the home meets the customer's specification. In addition the home is thoroughly cleaned and any discrepancies or flaws identified are put right at this stage.

Once stage 5 has been passed, stage 6 prepares the home for dispatch. If the home has been purchased with furniture, this is delivered and secured within the home (still in its packaging). For the larger units that are constructed in two halves, the exposed side of each half is secured using high grade polythene. This is nailed into position, making the exposed side of the building water proof, and ensures the contents of the house do not fall out during transportation. The house is then stored on the large Tingdene site until the transport date.

The final stage, stage 7, sees the home/two halves of the home loaded onto the backs of flat bed trailers for transportation. It is then transported by the flat bed trailer to sites throughout the UK and to parts of Europe, such as Germany, France, Spain and Holland. On arrival the two halves of the home (for large buildings only) are secured together. The seams are decorated to make them less visible, and the furniture is unpacked and positioned ready for the customer's arrival.

In total, the construction of a complete home takes approximately 10 days, with another 2 days being allocated for siting the home on the customer's plot. The only part of the process that takes a varying length of time is the point at which the home is stored within the yard ready for

dispatch. This is often reliant on access to the customer's site, the date for which transport had been booked, and the customer's final payment.

3.1.3 Tingdene job roles

At the time of the study, there were eighty office staff covering roles of; administration staff, sales advisors, office supervisors and managers, and the Tingdene Directors. About 200 individuals were employed on the manufacturing line, performing a variety of job roles. These included:

- Labourers, who ensured the site was clean and materials stored;
- Floorers, pannellers and roofers, who constructed the shell of the home;
- Plumbers and electricians who installed all the wiring, electrical fittings, piping, bathroom fittings and boilers;
- Decorators, who rendered the exterior of the home, artexed the ceilings, papered and painted the interior;
- Window fitters, who manufactured the window frames and fitted them;
- Inspectors who undertook checks at various stages of the manufacturing process, ensuring the home met its specification;
- Supervisors and managers were involved in organising and managing the construction process and distributing workers to specific jobs, and ensuring targets were met.

3.1.4 Existing practices at Tingdene Homes before interventionist techniques were applied

Prior to the introduction of interventionist techniques (see Chapter 5), a survey of Tingdene Homes was undertaken to establish what environmental initiatives were already in place and the response of the workforce to them. It identified that Tingdene Homes produced a wide range of waste types, such as: wood, metal, cable, polythene, card, expanded polystyrene, some electrical equipment, plastic containers, paint tins and insulating materials. Tingdene Homes had introduced coloured recycling bins around the site for the collection of cardboard and polythene. However, it was apparent that these recycling points were not being fully utilised, as inspections of waste bin by the researcher

highlighted that most of the cardboard and polythene was being disposed of with the general waste.

In addition to the recycling bins for cardboard and polythene, Tingdene had separate containers and skips for the collection of metals, cables and wood, which had been in place for many years. These facilities were regularly being used and in the correct way.

Little in the way of efficient use of resources was occurring within the manufacturing line. Off-cuts of wood, insulation and other re-useable materials were simply disposed of, and there was limited consideration of how to obtain some value from the waste materials. In addition, materials such as paint and rendering, used to coat the exterior of the home for weather protection, were often wasted, with the materials not being correctly stored once opened. Overall the concept of resource efficiency (i.e. making the most out of the materials they had), was not considered in the day to day activities of the company or the majority of staff.

3.2 Interventionist techniques

In order to gain an understanding of the workforce's baseline attitudes and beliefs towards environmental issues, a questionnaire was distributed in February of 2007. Ethical approval was sought and gained prior to the questionnaires being distributed. It was identified that the level of knowledge amongst the workforce was a barrier to their participation (Chapter 4). Therefore this research made use of a selection of interventionist techniques and data collection methods. These were employed at different stages throughout the research, from January 2007 to September 2008 (fig. 3.9)

	2007												2008											
	J	F	M	A	M	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	
Beginning of research	█																							
Questionnaire A distribution		█																						
Manufacturing workforce training			█																					
Placement of environmental notices/posters				█																				
Implementation of environmental team						█																		
Poster of environmental officers placed on notice boards							█																	
Promotion of environmental team at communication meetings								█																
Office staff training									█															
Environmental section included in induction programme										█														
Environmental officer training programme											█	█	█	█	█	█	█	█	█	█	█	█		
Environmental notice board put in place												█												
Environmental notices distributed - including progress report													█	█	█	█	█	█	█	█	█	█		
Narrative interviews undertaken																				█	█	█	█	
Questionnaire B distribution																								
Data analysis			█	█																				

Figure 3.9 Timeline of research activities

An environmental training programme formed the first stage of the interventionist techniques. Figure 3.9 demonstrates how the training was split into two, with the manufacturing workforce training being conducted in April 2007, and the office staff training being undertaken in October 2007. The rationale for undertaking the training in two parts was based on designing the sessions to meet the needs of the manufacturing workforce and the office staff (Hughes, 2007). The time lapse between the sessions was as a result of identifying the immediate need to train the manufacturing staff, due to their work practices having a more significant environmental impact compared to the office workers.

In November 2007 an environmental induction pack was developed for all new starters. This included a copy of the environmental policy, a handout with pictures of the waste and recycling bins, with descriptions of what should go into each, and a handout detailing who the environmental team were, and where they worked. The contents of the pack were discussed with the new starters, informing them of the purpose of the environmental team, and the rationale behind Tingdene's decision to improve its environmental performance. This pack was intended to replace the need for ongoing training sessions with the workforce.

In order to supplement the environmental training, posters and notices were first distributed throughout the manufacturing lines in April 2007. However, posters and notices were replaced on a regular basis throughout the research. This method of communication was later utilised in March-May 2008, informing the workforce of the environmental improvements and achievements already made.

In July 2007, an environmental team was formed. Once the team was formalised, notices identifying the team members were positioned around the manufacturing line. In addition, in September 2007 the manufacturing communication meetings 'tool box talks' were utilised to further promote the environmental team. After the environmental team had undergone the first month within the position, it was identified that

they would benefit from a programme of environmental training. This would give them a broader knowledge of environmental issues, and a better knowledge of how to deal with environmental issues specific to the construction sector and to Tingdene Homes. This programme was undertaken between the months of December 2007 and May 2008, with one session being scheduled per month. At the end of the research, in August 2008 narrative interviews were undertaken with the environmental team. This was to gain a better understanding of what experiences they had had within the role, how the workforce had reacted/interacted with them, and what barriers there were to the role (Chapter 5).

The final data collection undertaken within the research was a follow up questionnaire that was distributed in September 2008. The questionnaire was aimed at validating whether the interventionist techniques had had an impact on employee attitudes and behaviours (Chapter 6).

3.2.1 Training in environmental management

As shown in figure 3.9, questionnaires were used during the initial assessment, in order to gain baseline quantitative evidence of workforce attitudes and behaviours. Further information on the structure and purpose of the questionnaires can be found in section 3.3.1. After the analysis of the first questionnaire results, it was identified that the workforce required educating (see Chapter 4). Many were unaware of the environmental initiatives that were already in place, as well as in environmentally responsible ways of working (e.g. how off-cuts could be utilised in other areas of the manufacturing chain, or designed out, and how wastage of electricity could be limited).

Formal training was chosen as part of an integrated education programme, as Hyde *et al.* (2003) found that formal/structured training programmes not only provide the information required, but they can also help change attitudes and organisational culture. Formal training was also chosen due to its ability to deliver a consistent message to a large number of the workforce in a short time period.

The aim of the sessions for both the manufacturing workforce and the office staff was to provide a base of knowledge that explained:

- reasons behind undertaking environmental improvement activities within the construction sector;
- a business case for undertaking environmental improvement activities;
- current environmental initiatives already underway within Tingdene Homes;
- upcoming environmental initiatives that Tingdene was planning to implement.

Whilst these areas of discussion were relevant for both the construction workforce and office staff, two different environmental training sessions were run. The first was tailored to the needs of the manufacturing workforce as a whole, with a focus on the environmental and resource efficiency issues that they would face everyday. The second was aimed at the office staff, and issues more specific to their area of work (Appendix A and B training presentation slides). It was important to tailor the sessions in this way to the two areas, as a 'one size fits all' method in training can lead to negative responses from audiences if they feel the content is not entirely relevant to them (Hughes, 2007). Aspects of the training that were the same for both groups were topics on the associated environmental, business and personal benefits from undertaking environmental improvement activities.

The training sessions were delivered in a formal presentation format, with groups of up to 16 individuals. The presentation lasted for approximately 20 minutes, after which an open forum discussion session was held with the workforce, allowing them to voice concerns, opinions and ideas regarding how to improve the environmental performance of the company.

3.2.2 Use of the environmental officers

Remmen and Lorentzen (2000) proposed that the use of an environmental team can influence behaviour change and generate significant environmental and business benefits. Evidence to show the effectiveness

of these environmental teams in the construction sector is limited, therefore this method was adopted as the second interventionist technique for this research.

The environmental team was formed from members of the manufacturing workforce. The workforce was informed about the upcoming voluntary role during the formal training sessions, allowing questions on the role to be raised and answered. In total eleven individuals from across the manufacturing line volunteered for the role, coming from various backgrounds, such as painters, plumbers, supervisors and inspectors. Figure 3.10 depicts the employees who were part of the environmental team for the duration of the research.



Figure 3.10 The Environmental Team (J. Jones)

A job description for the position was discussed with the volunteers before their appointment, to ensure they fully understood what was involved in taking on the role (Appendix C). Overall the job required the team to undertake visual inspections of the site, engage with the workforce (especially when the incorrect behaviour was witnessed), provide on the job training, and to help with the identification and implementation of new environmental initiatives.

The volunteers underwent a one-month trial period to see how well the role fitted in with their main duties. All eleven volunteers completed the trial period and were keen to continue with the role. However, three months into the initiative three of the officers found alternative employment and therefore had to resign their posts. Another volunteer from the manufacturing line filled one of these positions, but the others remained un-filled.

During the month's trial it was identified that the environmental officers would benefit from further training on environmental issues. As mentioned previously, in depth environmental knowledge was not vital for the success of the role (Johansson and Magnusson, 2006), however, the officers had shown a keen desire to learn more about the subject. A training schedule was devised for the environmental officers covering a wide range of environmental topics such as; Waste Minimisation; Climate Change; Water and Energy Efficiency and Sustainable Living. The training sessions were designed to use a mixture of formal presentations, group discussions and site visits (fig. 3.11) as Hughes (2007) describes how classroom training should form only a part of the training programme.



Figure 3.11 Environmental Team training session – A site visit to the Upton Meadows development in Northampton (J. Jones)

Wall and Ahmed (2008) also promote the use of blended learning techniques when undertaking training in business. Blended learning makes use of a number of educational techniques and can as a result help to overcome issues surrounding different learning styles (Wall and Ahmed, 2008). A programme of the environmental training can be found in Appendix D. Figure 3.9 shows where the environmental officers and their training fitted into the research timeframe.

3.2.3 Awareness building in environmental management

The use of posters has been found to be a useful tool in changing behaviour when properly deployed (Bankole *et al.* 2004). Bankole *et al.* (2004) found that strategically placing posters within a Nigerian hospital after other engagement activities had been undertaken had a significant impact on nurse behaviour.

Notices outlining strategies for resource efficiency were chosen to supplement formal training and the environmental team in order to provide ongoing information to the workforce. A notice board solely for environmental information was installed next to the existing Health and Safety Board. Environmental awareness posters and other environmental information relating to Tingdene Homes' waste strategy were put on the board along with photographs of the bins and photos and descriptions of

the locations of the environmental officers. In addition, as changes were made to systems in order to improve environmental performance, informative notices that detailed these changes were placed on the board and were placed on the walls of toilets throughout the site in order to reach the highest proportion of the workforce.

The posters were refreshed on a regular basis in order to limit the over saturation of information and to maintain interest in subjects on the notice boards. This was done because previous studies have found that the following factors limit the impact of posters: location; duration in the same location; too much other information on the notice board and visual attractiveness (Bankole *et al.*, 2004).

3.3 Measuring the impact of interventionist techniques

The research made use of both quantitative and qualitative research methods, as it was believed using a blend of research methods would best address the research questions. Research by Mcvilly *et al.* (2007) showed the merit of using a blended approach in this way, describing how neither quantitative nor qualitative methods were superior but that the use of both approaches at times can be more effective. The use of both quantitative and qualitative research methods was further supported by Knafel *et al.* (1988) who stated that using the techniques in this way minimised the weaknesses of each method.

The research tools employed and the interventions examined were:

- Quantitative
 - Questionnaires (awareness building) (see Chapter 4)
 - Waste and energy invoice analysis (see Chapter 6)

- Qualitative
 - Participant observation and informal conversations: with the entire workforce (see Chapter 4)
 - Narrative interviews: with the Environmental Officers (see Chapter 5)

3.3.1 Questionnaires

Questionnaires were used to establish the attitudes and beliefs of staff within Tingdene Homes as they offered a method for sampling a large percentage of the workforce in a short period of time. Questionnaires are also a tried and tested method of gauging attitudes (Saba and Messina, 2003; Balram and Dragicevic, 2004; Milfont and Duckitt, 2004). The questionnaires employed a combination of closed and open-ended questions. Closed questions were used to gauge scales of opinions on specific issues, where as open questions were used to gain additional information on issues that the workforce felt strongly about. The number of questions asked was kept to a minimum, in order to reduce the number of incidences of participants not finishing the questionnaire due to boredom or time constraints (Stacey, 1969).

The questionnaires were piloted amongst a small number of staff within Tingdene Homes to ensure any anomalies or ambiguous questions were rectified before full distribution. All employees had the opportunity to complete either a paper or electronic copy of the questionnaire. All staff with access to email received a copy electronically, and those without email access received a hard copy distributed by the area supervisors and Environmental Manager/Researcher.

One hundred questionnaires were distributed electronically and 200 copies were distributed by hand to ensure all employees had the opportunity to complete a copy. These quantities were based on the number of staff that had access to email, and the employees working on the manufacturing line that did not. Overall the return rate for the first questionnaire (Appendix H) was 27% and 20% for the second (Appendix I). In total, the first questionnaire had more electronic copies returned (36%) than hard copies (18%), whereas the second questionnaire this difference was not seen with equal participation from both.

Participants were asked to state their job title on the questionnaire. The researcher then broke down those job titles into the following categories, based on discussions with supervisors and staff at Tingdene Homes:

1. Directors/management
2. Supervisors/foremen
3. Administrative staff
4. Technical staff
5. Non-technical staff

The data from the returned questionnaires was analysed using the statistical programme SPSS. Descriptive analyses were first undertaken to understand the composition of the workforce. Bivariate analyses (primarily correlations and Chi-square) were then conducted to examine staff behaviours and the underlying factors governing these behaviours.

3.3.2 Conducting the ethnography

Atkinson and Hammersley (2007) describe ethnographic research as research that takes descriptive accounts of a community or culture, whilst participating overtly or covertly in people's lives for an extended period of time, watching, listening, conducting informal and semi-formal interviews, and collecting whatever data is available. Individual actions and accounts are to be studied in an everyday context, rather than in an experimental setup or through highly structured interviews. For the purposes of this study, this description of ethnography should be used, as the research sought to identify how employees' views and behaviour towards environmental improvements within the case study company changed overtime.

The description of Atkinson and Hammersley (2007) considers that the researcher themselves may be part of the community in which they plan to study. This was the case with this study as the researcher worked within the case study company as the Environmental Manager. This position within the case study company allowed for participant observation and informal discussions to take place. Interactions with the workforce

occurred on a daily basis, offering valuable opportunities for data collection on attitudes and behaviours.

Walk-about at the company's manufacturing site were conducted up to around four times daily during the beginning period of the study, as this was the point at which the greatest changes were being made to company procedures. The purpose of the walk-about was to build rapport with the workforce and to monitor behaviour and methods of working. Comments and suggestions from the workforce regarding waste management/environmental issues were recorded in a logbook. If negative environmental behaviour was apparent, but not witnessed by the researcher, informal discussions were held with members of the workforce to determine and understand the underlying causes. General observational data was also collected on a daily basis whilst conducting inspections of the recycling and general waste bins.

3.3.3. Narrative interviews

Narrative interviews were chosen as the research tool to assess the experiences of the environmental team. They provided the opportunity for the environmental officers to discuss issues that were important to them, rather than just answering questions posed by the researcher. This helped to tell the 'story' of the officers, and provided more in-depth insight into their role than a structured interview would have achieved (Elliott, 2006).

The focus of the interviews was on the environmental officer's stories, as it was aimed that the interviewer would provide minimal prompting. However, a sheet with discussion headings was provided to the environmental officers a week before the interviews to act as a prompt (Elliott, 2006) (Appendix E). The interviews were conducted on a one to one basis, and lasted between 20 and 45 minutes, depending on how descriptive the officers were in their accounts.

Seven of the nine environmental officers were interviewed, as two officers left the company prior to the interviews taking place. The officers were invited to the interview one month in advance, and a mutually convenient time arranged. One week before the commencement of the interviews each officer was asked to complete a consent form (Appendix F), which detailed their rights and how the interview would be conducted. Audio recordings of the interviews were taken to ensure full records of the interviews were achieved; these were later converted into transcripts by professional transcribers (Bryman, 1988).

On receiving the transcriptions, each interview was broken down into 'themes'. These themes included:

- Family influences
- Rationale for taking on the role
- Barriers to undertaking the role
- Benefits to undertaking the role
- Workforce attitudes
- Management support

These were then compared and combined with all the other interviews to identify a short list of 'key themes' from the interviews (Appendix G).

CHAPTER 4 - BASE LINE ENVIRONMENTAL BEHAVIOUR AT TINGDENE HOMES

4.1 Introduction to workforce behaviour at Tingdene Homes

There had been some recycling facilities in place at Tingdene Homes for several years (metal and wood), and others that were introduced at the start of the research (card and polythene). The more long-standing recycling facilities were being utilised by staff far more effectively than those recently implemented. However, little had been done to encourage staff to comply with the new recycling system. The initial inspections of the site highlighted that there was little consideration made for the storing of partly used 'wet' materials (i.e. paint), and large amounts of plywood were often wasted.

In order to begin to change the behaviour of staff, their attitudes towards environmental issues had to be established, and identification of what factors were limiting their involvement in positive environmental tasks undertaken, i.e. ease of implementation (Fuji, 2006). In addition levels of awareness/knowledge needed to be assessed, along with perceptions of environmental improvement activities (Clarke and Maantay, 2005). This was to be achieved through the use of questionnaires and informal conversations.

4.2 Responses from initial questionnaire

4.2.1 Baseline attitudes and beliefs towards the environment and resource efficiency

100% of the employees who participated in the questionnaire were concerned about the environment and their own impact on it, with 96% viewing themselves as environmentally friendly. Most (98%) were regular recyclers at home, either recycling on a weekly or fortnightly basis (fig. 4.1) and 83% stated they conserved materials at work. The SPSS correlation analysis did not show these results to have a significant link despite previous research showing that people who recycle at home are more likely to recycle at work (Tudor *et al.*, 2007). Of the respondents,

85% felt that their actions could make a positive difference to the environment and 64% saw environmental management at work as a major issue and felt that waste minimisation at work benefited them. These results indicate potential responses to strategies that encourage pro-environmental behaviour change, as benefits to 'the self' can be motivational drivers for recycling (Tudor *et al.*, 2007). Observations and informal conversations with the workforce support these preliminary results, in that many of the workforce were environmentally aware and on a daily basis staff made frequent enquiries into whether items could be recycled and raised environmental concerns with the Environmental Manager/Researcher.

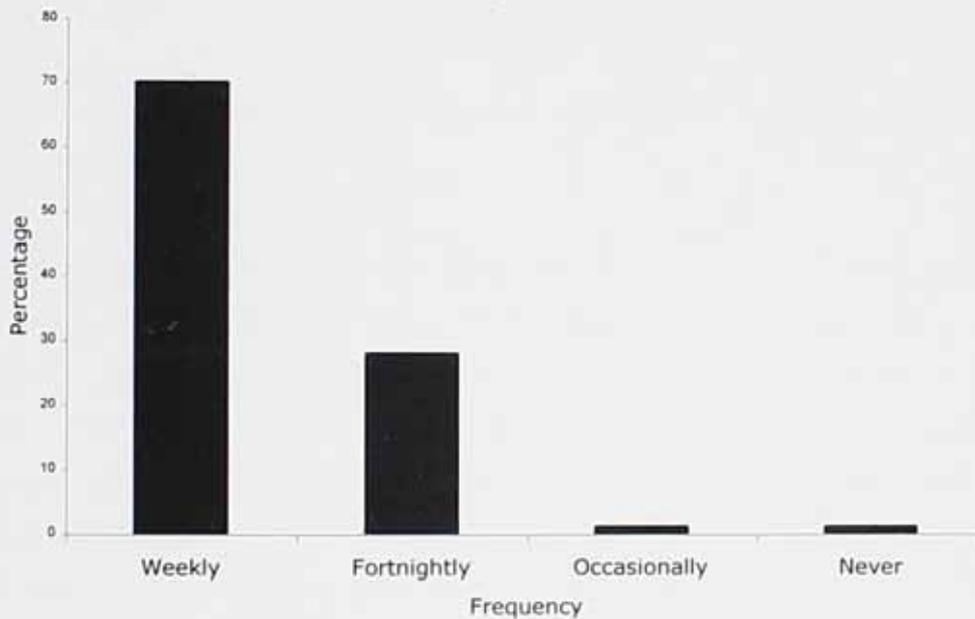


Figure 4.1: Participant engagement in recycling behaviour in the home

Figure 4.2 shows the most common items staff stated they recycled in the home as being paper and plastics. Other key recyclables mentioned by staff were cardboard, glass and green waste. These findings are largely in line with a national survey conducted by the Department of Environment, Food and Rural Affairs (Defra, 2007), which showed three quarters of the population recycled paper, glass and plastic, mainly through kerb-side collection schemes.

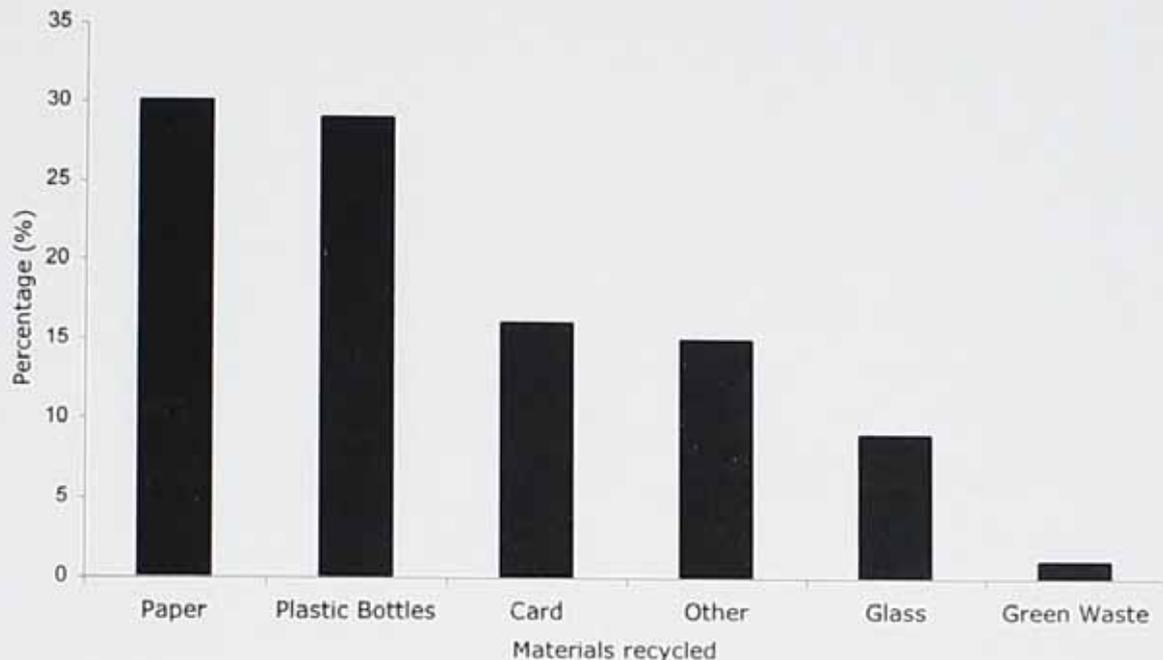


Figure 4.2: The main items recycled in the home by employees at Tingdene Homes

When staff were asked what was wasted in the workplace it was apparent that they were much more aware of the wastage of physical items, such as construction materials and paper, than they were of items such as energy and time (fig. 4.3). This concept was demonstrated not only through the questionnaire responses, but also through the observed behaviour of the employees. Staff on the production line were observed using the compressed air lines to blow dust off the floor of the home, instead of using a broom 100% of the time; thus wasting energy. However, this practice was supported at all levels of management, as it was quicker and deemed as being more effective than removing the dust by hand. Figure 4.3 also shows that only 10% of those individuals involved in or influential over the construction of the homes stated 'energy' as a wasted resource. Overall there was a significant difference in what the different job categories saw as being wasted ($\chi^2 = 43.951$, $df = 20$, $p < 0.005$). Administrative staff (68%) stated 'paper' as being most frequently wasted resource. However, both the technical and non-

technical categories stated paper as a wasted resource as well, despite neither category having much to do with paper waste.

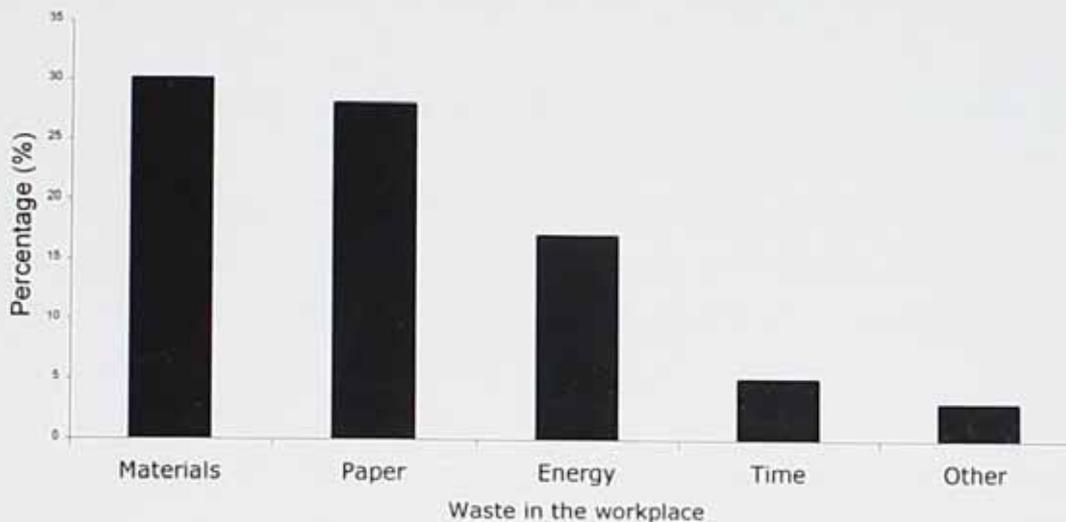


Figure 4.3: Employees perception of waste in the workplace at Tingdene Homes

4.2.2 The effect of socio-demographics on environmental behaviour

All staff viewed protecting the environment as important, despite 15% of them believing that their actions would not have a positive impact on the environment. When the results were cross-tabulated against the socio-demographics of the sample there was no apparent link between age, educational level, job category, or length of employment. However, there was a clear distinction between males and females answering 'false' to "my actions can make a significant difference to the state of the environment". Only 1% of females felt their actions had no positive impact on the environment, compared to 14% of males. This result could partly be explained by 66% of the responses being from male employees, however, despite this, the result was found to be significant under chi squared statistical tests ($\chi^2 = 5.980$, $df = 2$, $p < 0.05$).

Another key finding was related to links between job categories and recycling activities. One job category that stood out as the most negative towards recycling was that of the technical staff, such as electricians and plumbers. The electricians were the most complained about group by the

rest of the workforce. For example, comments from the cleaning staff, whose job it was to clean the homes of dust and dirt ready for dispatch, were that:

The electricians regularly leave their rubbish for us to clean up

This was in comparison to all other job categories who sorted out their own waste. When the supervisor of the electricians was asked to encourage greater amounts of recycling amongst the electricians, their response was:

It is hard enough to get them to put the waste into a bin in the first place, let alone different bins, but I will try

Over a 12 month period, daily inspections revealed fewer recyclable items such as cardboard, polythene, cable and metal in the general waste bin. The one exception to this was the bin found outside of the Pre-Despatch Inspection unit, where the finishing touches to the homes are fitted (e.g. light fittings, electrical items, radiators and cupboard doors). The inspections highlighted large quantities of cardboard, cable and polythene being disposed of with the general waste. The polythene was not easily traced back to a certain job category; however the cable and the cardboard boxes were easily identified as having come from the electricians. The cardboard boxes contained descriptions of the contents on the outside, for instance 'light fitting', as well as a code linking it to a specific home being built. Due to the codes, individuals responsible for putting the cardboard in with the general waste were identified and asked to put the waste into the correct bin. After two weeks the electricians realised that it was the codes that were giving them away, so they proceeded to tear off the codes from the boxes, and 'hide' their waste in the general waste bin. It took several more weeks of persistent rummaging in the bins for cardboard and other recyclables before the electricians began to recycle regularly. However, after reaching this point

the electricians began to take pride in what they were doing, pointing out how much they had recycled and they even began making suggestions as to how things could be improved.

4.2.3 Drivers and barriers for recycling

The most frequently stated driver for recycling was convenience with 74% of staff stating that they would be more likely to recycle if it was convenient ($\chi^2 = 53.75$, $df = 4$, $p < 0.005$). Staff noted (65%) that they would recycle more if they were instructed to, and 64% stating they would recycle more if they knew what went where. Improved interest in recycling was supported by the ethnographic study as additional bins were frequently requested by the workforce to help them recycle more efficiently. Instructions from supervisors and increased knowledge were also potential drivers for improved recycling behaviour. Table 4.1 shows a significant correlation value between a driver of instructing the workforce to recycle and increasing knowledge and/or convenience.

Table 4.1: Correlations between the key influencing factors and recycling

	I would recycle more if it was convenient	I would recycle more if I knew what went where
I would recycle more if I was instructed to	0.735	0.747

$p < 0.01$

Limited knowledge was identified as the greatest barrier to recycling, with 13% of employees noting that they did not know which bin to put the waste into. However, less than half (48%) of the participants felt incentives, such as financial rewards would encourage them to increase their recycling rate.

Other barriers included lack of time (10%) and motivation (9%). These results were less than unexpected, as from the informal conversations

with the workforce, people repeatedly expressed that time was a major issue. During these conversations, the workforce never mentioned lack of motivation to be a problem, however, this was the barrier most frequently mentioned by line managers and supervisors when referring to their staff.

4.2.4 The influence of managers

Nearly a third of the employees (30%) stated that if they were unsure of where to put waste they would resort to putting it in with the general waste and 13% of participants felt that being unsure of where to put waste as a barrier to recycling. Despite these uncertainties, the majority of respondents (79%) stated they would consult with the Environmental Manager if they required assistance with the disposal of waste. The ethnographic data supported this, with individuals from the manufacturing line and the offices specifically asking the Environmental Manager questions, instead of colleagues or supervisors. Just under half (48%) of staff said that they would consult a supervisor if they were unsure about where to put the waste. Supervisors were a constant presence on the manufacturing line and were always available to guide the workforce, but informal conversations with individual employees did unearth a certain amount of distrust towards certain supervisors, and many of the employees had incidents of informing their supervisors of an issue and it not being rectified.

Another possible barrier hindering progress towards overall resource efficiency within the company was that of the senior directors. They showed reluctance to separate their own waste when in-office recycling was introduced, instead 'delegating' the duty to another member of staff. The company motto 'build it fast, build it right' and steep production targets meant there was little time for the manufacturing workforce to consider how to get the most out of the resources they used. When a reduction in the production target by one house was proposed, in order to increase resource efficiency, it was rejected on the basis that the money saved from using resources correctly would not be comparable to the profits made from manufacturing and selling that house.

4.3 Discussion

4.3.1 Attitudes and beliefs

The majority of the employees were already conscious of environmental issues, and agreed that they were concerned with the conservation of the environment. Therefore little work would be required on changing the attitudes of the employees; instead it was behavioural change that was required. The majority of participants also stated that they recycled at home, so it could be assumed that the jump from recycling in the home to recycling in the workplace would not be a difficult one. Tudor *et al.* (2007) demonstrated that individuals who engage in recycling activities in the home were more likely to carry out that behaviour in the workplace. This was not supported by the questionnaire results, however, discussions with the workforce regarding recycling activities at work often led to employees stating proudly that they recycled a lot at home. One other key issue raised by McDonald and Ball (1998) and Tudor *et al.* (2007) was that employees are more likely to recycle when they see the behaviour benefiting them in some way and not just the company. This may explain why, despite employees seeming on the whole to be environmentally conscious, recyclables were still found in the general waste, as the results showed that 46% of participants did not see waste management as something that benefited them, but instead benefiting the company only. For a minority this was stated as the reason why they would not support environmental improvements, as they did not want to help the company. This was further shown by negative destructive behaviour in some of the workforce, who vandalised toilets and purposely left taps running.

4.3.2 Socio demographic differences

During the planning stage of the questionnaire survey several hypotheses were made regarding the socio-demographics of the participants and their expected responses to environmental issues. For instance, it was believed that there may be a difference in responses between men and women in regards to recycling activities (Steel, 1996). As such the questionnaire

was designed to explore if certain socio-demographic factors affected behaviour and attitudes. Largely, the results showed no discernable difference between various socio-demographic factors and environmental attitudes or behaviour. One exception to this was that there was a notable difference between men and women viewing their actions as having a positive impact on the environment. Neither the questionnaire results nor the ethnographic data can explain why men still recycled even when they felt it was having no positive impact on the environment. However, this could be a subject for further investigation.

Another socio-demographic difference highlighted was that of job category and wastage of materials at work. Largely, the workforce was more aware of wasted resources that were related to their role, for example administrative staff stated paper as a wasted resource. However, this was also stated by the technical and non-technical job categories, despite this not being a resource that they would come into contact with in large quantities. This could be explained by the fact that paper was the main item that the workforce saw as recyclable in the home, and so they automatically saw it as an item that would be wasted in the workplace. What was also clear across all job categories, except supervisors/foremen, was that waste was largely seen as physical items, such as building materials and paper, and that misuse of electricity and heat was not viewed as waste as there was no physical evidence left behind. This suggests that there was a gap in the knowledge of the workforce, as to what could constitute waste.

4.3.3 Drivers for involvement

Increased convenience was one of the factors that would encourage employees to recycle. Time was also a major barrier, however, increasing convenience should lead to a reduction in time taken to undertake certain activities reducing its impact ($\chi^2=53.750$, $df=4$, $p>0.005$). This was supported by the ethnographic study, as the issue most frequently raised by the workforce, was that greater numbers of recycling bins were required, and that larger bins were needed in certain areas. Often when

recyclable items were found in the general waste it was due to the recycling bin being full, or that no recycling bins were present. Incentives were not found to be as important a driver for the workforce as expected. This was most likely due to scepticism, as there had been cases where rewards had been promised, but not received.

Analysis of the data also suggested a relationship between the convenience of recycling and being instructed to recycle, as well as being instructed to recycle and knowing what went where (fig. 4.1).

4.3.4 Manager's and supervisor's responsibilities

A finding from the study was that employees felt that they would recycle more if they were told to do so by their supervisors. This raises an interesting point, as it suggests that the supervisors and managers were not doing enough to communicate to their teams that they should be engaging in pro-environmental behaviour. However, it also shows that senior managers and directors were not doing enough to communicate and support those below them in resource efficiency initiatives. Not having this support was a major barrier as it resulted in supervisors ignoring poor resource efficiency in their teams in order to meet the steep production targets.

4.4 Conclusions

The findings showed that the workforce were willing to undertake pro-environmental behaviour. They also showed that the company needed to make some changes in order to increase its uptake among employees. Fortunately, the majority of employees already had some level of concern for the environment, so their underlying beliefs did not pose a significant barrier to change. However, workforce knowledge, the convenience of recycling points and supervisor/manager support were barriers to change. Based on the findings from the literature review and the barriers identified in the questionnaire, the following recommendations were made to Tingdene Homes in order to engage the workforce in environmental improvement activities:

- undertake environmental training with the workforce,
- improve convenience of recycling points,
- raise awareness through notices/posters,
- form an environmental team.

CHAPTER 5 – USING INTERVENTIONIST TECHNIQUES: THE ENVIRONMENTAL TEAM

5.1 Introduction to Environmental Teams

Chapter 4 described the results of a questionnaire conducted in January 2007 (see figure 3.9). It was distributed to the workforce of Tingdene Homes in order to assess their environmental attitudes and behaviours. The questionnaire was also used to identify any barriers that were inhibiting positive environmental behaviour amongst the workforce. One of the conclusions from the research was that there was a need for increased awareness and engagement with the workforce, with the recommendation that the benefits of an environmental team should be explored. There is little research into the long term benefits and drawbacks of implementing environmental teams, however what research there is has shown the method to have promise at providing benefits in changing employee behaviour and providing environmental benefits. This research will therefore be of benefit to the wider research community.

5.1.1 Positions of the environmental officers

The environmental team held various positions within company, and worked in different locations. This meant that not all of their experiences within the role of environmental officer will have been the same, as they will have been working with different people, with different opinions and difficulties. As such, narrative interviews were chosen to gather stories and experiences of the environmental team. The teams roles and locations within the case study company are detailed in table 5.1.

Table 5.1: Details of the environmental officers

	Position	Other information	Location in company
Environmental officer 1	Manufacturing line supervisor		Manufacturing line 1
Environmental officer 2	Manufacturing line panneller	Was also a First Aider	Manufacturing line 2
Environmental officer 3	Electrician		PDI
Environmental officer 4	Inspector	Was training to become a psychologist	PDI
Environmental officer 5	Despatch		Despatch yard
Environmental officer 6	Painter	Later became section supervisor	Started in Line 2, once promoted moved to line 1
Environmental officer 7	Painter	Joined environmental team after colleague left	Manufacturing line 1

5.2 Influences on the Environmental Team

5.2.1 Family influences

When discussing with the environmental officers how they became interested in the environment, one main factor was identified. Families seemed to be the greatest contributor to their engagement with environmental issues, but this happened at two different stages in life. officer 4 went on to describe how:

"I suppose it kind of started growing up, my mum's very much into self-sufficiency"

Officer 7 described his “old fashioned family” who were all into self-sufficiency, including his grandparents, but he had really gained an interest for the environment through his hobby which was fishing. Others, however, had not had this early introduction into self-sufficiency and the environment, instead their interest came at a later stage in life once they had settled down with a partner and had children. For instance officer 1 stated that:

“I started becoming more interested in it really with, my wife’s very interested”

But instead of it being a desire to grow their own vegetables that had sparked this interest, it was from issues such as leaving lights on around the house, and a desire to recycle. For example officer 2 said:

“The misus is very environmentally, always moaning at me about leaving lights”

Officer 1 also went on to describe his wife’s environmental behaviour:

“My wife has recycled for quite a few years”

Officer 2 even described how his daughter would tell him off for not separating waste in the home:

“You could have recycled that, dad”.

Showing that influence from family members in the home is a significant factor behind the behaviour and attitudes of the environmental officers.

However, there was an exception to this finding. Officer 6 stated that he had little to no interest in the environment prior to undertaking the introductory environmental training session that was conducted for all Tingdene Homes staff. He had not been brought up with the concept of

self-sufficiency, and he was not married. He seemed to feel he had missed out by not knowing more about the subject earlier, stating that:

"I wish someone had brought it to light beforehand, you know, years ago".

5.2.2 Rationale for taking on the role

A main factor that influenced five of the six environmental officer's decision to take on the role was that of wanting to help. They believed that their knowledge or their time could help towards achieving improved environmental performance within the company. There was also the belief that this was something that everyone should be doing, as saving resources and the environment was important for future generations (officer 1).

"We are trying to make sure that our grand-children's children aren't growing up in a completely like shattered world"

Their decision to take on the role therefore could be seen to be altruistic. However, the officers were aware that by completing a year in the role they would receive a payment of £100. So whilst officers 3 and 4 noted that:

"What is a couple of minutes of my time to go and check some bins and make sure people are doing things"

and

"It just sounded like I might be able to kind of use some of what I learnt at Carlsberg and kind of help out"

Money may have been an underlying driver in their decision to take on the role. However, later on in the interview the majority of the interviewees made it clear that the money played little to no part in their decision to take on the role. For instance officer 5 stated that:

"Yes, 100 quid a year for being the environmental officer is great but it don't pay the mortgage"

Similarly officers 1 and 6 said:

"Fortunately I am in a position where that (£100) isn't really a great incentive"

"Some of them thought it was a joke at first, you know, just doing it like for the extra money but it's not that...I have learnt a lot from it so in many ways it's done me a favour"

There was one exception to this. Officer 7 joined the environmental team at a later date, and had heard about some of the benefits that the other officers had experienced, for instance additional environmental training. As such he was more informed about the potential benefits to himself than the original officers were. He stated that he had taken on the role:

"Partially because I heard that there was money involved... and it was something different than just working, you know, so I am part of something and I thought perhaps I might learn something at the same time"

Therefore this suggests that for those officers who joined in the beginning, that their intentions were likely to have been more altruistic than for the officer that joined later on.

5.3 Experiences of the environmental team

5.3.1 Time as a barrier to training

One of the requirements written into the environmental officer's job description was that they may be asked to attend training within working hours. Two of the officers expressed concern with this. They felt that the time they were spending away from their main roles was going to impact on them hitting their targets and therefore impact on their bonus. Officer

5 described how sometimes it was almost physically impossible to meet his weekly target, stating that:

"I mean you think well some weeks when we're despatching 32, 34 boxes... it takes what, roughly two and a half hours to do a box and you work that out and I am doing 60 hours, a 60 hour week in a 40 hour week, how do you work to that?"

Officers 1 and 6 also stated time to be an issue:

"It is hard for me at times because of how busy we are down there"

"Down there it is just mayhem, constantly on the go, on the go, on the go"

Despite time only being stated as an issue for three of the environmental officers, when training outside of normal hours was suggested, all were in agreement that this would be better for them. Research by Sammalisto and Brorson (2008) supports this, as they too found time to be a barrier to employee attendance at environmental training sessions, as well as the main factor that limited general participation in environmental initiatives. However, time did not impact on the ability of the environmental officers to undertake their duties. Officer 2 noted that:

"I only need to be the environmental officer at the times when there is an environmental issue so like until I see something, I am a carpenter"

And officer 3 felt the time away to undertake environmental duties was not a problem:

"What is a couple of minutes of my time to go and check some bins and make sure people are doing things"

5.3.2 Benefits to undertaking the role

Despite not taking on the role for personal gains, the environmental officers did experience several benefits from their position. They expressed feelings of personal satisfaction from undertaking the role. Officer 1 for example said:

"The fact that you're doing something for the better of people, for the good of people and that. I don't think you can top that at all"

Whilst officer 3 argued:

"When something's wrong and you get it changed and it continues to stay working...I think that is a good bit...you can sit back and smile and go "ha ha, I did that"

This finding is supported by Townsend (2006) who found that environmental teams working together to protect areas of habitat also stated feelings of accomplishment and satisfaction from their work. Taking on the role gave officer 1 feelings of such satisfaction that he has considered undertaking more formal training in the area with the aim of undertaking a permanent environmental role:

"Whenever I get any spare time I will be looking to do some sort of college course"

"I really would enjoy to do something along the environmental lines because it's not just for yourself it's quite a selfless line of work".

5.4 Relationships

5.4.1 Workforce attitudes

At the beginning of the environmental officers' appointment officer 1 reported that:

"Across the board the people just saw it (the environmental officer position) as a bit of a joke"

This feeling was also felt by officer 3 who was of the view that:

"They see environmental officers as the people that should be rifling through all the rubbish and sorting everything out"

Officer 2 also felt the attitudes of the workforce were one of the biggest challenges to overcome:

"Getting people to take you seriously when you are telling them about throwing like a little piece of rubbish on the floor like or in the wrong bin, they are looking at you like "what? It is a handful of something that has gone in a bin, why is it such an issue?" and to be taken seriously about that was probably the biggest challenge"

Alternatively, officer 3 felt that the workforce did not react well to change in general which was the main reason for their negative responses:

"People don't like change, as soon as you throw a spanner in someone's autopilot machine they go "no, not doing that, nothing to do with me".

He felt that it was getting everyone to see that it is "their duty" to participate in environmental improvement that was an area that needed to be addressed. But overall the feeling was that as a result of the company being old fashioned the workforce were:

"Stuck in old habits"

On the other hand, officer 1 felt that the people who had been put in place as the environmental officers were well equipped to change the attitudes of those employees "stuck in old habits" as:

"There are quite a few strong characters, you know, they can always put their point across and will not be deterred by other people"

Officer 2 supported this point as he described how he had taken the role of environmental officer seriously, which had ultimately resulted in others around him taking it seriously also. He said:

"If you take it seriously, people take you seriously"

officer 3 went on to describe a shift in workforce attitudes, which occurred later on into the appointment of the environmental team. He felt this was due to the fact that:

"They (the workforce) learnt what we were actually doing and the fact that it wasn't really big changes"

By contrast, officer 1 felt that the shift in behaviour for some of the workforce could be attributed to the fact that his position as a Senior Supervisor gave the role more credibility:

"It certainly has got them to be a bit more vigilant".

Overall none of the interviewees mentioned that their work mates had been particularly supportive of them in their roles. However, officer 4 did note that his team mates had indirectly supported him by covering his workload whilst he was at training sessions. Where as, despite officer 3 stating that he saw changes in the wider workforce's attitudes, the change in attitudes amongst his closer work mates was slower to come. He went on to describe that:

"(There is) lots of name calling, lots of bullying, you know, I feel like I am a prefect at school, you know, you are just a target"

5.4.2 Management support

An issue that was touched upon by officer 5 and 3 was the need for top management to be more active in their support for environmental improvement:

"What I would like to see with the environmental officers is to get involved with the management side of it and get the management to understand what we're doing"

"If anything the company should use its authority a little bit more"

The officers mentioned an important issue here, as senior management support has been said to be the most important critical success factor in project success (Young and Jordan, 2008). Similarly, research into the use of environmental teams has shown the method to be more effective at influencing friends and peers when the method is backed up by the use of fear from top management in the form of an institutional policy framework (Lozano, 2006).

5.5 The future

During the interviews all of the officers expressed a keen desire to continue in the role in the future, as they had benefited from the experience. Five of the environmental officers also reported that the role would be of benefit to them in relation to job seeking, with officer 4 reporting that:

"It is another string to a bow I guess for the CV"

Officer 1 also went on to describe how:

"Companies are becoming a lot more aware of their carbon footprint and the effect they have on the environment around them so I think if you have done something like that it can help you"

5.6 Discussion

5.6.1 Family drivers

All but one of the environmental officers described how their families had influenced their behaviour towards the environment. This happened at two different stages in life, the first of which was in childhood. Those who had not had this introduction to environmental issues at a young age had been encouraged to participate later on, after getting married and having kids.

Whilst being introduced to environmental issues in either childhood or adulthood both resulted in environmental concern, the subjects that sparked this interest differed depending on the stage of life at which it was introduced. Those officers who described that they had grown up within an 'environmentally friendly' setting described parents and grandparents who were into self sufficiency, who grew their own vegetables, kept livestock and generally lived 'with the seasons'. On the other hand, the officers that gained an interest in environmental issues later on in life described how they and their families had been introduced to the subject through household recycling and concerns over electricity bills. Whilst both sets of officers showed high levels of enthusiasm for environmental improvement, it became apparent during training and general dealings with the officers that all those who had been introduced to self-sufficiency had a better understanding of the importance to reduce waste rather than just recycle it. Suggestions on how to manufacture out waste or where waste from one area of the production line could be utilised at another point in the process came from this group more often. It may be possible therefore to engage future generations in environmental issues by introducing vegetable gardens at schools where the children are given practical lessons in sustainability and self sufficiency.

5.6.2 Barriers faced by the environmental officers

Time was not a barrier that seemed to inhibit the environmental officer's ability to undertake their normal duties as well as their voluntary ones.

This shows the possibility for the long-term formation of the environmental team, as normal working practices were not affected, whilst the company still received potential environmental benefits. Time was a barrier when it came to conducting training with the officers, as often the time they were required to spend away from their posts did cause staff shortages in some areas. The greatest time barrier was for the environmental officer from the Despatch team, as this team would lose half of its workforce for the duration of the training. However, Tingdene Homes worked a four day week and it was suggested by the environmental officers that training be undertaken on a Friday, which was not part of their working week. Senior management favourably received this and were happy to pay the officers overtime for coming in, as they were concerned about giving the officers time away from their full time roles in order to undertake environmental training. Whilst this was a mutually beneficial outcome, it also undermined the importance of training the officers, as it showed that senior managers were not willing to put in the resources to allow the officers to take time away from their posts to fulfil their environmental responsibilities. This was also shown by one officer's supervisor not allowing him to undertake environmental checks on a number of occasions, resulting in him having to 'sneak out'.

Initially the workforce also posed a barrier to the officers as they had to handle name calling and employees not taking the role seriously. To a certain extent this was to be expected in the beginning. Indeed this behaviour changed as time went on, and the workforce began to understand the purpose of the environmental officers. Areas in which this behaviour changed most dramatically was where the officers were also in a position of authority, such as supervisors or health and safety officers. This highlights the issue that individuals in a position to influence due to their job role may be better placed as environmental officers. This finding follows on from the questionnaire results in Chapter 4, where employees stated that they would be more inclined to reduce waste if instructed to do so by their supervisors.

Another factor that arose from the narrative interviews was that one officer had not stopped experiencing the name calling from his work colleagues. His work colleagues had even gone so far as to re-define the role of environmental officer for him, insisting that that was the officer's job to do all the cleaning and sorting of waste. This was solely found in the electrical team, which mirrors behaviour witnessed earlier in the study. It cannot be said whether or not this would have been different had an individual in more authoritative position taken on the role, as Chapter 3 described how even the electrician's manager struggled to get them to follow instructions.

5.6.3 Benefits of the environmental team

The environmental officers did report changes in employee attitude and behaviour towards environmental improvement. However, whether these changes were widespread enough throughout the organisation to result in actual environmental improvements is yet to be determined. There were, however, intangible benefits to the environmental team. Two of the environmental officers reported feelings of satisfaction from their positions, with one officer describing how it also added to the satisfaction he got from his main job. Another benefit was that two of the officers felt the role gave them additional skills and accomplishments to add to their CVs. This was especially of benefit towards the end of the study, when the case study company experienced financial problems due to the economic situation, and had to make large-scale redundancies. At the point at which the research was undertaken, all of the environmental officers showed enthusiasm for continuing with the role.

5.7 Conclusions

The narrative interviews did highlight some change in workforce behaviour as a result of the environmental team. However, the information gathered was not as detailed or free flowing as intended, making it difficult to present the findings in a typical narrative format. This may be attributed to the environmental team not being used to giving open and honest accounts of their experiences, which made some of the officers

appear uncomfortable whilst in the interview. In order to get a better understanding of the benefits of the environmental team in changing workforce behaviour further investigation is required. Questionnaires will be used to gather further information of workforce attitudes, whilst waste and energy data will help to quantify the impact on behaviour change (Chapter 6).

CHAPTER 6 – REVIEWING ENVIRONMENTAL PERFORMANCE INDICATORS FOR CHANGE

Research by Perron *et al.* (2006) has shown that programmes aimed at changing behaviour are not always effective. The knowledge given to individuals through training may fade over time if not reinforced/used, making the individual less likely to undertake the desired behaviour (Grodzinska-Jurczak *et al.*, 2005). In addition, awareness campaigns may have affected the internal values of the individual, but other factors such as time constraints may be impacting on the likelihood that the individual will undertake the desired behaviour.

It is therefore important to review the impact of the educational campaigns and training at Tingdene and to ensure they have had the desired impact, not only in the short term, but in the long term as well. Assessment of the impact of the interventionist techniques used in this study are presented in the Chapter. Section 6.1 presents the results of Questionnaire B (QB) and compares the responses to the questionnaire taken at the start of the study (Questionnaire A (QA)). The return rate for QA was 27%, with fewer (20%) returning QB. Chapter 4 described how QA showed the overall attitudes of the workforce to be positive towards environmental improvement, but that there were various barriers that were limiting their participation in environmental activities at Tingdene Homes.

6.1 Follow up Questionnaire Responses

6.1.1 Attitudes and beliefs towards the environment and resource efficiency

When employees were asked to state whether they saw themselves as environmentally friendly, 87% either agreed or strongly agreed with the statement. However, in the questionnaire conducted the previous year, 96% of employees regarded themselves as environmentally friendly. Similarly in relation to recycling in the home, 89% stated that they recycled on a weekly, fortnightly or monthly basis, compared to a rate of 98% in QA. Whilst this may indicate a slight negative shift in behaviour in

the home, it may also be attributed to opinions not previously gathered being recorded. This could have been down to factors including how the questionnaire was distributed, or more simply that new employees had completed the questionnaire. A much greater indication of attitudinal change was shown when employees were asked whether they believed resource conservation and recycling benefits the environment. Previously only 47% believed that resource efficiency did benefit the environment, compared to 95% in QB.

There was also an increase from 83 to 87% of employees stating that they participated in resource conservation at work, and from 64 to 66% when they were asked whether they felt resource conservation benefited them.

6.1.2 Drivers and barriers to positive environmental behaviour

The barrier which employees felt had most significantly impacted on their ability to participate in positive environmental behaviour was the quantity and availability of recycling bins. In QB 78% of employees felt there should be more bins, with a comparatively lower 48% feeling that the convenience of the bins should be improved upon. This showed a level of improvement, as the previous questionnaire highlighted that 74% of employees were dissatisfied with the convenience of the bins.

This result was corroborated during inspections of the site as the number of recycling bins was doubled between the two questionnaires taking place and each was more strategically sited so that more work areas were supplied with recycling points. One of the issues which arose in relation to the bins was that, as employees began to participate more in recycling activities, the recycling bins would fill up quicker than they could be emptied. This could account for the high proportion of staff who wanted more bins.

For QB, the next most frequently stated barrier to engaging with environmental initiatives was time (49%). In QA only 10% of employees

stated this as an issue, despite it regularly being stated as a problem in conversations with staff. This increase in perception that time is a barrier is therefore most likely due to a truer representation of staff opinion than to do with less time being available. But it once again suggests that the ethos of the company to build their homes as quickly as possible was inhibiting the participation of the workforce.

Almost half (49%) felt their knowledge of what to do to minimise general waste was an issue, despite companywide training sessions and incorporation of environmental inductions for all new starters. However, this was down from the previous year's results where 64% felt they were lacking the necessary knowledge.

6.1.3 Effectiveness of the interventionist techniques

Whilst every effort was made to ensure that all employees attended either the manufacturing line, the office, or the induction training sessions, only 77% of employees reported having attended any training. This may explain why 49% of employees still felt that they were lacking in environmental knowledge.

The majority of employees (68%) were aware who the environmental officers were. However, it was expected that this would have been greater as posters of the officers were sited throughout the manufacturing line and distributed during induction programmes. In addition the environmental team were promoted at the internal communication meetings throughout the site, informing the workforce of who their 'local' officer was.

A larger proportion of the workforce had been exposed to the environmental information through notices and emails (86%). The posters were sited to reach most employees and a high percentage of them reported the posters had had a positive impact on their knowledge (76%), as shown in figure 6.1. Employees noted that the training sessions (68%) increased their awareness of environmental issues within Tingdene. Just

less than half (48%) of the employees felt that the officers had helped to improve their knowledge of environmental issues.

Further questions in QB revealed that even though the posters had received the greatest exposure within the workforce, and were reported to have resulted in the greatest level of attitudinal change, they did not have the greatest impact on knowledge. Posters were reported to have positively changed attitudes in 75% of employees, where as the training had and almost equal impact on attitudes and knowledge (69-70%). The environmental team resulted in less attitudinal changes (43%), however, whilst the posters were better at changing attitudes than they were at improving knowledge, the environmental team were similarly effective at providing both.

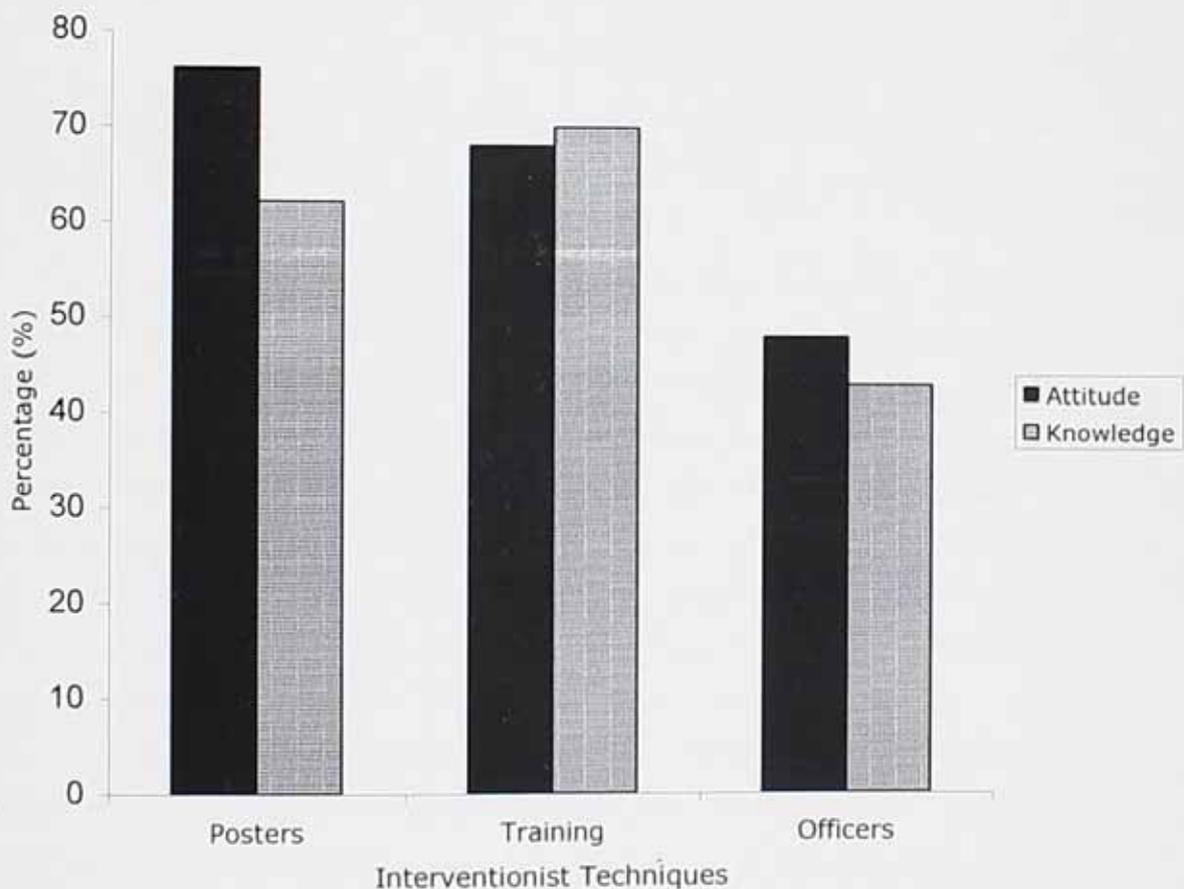


Figure 6.1: How environmental initiatives influenced knowledge and attitudes

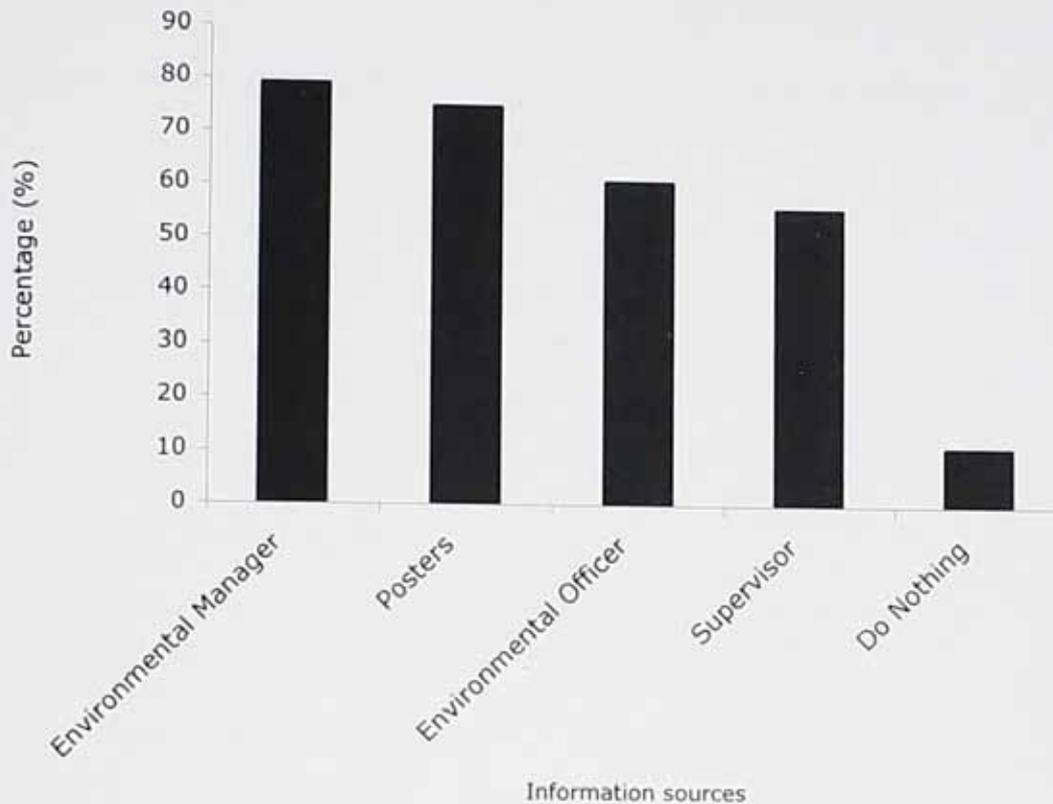


Figure 6.2: What/who employees would turn to if unsure of what to do with waste or had an environmental problem

The workforce felt that the environmental manager was the main point of contact if they had a query on an environmental issue (79%), as was found to be the case in QA (fig. 6.2). On the other hand, in QB the workforce also felt strongly that they could refer to environmental notices as well (75%), which supports the earlier finding that the workforce felt the notices improved their knowledge. What was most positive, however, was the fact that more employees felt they could turn to the environmental officers (61%), than their supervisors (58%). In addition, whilst the environmental team were not found to have been the most effective at providing knowledge and changing attitudes, it was found that almost all of those employees who were aware of the officers were felt that they could turn to them if they had queries. This result suggests that if workforce knowledge of the environmental team was improved, then more employees would turn to the team if they had an environmental problem.

6.2 Validating stated behaviour through waste data analysis

6.2.1 General waste arisings

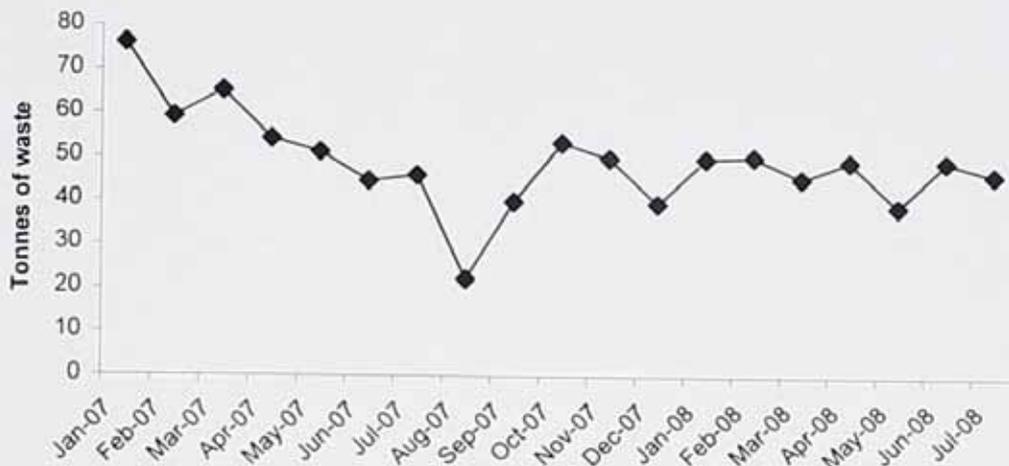


Figure 6.3: Monthly waste production at Tingdene Homes

As can be seen from figure 6.3, waste production gradually fell between January 2007 and July 2007. In August there was a significant drop in waste arisings, which can be attributed to a two week long company holiday, where the manufacturing line is shut down. Waste production did rise in October to levels not seen since March 2007, but levels still remained 20 tonnes below the production recorded in January 2007. Waste arisings largely stabilised after this point, with dips in waste production only seen during other holiday periods.

These findings along with visual inspections of the bins suggest that there was an improvement in workforce behaviour towards waste. However, as the quantity of waste generated was influenced by unit production it was decided to normalise the waste data against the number of units produced. Figure 6.4 shows the normalised general waste data. It suggests that waste produced per unit manufactured had fallen. However, a peak in waste production was seen well into the improvement programme in October 2007. This peak in waste per unit occurred during a company shut down period and can be explained by tidy up work undertaken throughout the site in preparation for a new project which was

to begin in the new year. So whilst additional waste was being removed from the site, additional units were not being manufactured, skewing the waste per unit figures for this month.

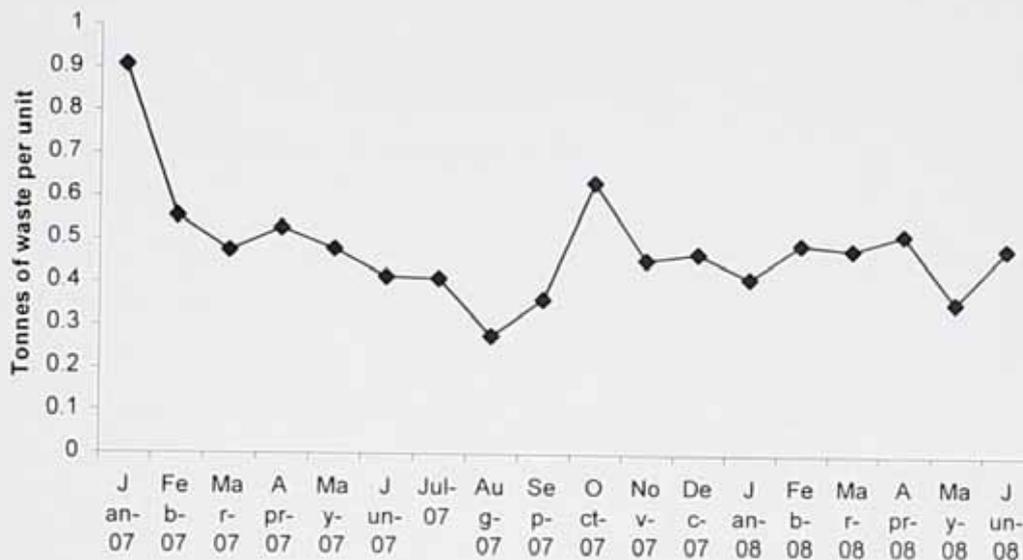


Figure 6.4: Normalised general waste production at Tingdene Homes between December 2006 and June 2008

Due to the way in which general waste was collected and disposed of, i.e. in Rear End Loaders (REL), accurate weights of waste could not be obtained. Instead, figures gathered from the waste contractors on the average weight of a full REL bin on Tingdene’s site had to be used. This meant that a standard figure was used for all emptied REL bins, whether they were 100% full or not. In many cases the bins could be as little as 50% full and still be emptied, as overflowing bins could not be risked due to the impact it would have on the production line. Therefore, waste figures alone do not illustrate the full extent of improvement in workforce behaviour.

6.2.2 Recyclables recovered

In order to get a clearer picture of the improvement in workforce behaviour, the quantities of recyclables recovered were investigated.

Table 6.1 shows that recyclables recovered increased from 35.1 tonnes at the beginning of the study in January 2007 to 46.8 tonnes by the end of July 2008. Whilst the total amount of recyclables recovered fluctuated throughout the study, the overall trend showed an upward pattern (table 6.1). However, as with general waste, the recyclables recovered would have been subject to the influence from the number of units manufactured and the holiday shutdowns. As such recyclable data was normalised against unit production (see figure 6.5).

Table 6.1: Total tonnes of recyclables recovered at Tingdene Homes between January 2007 and July 2008

	Recyclables				Total
	Metal	Polythene	Card	Wood	
Jan-07	4.2	1.9	3.5	25.5	35.1
Feb-07	3.4	2.4	2.2	35.8	43.8
Mar-07	4.1	1.9	3	49.7	58.7
Apr-07	4	2.8	2	44.4	53.2
May-07	4	2.4	2.9	54.4	63.7
Jun-07	5	2.4	3.4	34.6	45.4
Jul-07	7.7	3.3	1.76	58.6	71.36
Aug-07	5.4	1.4	0.88	29.2	36.88
Sep-07	3.9	1.4	0.8	51.7	57.8
Oct-07	2	1.9	1.5	48.6	54
Nov-07	4.1	1.4	2	48	55.5
Dec-07	1.5	1.4	0.8	33.5	37.2
Jan-08	6.6	2.4	1.7	59.8	70.5
Feb-08	5.5	2.4	1.7	61.9	71.5
Mar-08	9	2.4	2	52.4	66
Apr-08	6.2	2.4	1.7	66.6	76.9
May-08	10	1.9	1.7	46.46	59.96
Jun-08	7.4	2.4	2.1	52.98	64.88
Jul-08	3.8	1.4	1.7	39.94	46.84

Figure 6.5 shows the actual and expected recyclables recovered per unit. The expected values were derived from the data that was available prior to the beginning of the research. For cardboard and polythene only a few months of data were available so the figures were extrapolated to account

for a full year. There is a visible difference between the actual and expected recyclables recovered. There is also a slight upward trend in the actual recyclables recovered. Waste bin inspections also support this finding, as recyclables were found within the general waste bins less often as time passed, with recyclable materials only found within the general waste when they had been soiled, or when all the recycling bins were overflowing.

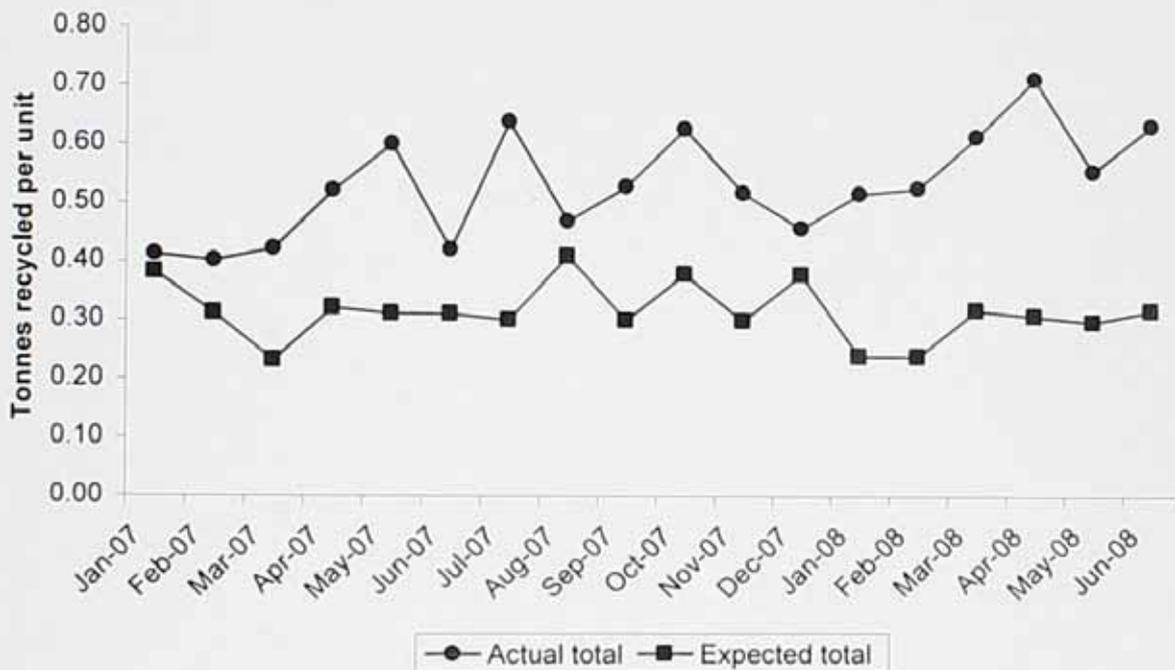


Figure 6.5: Comparing actual and expected recyclables recovered per unit manufactured at Tingdene Homes between January 2007 and June 2008

Based on inspections of the general waste, it appeared that the biggest improvement had been made with cardboard and polythene recovery, as previously these items were often overflowing within the general waste bins. Other items such as wood and metal were rarely found within the small general waste REL's as separation of those materials had been in place for many years. The only times these materials were found within the general waste was when the internal construction 'tipper skips' had been contaminated with other waste and it would have been too time

consuming to separate the materials. Occurrences of this had largely stopped towards the end of the research due to education of the workforce and colour coding of the bins. The impact the education of the workforce had on wood recovery is shown in figure 6.7. Throughout the research more wood was recovered per unit than was expected. Within the first year of the research this level fluctuated by up to 0.2 tonnes per unit. This fluctuation was most likely from wood being disposed of within the large general waste skip, partly through the contamination of the 'tipper skips'. However, in addition to this, full loads of wood were also finding their way into the large general waste skip. Investigations highlighted that a forklift truck driver was disposing of wood within this skip, as he miss identified the bin as a wood skip. Education of the individual helped to reduce instances of this occurring.



Figure 6.6: Comparing actual and expected recycled wood per unit manufactured at Tingdene Homes between January 2007 and June 2008

However, figures 6.7 and 6.8, showing the normalised polythene and metal per unit illustrate a much smaller difference between the expected and the actual recyclables recovered.

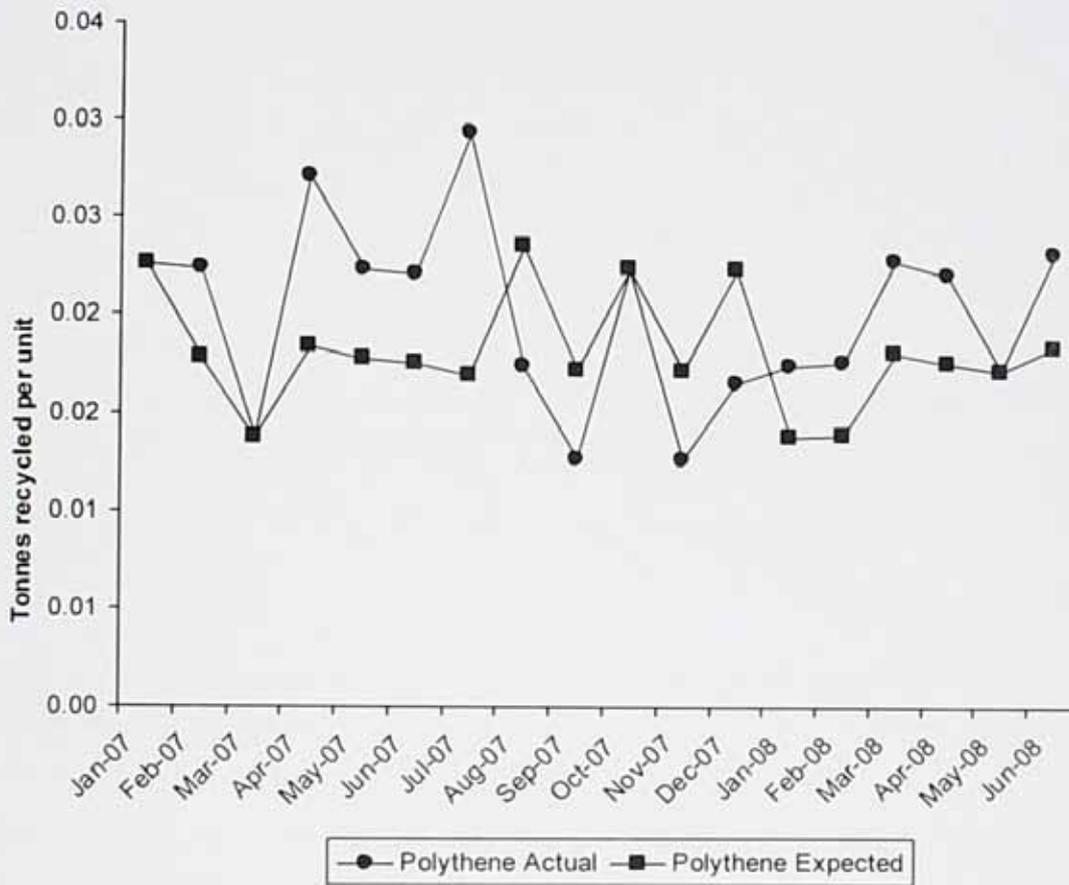


Figure 6.7: Comparing actual and expected polythene recycled per unit manufactured at Tingdene Homes between January 2007 and June 2008

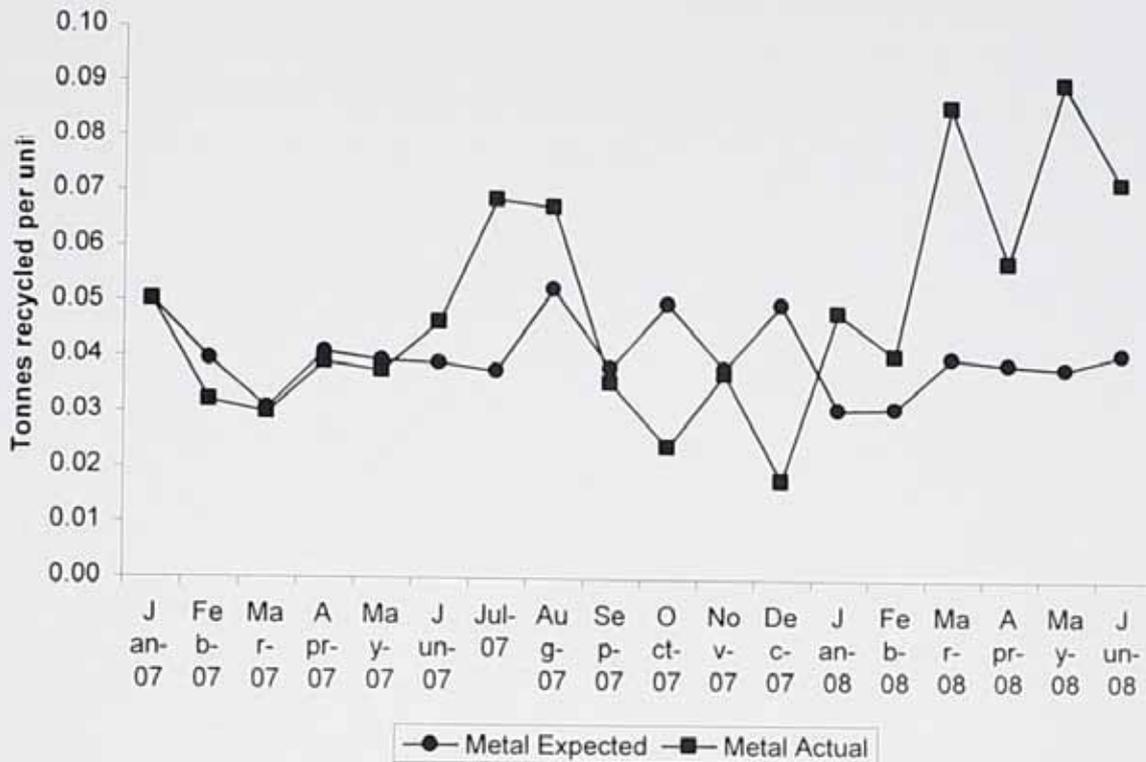


Figure 6.8: Comparing actual and expected metal recycled per unit manufactured at Tingdene Homes between January 2007 and June 2008

Whilst waste bin inspections suggested that improvements had been made in polythene recovery, the recyclable data did not support this (table 6.1 and figure 6.7). However, this discrepancy was likely due to the nature of the polythene material. When it was disposed of within the general waste bin, it took up a large proportion of the bin, giving the impression that there was a lot of material there. But in actual fact this material weighed very little. So removing the polythene from the bins did little to increase the tonnage recovered, but did make more space available within the general waste bins for other waste.

It was not expected that the amount of recyclables recovered per unit would increase for metal, because as described in section 3.1.4 the metal bins were being used correctly from the outset. However, figure 6.8 shows a deviation from the expected tonnage recovered in the last few months of the research. The increase seen from April 2008 onwards can

be attributed to renovation work taking place within manufacturing line 2 in preparation for taking on new manufacturing work. Some of the old fixtures, such as metal racking were disposed of along, with other items increasing the metal recycled in those months.

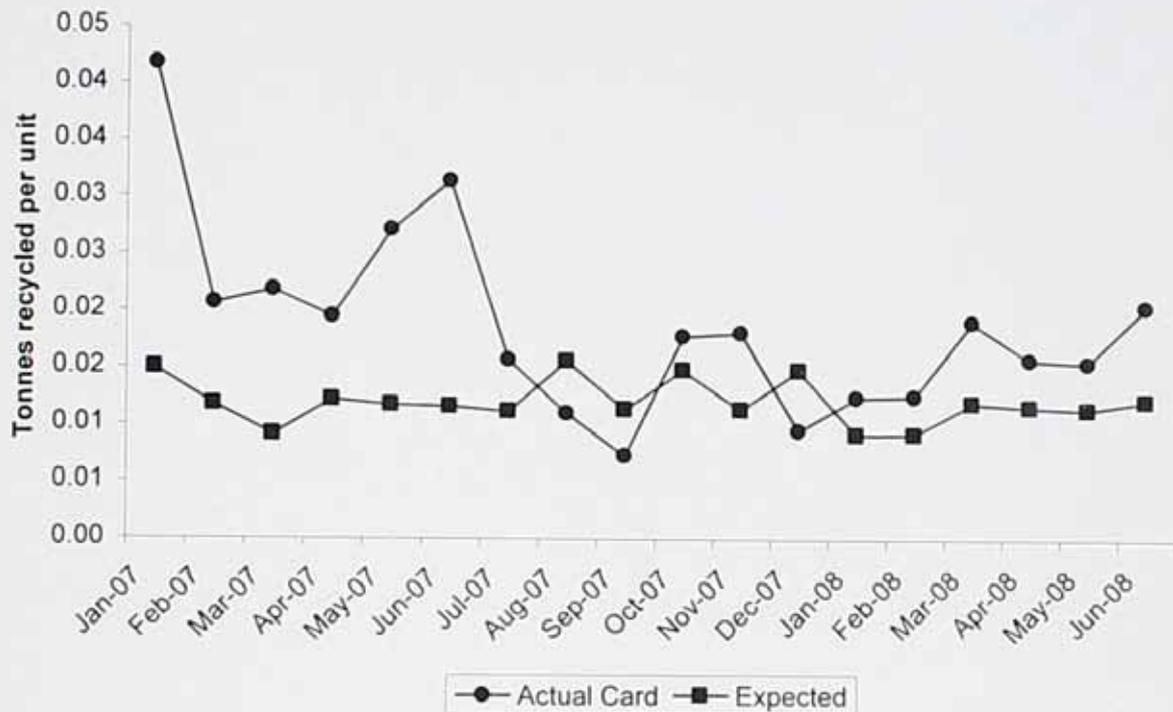


Figure 6.9: Comparing actual and expected cardboard recycled per unit manufactured at Tingdene Homes between January 2007 and June 2008

Whilst polythene and cardboard recovery did not show a significant deviation from the expected values, figure 6.9 shows that there was a larger deviation between the expected and actual cardboard tonnages recovered per unit. This suggests that per unit manufactured, more cardboard was being recovered, which was also supported by the observational data.

6.3 Validating stated behaviour through energy data analysis

6.3.1 Validation through gas data analysis

In November 2006 Tingdene Homes invested in an 'intelligent' gas heating system for its two manufacturing lines. This had an impact on the overall gas consumption for the site, as shown in figure 6.11. The system

worked by turning off the heating system if the factory doors were open for over 2 minutes. This enforced a behavioural change within the workforce, as they soon found that they were getting cold if they did not shut the doors after opening them. Once closed for 3 minutes, the heating system would once again turn on.

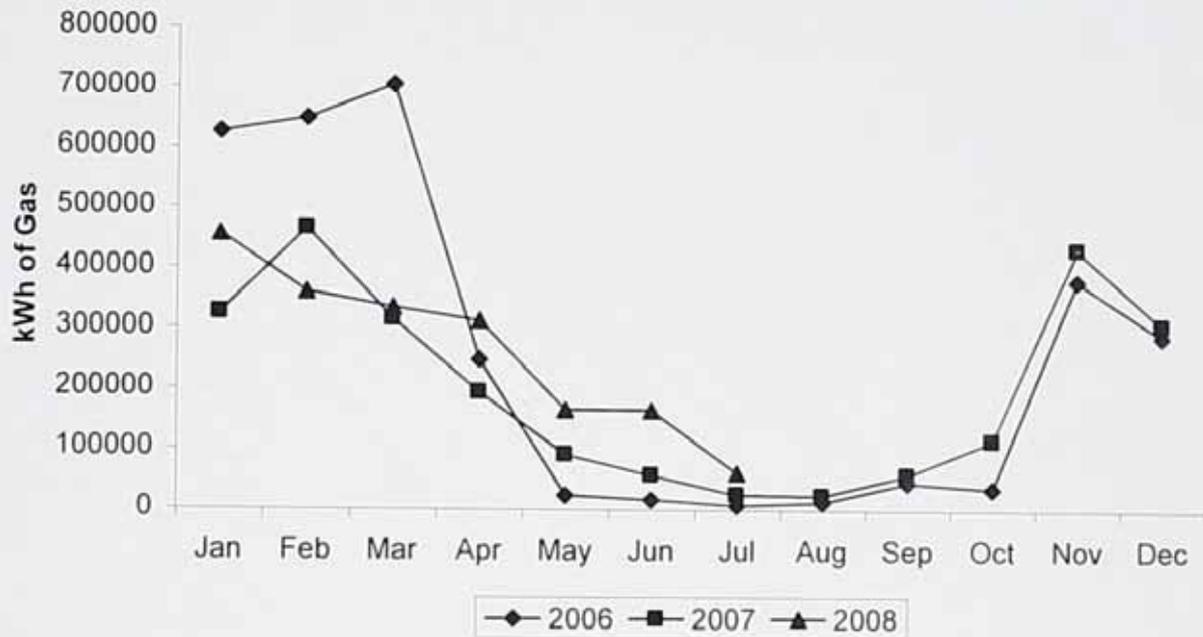


Figure 6.10: 2006 to 2008 gas consumption at Tingdene Homes

Between 2006 and 2007 Tingdene experienced a reduction in gas use of 993,984kWh, which equated to a cost saving of £29k in the first year. Whilst in 2008 gas use was still substantially lower than in 2006, overall use was higher than in the previous year. This could have been attributed to weather conditions. However, when gas use was broken down into individual areas within the organisation, it became apparent that the increase was only seen within one building on the site. If weather had been the root cause of this increase, a small rise in all sites, rather than a large increase in one would have been expected. Hence weather/temperature was not likely to have been the cause of the increase.

Figure 6.11 show that the Home Maker Centre (HMC) had a large increase in gas use at the end of 2007, which continued into 2008. The cause of

this increase was never officially identified, however, it was believed that the new heating/cooling system installed towards the end of 2007 may have be faulty, as no gas leak was identified, and no other explanation was found for the dramatic increase in consumption.

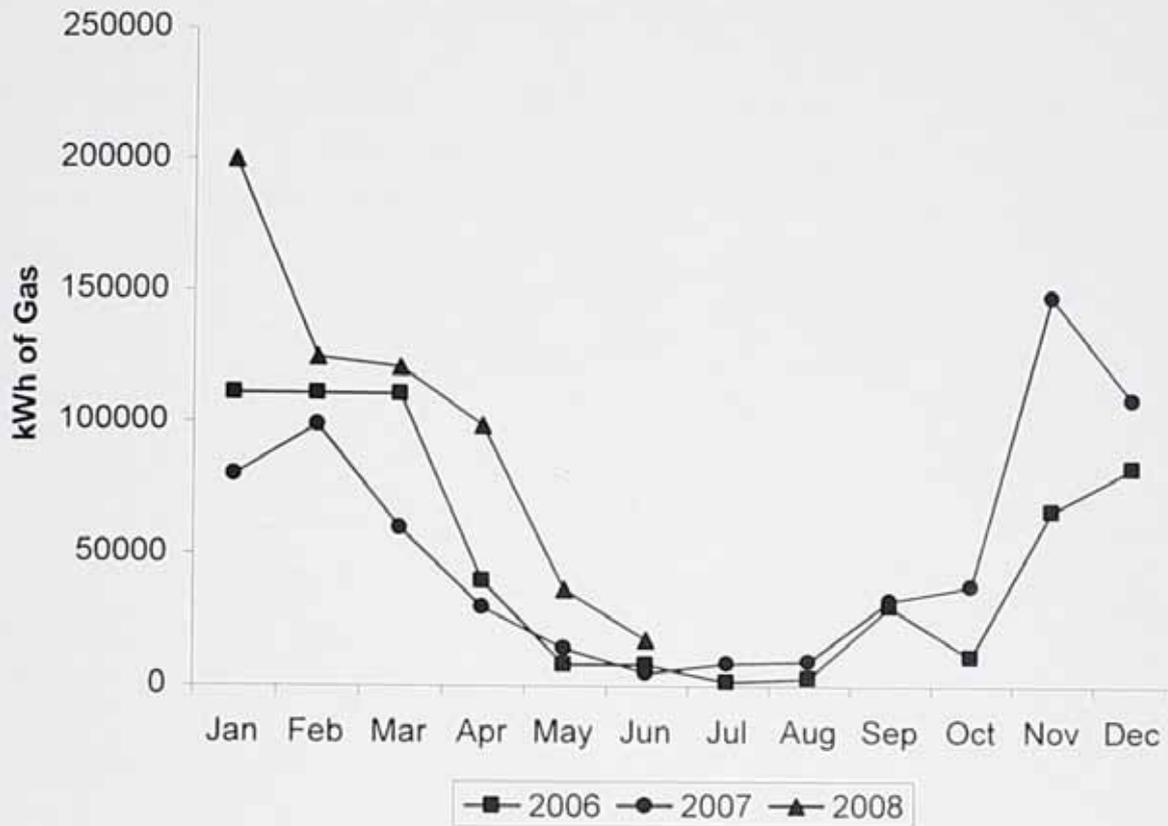


Figure 6.11: 2006 to 2008 Home Maker Centre gas consumption

6.3.2 Validation through electricity data analysis

When looking to validate behaviour change through electricity use, the results are inconclusive. Throughout 2007 the electricity used per unit manufactured varied considerably. There was minimal evidence to suggest why these fluctuations were occurring, other than some late night audits had highlighted that equipment such as air compressors and dust extraction units were being left on. It was felt that this could not be the only explanation. Further investigation into electricity invoices showed regular occurrences of queried invoices and rebates received throughout 2007. This may account for the peaks and troughs seen in electricity consumption.

However, in 2008 invoicing issues appeared to have been resolved. A positive aspect shown within figure 6.13 was that electricity consumption per unit manufactured had steadily decreased. As no energy efficient equipment was installed this reduction can only be attributed to behavioural change of staff.

Areas where visible changes in behaviour were witnessed were in the routine checking and maintenance of compressed air lines, in the shutting down of office equipment at night, and in the turning off of show home lighting at night.

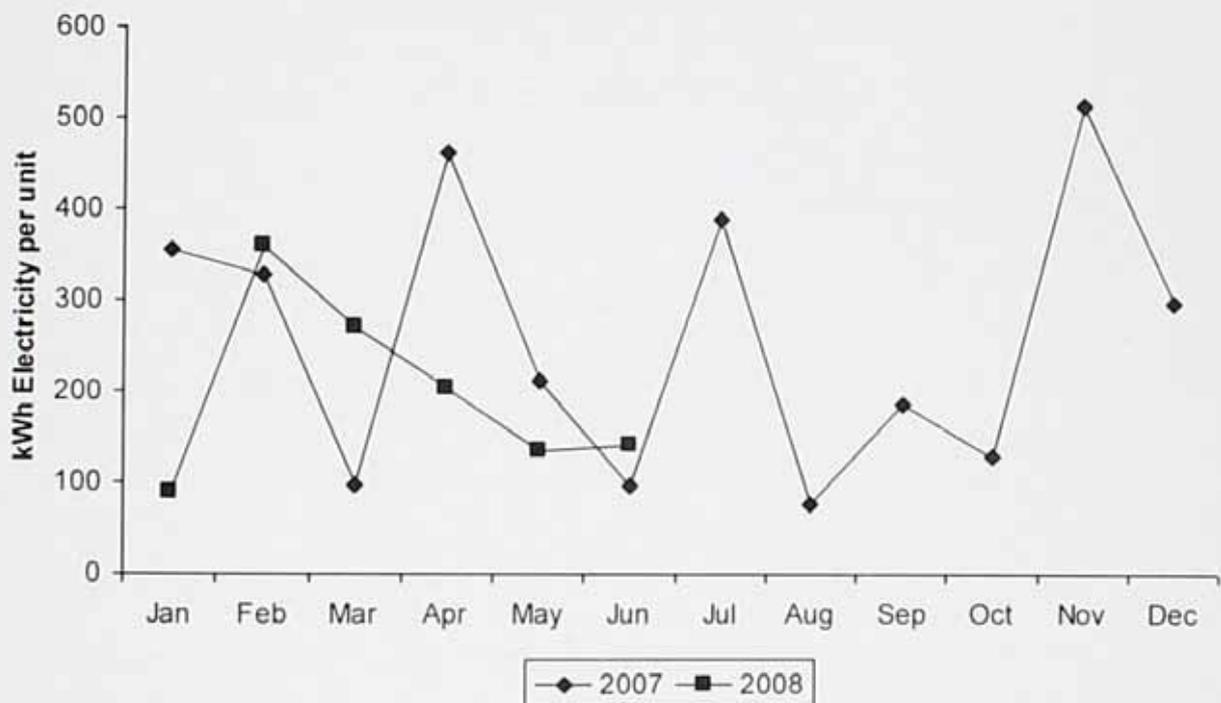


Figure 6.12: 2007 to 2008 electricity consumption per unit manufactured at Tingdene Homes

6.3.3 Validation through cost savings

As shown through the waste, gas and electricity data, there were positive changes to workforce environmental behaviour. However, did these positive changes in workforce behaviour, lead to business benefits as well as environmental benefits? Table 6.2 gives a breakdown of the

expenditure and savings associated with the environmental improvement programme.

Table 6.2: Breakdown of total expenditure and total savings to Tingdene Homes as a result of improved environmental management between November 2006 and November 2008

Activity	Expenditure (£)	Savings (£)
Recruitment of Environmental Manager for 2 years	40,000	
Installation of efficient heating system	30,000	
Payment of environmental team	800	
Rental of bailing presses	10784	
Purchasing of additional bin	1,300	
Gas reduction		52,450
Waste disposal reduction		24,613
Rebates for recycled materials		27,561
Savings from not land filling recycled waste		8,355
Other savings		19,616
Total	82,884	132,595
Profit increase = £49711		

Table 6.2 shows that in 2 years Tingdene Homes invested £82,884 on the environmental improvement programme. The two biggest investments were in the recruitment of a full time Environmental Manager, and in the installation of the efficient heating system. However, the total savings to Tingdene Homes were in excess of £132.5k. Whilst a large proportion of this (£52k) was attributed to savings from the efficient heating system, the savings from waste and the rebates for recyclables can be directly attributed to the positive environmental behaviour of staff. Therefore, the total savings from that can be attributed to changes in workforce behaviour were £80,000.

Another finding shown by table 6.2 was the support for environmental improvements demonstrated by senior management. Whilst Chapters 4 and 5 describe how senior managers needed to be more supportive of environmental improvements, table 6.2 shows their commitment through the investment of over £82k. This indicates that senior managers were committed to environmental improvement, but that they did not actively promote/show this support to members of the workforce.

6.4 Discussion

6.4.1 Effectiveness of the interventionist techniques

For the consistency of providing both knowledge to the workforce and changing workforce attitudes, it was found that training was the most effective interventionist tool. However, the impact from the interventionist techniques used within this research were intended to be assessed as a whole and not on individual merit. In fact QB highlighted that the three main techniques used, training, notices and the environmental team all brought individual benefits. It is believed that this integrated system resulted in benefits greater than would have been experienced had one technique been implemented in isolation.

Posters were found to be the most effective means of providing knowledge to the workforce. However, they were less effective at changing behaviour, which is the opposite to what was found by Bankole *et al.* (2004). However, the positioning of the posters was found to be an important factor, as posters placed on notice boards, such as those of the environmental team, were seen by fewer employees, which does support the findings of Bankole *et al.* (2004). By contrast posters placed within the toilets reached a far greater proportion of the workforce. Training on the other hand was the most effective tool at changing attitudes. Indeed, some employees stated that whilst the training had not provided them with increased knowledge it had changed their attitude towards the importance of resource efficiency. This is in line with findings by Perron *et al.* (2005) who also found training not to improve knowledge significantly. Finally, the benefits of the environmental team were in the engagement

and support of the workforce. Whilst the environmental team were not stated as being the first point of contact for environmental queries, it is believed that a lack of knowledge of who the environmental officers were was the limiting factor in this. If the team was to remain in place for a further 12 months, and was promoted throughout the company through various media, it is believed that their impact would increase.

6.4.2 Cost effectiveness of the interventionist techniques

Throughout the course of the project, the case study company realised savings in excess of £132k. This meant that over the course of the research they had increased their profits by £49k through environmental initiatives. The cost savings and environmental benefits realised during the research supports the theory that using a blend of interventionist techniques in order to improve workforce environmental behaviour is cost effective.

6.4.3 Sustainability of the improvements made

Towards the end of the research, the housing market took a downturn that resulted in a fall off of sales for Tingdene Homes. As a result, large-scale redundancies had to be made within the company. Whilst every effort was made to pass on the information and systems to allow Tingdene Homes to carry on the work, there was no guarantee that this would occur. The environmental team were not disbanded, however only 2 members of the team remained after the redundancies, and no effort was made to employ new members. The environmental manager's position was also left unfilled after the two year project, which left no full time employee to coordinate the ongoing environmental improvements. In addition, a lot of the knowledge and positive behaviour built up during the research will have been lost with the employees.

The health and safety (H&S) department were given literature to enable them to include an environmental briefing along with the H&S induction for all new starters. This will provide base-level knowledge for all new employees, which Tingdene will hopefully be able to build on at a later date. The savings realised during the study will also hopefully incentivise

Tingdene to once again tackle their environmental performance, once the housing market has stabilised.

CHAPTER 7 – DISCUSSION AND CONCLUSIONS

7.1 Were the interventionist techniques effective at changing behaviour?

The environmental behaviour of staff did positively change during the course of the study, with waste production per unit manufactured decreasing from 0.9 tonnes at the start of the study to 0.6 tonnes by the end. Recyclables recovered also increased per unit, from 0.4 to 0.7. This strongly suggests the integrated interventionist techniques were effective at instigating not only attitudinal change, but behavioural change as well. However, the purpose of the research was to ensure that the interventionist techniques were 'cost effective'. Overall the integrated interventionist programme can be said to have been cost effective, as cost savings of over £132k were seen, resulting in increased profit of £49k for Tingdene Homes.

7.1.1 Effectiveness of the Environmental Team

The findings support earlier research by Remmen and Lorentzen (2000) that employing an environmental team can have both business and environmental benefits. On the other hand, whilst the study successfully identified and quantified methods for improving workforce environmental behaviour, if the research was to be undertaken again, some changes may have resulted in greater benefits being seen. The first of these analyses related to the environmental team. The members of the team that had the greatest impact on the wider workforce were those already in supervisory roles. It would therefore be recommended that when forming an environmental team, staff in positions of influence be placed within the role. However, whilst this may have resulted in behavioural change, the attitudinal change may have been less, as the workforce potentially would have been 'told' to change rather than being 'persuaded', which ultimately would result in less sustainable changes being seen.

Despite there being potential benefits to having more influential individuals within the roles, the technical knowledge of the environmental officers within their work areas was of benefit. This was in line with

Johansson and Magnusson's (2006) findings, as they found this knowledge to be of more use than specific environmental knowledge. Whilst environmental knowledge was not critical for the environmental officers to undertake their duties, significant motivational benefits were experienced as a result of undertaking an environmental training programme with the team.

Unfortunately, despite numerous efforts to promote the environmental team, many within the company were still unaware of who the environmental officers were. This may explain why only 60% (figure 6.2) of the workforce would consult one of the officers if they had an environmental issue. The tactics used to promote the officers, such as notices with their photos and promotion at 'tool box' talks were not enough. Potentially what would have aided with their promotion would have been issuing the officers with distinctly coloured t-shirts, like the First Aiders, so that they were easily identifiable from the rest of the workforce. However, half of the officers were already in coloured shirts, due to being supervisors or First Aiders.

7.1.2 Effectiveness of the posters

Whilst research has shown posters can be effective at providing information and changing behaviour (Bankole *et al.*, 2000), it was surprising how much of an impact the posters appeared to have. Especially as the Health and Safety Manager had recommended against using them, stating that:

"No one ever reads them"

The impact the posters had was dependent on where they were positioned. As with the posters promoting the environmental team, the posters were placed on notice boards, where they vied for attention with other information. Posters informing the workforce that the bins had been colour coded were placed on the walls of the toilets, and their impact was far greater. This supports the findings of Bankole *et al.* (2004) that the

position of posters can influence how big of an impact they have on attitudes and behaviour.

7.2 Effectiveness of research methods

Using a combination of both quantitative and qualitative techniques to collect data to support attitudinal and behavioural change was effective in this study.

7.2.1 Using ethnography

It was felt ethnography would be a useful tool in assessing attitudinal and behavioural change within Tingdene Homes, as the researcher was already part of the population being studied. This meant that a rapport already existed between the researcher and the workforce, facilitating the free sharing of opinions and attitudes. However, a drawback to the use of this method was that as the researcher worked as the environmental manager, the job title may have influenced how the employees voiced their opinions. In addition, the position of environmental manager meant that only 2-3 hours of each day could be spent with the workforce, due to the balancing of workloads. This meant that many interactions will have been missed. As more time was not available to spend observing and interacting with the workforce, the ethnographical data was not enough to draw conclusions to the research. As such it was important to support the ethnographic findings with quantitative data analysis, such as the questionnaires.

7.2.2 Using questionnaires

Questionnaires were used to support the findings from the ethnographic study on the attitudes of the workforce. Whilst the purpose of using questionnaires was to get information from as many employees as possible, both questionnaires had lower than expected return rates of 27% and 20% respectively. The chances are that those employees with strong views on environmental issues, whether they were positive or negative, would have answered the questionnaire, with those with middling views not taking the time to complete it. However, if the

research was to be undertaken again, questionnaires would still be used as the findings largely correlated with the ethnographic data, and the results did not suggest that only employees with polarised views completed them.

7.2.3 Using narrative interviews

The narrative interviews did not work as well as expected. It was hoped that they would give a personalised account of the environmental officers' experiences. However, getting the officers to talk in depth about their experiences was harder than expected. This may have been due to them not being involved in unstructured interviews previously. Research on unstructured interviews suggests that undertaking a trial interview, where the results are not used, may have aided with opening up the officers for the real interview (Elliott, 2005). If the research was to be conducted again, this pre-interview would have been incorporated. During the project this approach was decided against based on the increasingly limited time that environmental officers could get away from their main duties, but it is believed the benefits would have outweighed the time requirements.

7.2.4 Using data to support behavioural change

Analysing waste and energy data enabled the benefits from the interventionist techniques to be quantified. This was a fundamental aim of the research, as it suggests that implementing environmental improvement activities and investing in instilling positive environmental behaviour makes good business sense. This is vitally important to promote if the case study company is to continue to invest time and money into encouraging positive behaviour after the research has come to an end.

7.2.5 Key research findings

Table 7.1 Summary of the key research findings

Blended research methods	Throughout the research it was found that both quantitative and qualitative research methods were beneficial in gaining the required data. Findings from both questionnaires and ethnographic data were used to validate each other. Using a blend of techniques in this way enabled a clearer picture of attitudes and behaviour of staff to be gathered.
Blended interventionist techniques	A blend of interventionist techniques were used within the research as previous studies have shown the benefits of using the techniques singularly to have mixed results. By using formal training, coupled with the formation of an environmental team and posters, the limitations of each technique was minimised. This resulted in both staff gaining the necessary knowledge, and positively changing their attitudes and behaviour towards environmental improvement.
Cost effective	As well as the blended interventionist techniques being effective at improving knowledge and changing attitudes and behaviour, they were also cost effective. Tingdene Homes experienced increase in profits of over £49k in a two year period.

7.3 Recommendations for Tingdene Homes

In order to sustain the current level of positive attitudes within the workforce, especially after the large scale redundancies, it would be recommended that Tingdene Homes continue with the education of the workforce through the use of posters and the environmental team. However, as described earlier, the posters must be updated regularly and placed in prominent positions to ensure they continue to influence the

workforce. The environmental team may also benefit from the addition of individuals in positions of influence, and a senior manager/director as a stakeholder for the team, in order to ensure they remain focussed and supported. In addition the environmental team would benefit from continued investment in their education if they are to continue to be enthused for the role, and therefore enthuse others.

In addition the overall research findings showed that more still needed to be done: to improve convenience of recycling; to increase the workforce's knowledge on what waste goes where; and to ensure that the supervisors were instructing their workforce to recycle on a daily basis. This will be especially true when Tingdene Homes begins to recruit more staff.

7.3.1 Improving resource efficiency within Tingdene Homes

Whilst it was possible to educate the workforce in the principles of resource efficiency, it was fundamentally impossible for the majority of the workforce to put this into practice, due to the ways of working set by senior management.

It was identified that there were potential savings of £120,000 a year if time was allocated to the workforce for cutting plywood to size prior to attaching to frames of the walls. Unfortunately, Tingdene made more money from getting their homes out quickly than they would have saved if they had taken their time and used as much of each sheet of plywood as possible. However, with the smaller order book, this may be the time to investigate where efficiencies can be made through alternative methods of working.

Additionally, Tingdene wasted thousands of pounds each year through leaky compressed air hoses. Whilst the wastage from this was reduced through routine maintenance and reporting, huge losses were still occurring. By introducing electrically powered tools and signing the tools in and out each day Tingdene could realise large reductions in their

electricity consumption, as well as free up time within their maintenance team for other tasks.

7.4.2 Management support

Whilst the financial investments that Tingdene Homes made in environmental improvements showed that the senior management were committed to environmental improvement, this was not the perception of the workforce. As such, it is recommended that senior managers actively promote their support to all levels within the company. This in turn would result in supervisors promoting environmental considerations to their teams. This will be vitally important if Tingdene are to see the improvements already made continuing (Young and Jordan, 2008).

7.5 Conclusions

7.5.1 Meeting the research objectives

The research findings were in keeping with the objectives of the thesis, with baseline levels of pro-environmental behaviour being determined, and the impact of interventionist techniques quantified. It was found that the three methods of interventionist technique, posters, training and the environmental officers had resulted in increased levels of knowledge and increased positive attitudes amongst the workforce. Posters were also stated highly as a source of ongoing support that the workforce utilised. Overall interventionist techniques were found to be cost effective, with Tingdene Homes experiencing increased profits through environmental improvements of £49k.

7.5.2 Limitations and practical difficulties

Whilst the research achieved what it set out achieve, there were a number of practical issues that limited the research. One limitation was related to the gathering of data from the workforce. Amongst the manufacturing workforce, there were a number of individuals who could not read or write and a greater number who could not understand English. This posed problems when both gathering data from the workforce, as these individuals were unable to complete the questionnaire, and in

disseminating information, as they could not read the posters. In regards to the questionnaire, the majority of this proportion of the workforce was missed, with only the individuals known to the researcher as being unable to complete the questionnaire being read the questionnaire in an informal interview format.

In order to ensure that the posters were not ineffective on these individuals a mixture of text and photographs were used to get around this issue. For example, recycling posters showed the colour of the bin, alongside a photo of the waste that should be put inside. Where possible a small section of the waste was attached to the bin itself to illustrate the type of waste accepted.

The gathering of information from the environmental officers was equally difficult when it came to the narrative interviews. Whilst the officers interviewed gave some interesting insights into the roles, none of the interviews came near to providing the narrative accounts sought. Instead the interviews became more like unstructured and in some cases structured interviews. One of the officers in particular appeared very uncomfortable during the interview and provided answers as close to single word responses as possible.

Another limitation to the research was the time frame and setting in which it was undertaken, as the research was part of a larger 2 year KTP (Knowledge Transfer Partnership) project. The needs of the research had to be balanced around the needs of this KTP project, the needs of the company, as well as other training being undertaken by the researcher, namely an NVQ in Management. This greatly limited the time required to gather data and explore in greater detail subjects that were of further interest to the researcher, such as impact of senior management vision and values. As such techniques had to be chosen that could be undertaken quickly and without interfering with the production of the case study company.

7.5.3 Future research

Overall, the gathering of information from individuals with lower educational levels was difficult. Future research should explore why this group does not readily engage in research and how they can be encouraged to participate.

In addition further work into how to create a common vision between senior management and the workforce would be of benefit. Research has shown the importance of this, but more understanding on how to achieve it within business is required (Tsui *et al.* 2005).

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Environmental Training

Joanna Walker

Environmental Project Manager

joanna.walker@tingdene.co.uk

Ext: 2907

What are we trying to achieve?

- We aim to:
 - Reduce the amount of general waste we send to landfill; as landfill tax is now £24 per tonne and will go up by £8 each year.
 - Increase the amount we recycle; and earn money from our waste
 - Improve our environmental performance

Did you know?
The construction industry
produces 109 million tonnes
of waste a year.

So what goes in which bin?

- General Waste
 - Floor sweepings
 - HEAVILY soiled polythene
 - Facia off-cuts
 - Wall paper
 - Silicon tubes
 - Small pieces of pipe lagging
 - etc..



All cardboard in GREEN bins



Did you know?
81% of waste goes to landfill.

Did you know?
80% of waste can be recovered,
recycled or reused.



Polythene



All
polythene
goes into
yellow bins

Except heavily soiled poly

Wood



All wood to be put into designated tipping bins or large wood skips. But NOT doors, as they have strips of polystyrene inside.

Metal, cable and copper

CABLE



METAL



COPPER



Did you know?
The UK sends 400 million tonnes
of waste to landfill each
year.

Paint Tins

Did you know?
Landfill contributes to ground water pollution, acid rain and global warming.



ALL paint in tins to be used up
before being disposed of. Paint
tins can then be put upside
down in cages to dry.

Resitex buckets

- ❑ Clean stucco and siltex buckets stacked on one pallet.
- ❑ Dirty buckets to be stacked on a separate pallet.
- ❑ There should be no rubbish in the buckets.

CLEAN



DIRTY



What's wrong with this picture?



By the way this is a general waste bin.



Get involved

- If you have suggestions on how we can improve things further, tell us
- You can become an environmental officer for your area, just put a note down next to your name on the register.
- Or you can get involved with environmental issues in your community, visit:
www.sustainable-development.gov.uk.



Questions?

Office Environmental Training

Joanna Walker
Environmental Project
Manager
2907 Radio 6

What are we trying to achieve?

We are trying to:

- Reduce the amount of waste we send to landfill
- Increase our resource efficiency
- Become a more environmentally responsible company
- Create a culture of environmental awareness amongst all staff.
- Become a industry leader for our environmental performance.

[Why are we doing it?]

- The Government estimates that we will have ran out of current landfill space by 2016.
- Methane given off by landfill is 20 times worse for Global Warming than CO2.
- Using resources effectively saves money.
- Reducing waste sent to landfill through recycling saves money.
- Tackling environmental issues is good PR for the company, as ethical consumerism is on the increase.
- Ultimately, we all need to start making changes, as individuals and as a company, as it is estimates that if we continue at our current rate we will need 3 planets worth of resources to support us.

[How can you help us meet our objectives?]

1. Reduce the amount of paper used
 - Many documents can be printed double sided
 - Some documents don't need to be printed/photocopied at all (i.e. emails)
 - When making notes, use scrap paper instead of new paper.
 - As a last resort paper can be recycled in the designated areas after use.

2. Use the recycling points

We have recycling points for:

- Plastic bottles
- Newspaper and magazines
- Office paper
- Confidential paper
- Toner cartridges



3. Turn off electrical items

- Before going home check you have powered down all monitors, computers, printers etc.
- Turn off lights when they are not needed. For example when you are going to be out of your office for longer than 5 minutes.
- Nominate people to check these have all been done before heading home (i.e. last one in the office)

[4. Get Involved]

- If there is something you think we should be recycling tell us
- Can we make recycling more convenient?
- What else could we be doing in your area?

[Questions?]

Environmental officer job description

In this position you will be expected to:

- Be a point of contact in your area, for people to raise queries about environmental issues, which you will pass on to the Environmental Project Manager (EPM). You will also be able to direct people to where they should put their waste if they are ever unsure.
- Inform the EPM if there are individuals who repeatedly refuse to separate their waste.
- Attend monthly meetings to discuss how things are progressing.
- Attend further environmental training sessions to improve your environmental knowledge.

Terms and conditions:

- This position will be in addition to your regular duties.
- There will be a 3 month probationary period to ensure your suitability for the role.
- After the successful completion of 12 months in the role, you will be paid the sum of £100.
- Tingdene Homes reserves the right to change the terms and conditions of this role and to end the position at any time if you are not carrying out the relevant duties.

Programme of environmental officer training

Environmental Officer Training Schedule	Session plan
December 2007	Waste and resource management
February 2007	Energy and water efficiency
March 2008	Materials Recovery Facilities
April 2008	Climate change
May 2008	Sustainable urban development

Waste and resource management

This session sought to provide the environmental officers with a deeper understanding of the resource management issues at Tingdene Homes and the principles behind waste minimisation in the workplace. The session made use of presentations, led by the environmental manager, on the subject area and group discussion work. The environmental officers were set the task of identifying areas for waste minimisation and increased resource efficiency at Tingdene Homes.

Energy and water efficiency

This session was ran in the same format as the waste and resource management session, but had a slightly longer allocation of time for the group discussion work. The session provided the environmental officers with background on the pros and cons associated with the various energy production methods. It also covered the importance of water conservation, introducing the concept of it being a finite resource. The environmental officers were tasked with identifying areas for energy and water reduction within Tingdene Homes.

Materials Recovery Facilities

The environmental officers participated in a site visit to a Materials Recovery Facility (MRF) as part of their training programme. The visit introduced to the officers how a MRF works and what sorts of waste can be processed through it. This session was also chosen to give the environmental officers a greater understanding of what happens to Tingdene's waste after it leaves the site and to highlight that due to the value of certain materials, it is cost effective to recover materials such as cardboard and clean timber from mixed commercial waste.

Climate change

Climate change was a term that the environmental officers were familiar with. However, they were not confident in their own knowledge of the various factors that contribute to it and the potential impacts that it was having. They were also confused about the difference between climate change and global warming. This session therefore sought to provide the officers with a greater knowledge of the subject and the difference between the two terms. It also aimed to provide them with the knowledge of the factors that contribute to climate change and the impacts that it is likely to have in the future and is having now. The film 'An inconvenient truth', presented by Al Gore was used as a training tool for this session.

Sustainable urban development

This session was based on a request from the environmental team to learn more about what can be done in the home to improve environmental performance. The team were taken to the Upton Meadows development in Northampton, where they received a guided tour by a lecturer from Northampton University. It was hoped this would better inform the officers on what could be done in their own homes, as well as within a Tingdene home to improve efficiency and sustainability.

Narrative Interviews – prompt sheet

Questions for narrative interviews held with environmental officers at Tingdene Homes, May 2008.

History

Can you tell me about your past, and how/when you started to become interested in the environment?

Rationale

What made you decide to take on your role as an environmental officer?

Your role as an environmental officer

Please can you tell me about your experience as an environmental officer?

Relationships

How did the rest of the workforce respond to your new role as an environmental officer?

The future

What's next?



CONSENT FORM (Interviews)

These interviews are taking place as part of a research degree with the University of Northampton and will be focussing on the experiences you have had as an environmental officer.

Name of Interviewer:

Joanna Walker

Please tick in the boxes

1. I understand that my participation is voluntary and I am free to withdraw at any time
2. I understand that the information I disclose will be confidential and destroyed after submission of the final report.
3. I understand that data collection may be made by the taking of notes and by an audio-recording.
4. I am willing to participate in this research

Name of Interviewee

Date Signature

Researcher

Signature

Date

When completed: 1 for interviewee; 1 for researcher

Narrative Interview Themes

History

Always been interested in environmental issues ✓
 Started while growing up
 Environmental issues weren't mainstream whilst at school
 Only got into it through the company
 Became interested through family actions ✓✓✓
 School had veg patch we worked on ✓
 Television made me interested
 Home recycling schemes

Previous employment

We did effluent analysis, compressed air leaks
 ISO14001
 Previous employers didn't promote environmental improvements ✓

Reasons for taking on role

Took on role as it sounded interesting
 Wanted to help out
 Make some kind of a difference ✓
 Learn while doing the role
 Money was a token, not a real incentive
 Money

Impact of environmental officers

Main part of the role is guidance with people
 Made little improvements in lots of areas, rather than focussing in on one area
 Repetition at the workforce, changed them once they got used to it
 A couple of times the people have come and asked questions

Benefits to the env. officers

Made me feel good
 Enjoyed the learning aspect of the role ✓
 Good to see something at the forefront in the local area
 Opened their eyes to wider issues ✓

Barriers

People stuck in old habits ✓
 Easier for people not to participate
 Not a lot of time ✓
 No-one talks to them about environmental issues ✓

Reaction of the workforce

Treated it as a joke ✓
 Didn't take it seriously
 Once they realised it was little changes they were being asked to do, it was easier

Other issues raised

Government legislation needed to crack down on problems in industry

Make sure that all supervisors and senior supervisors are actually trained up and totally aware and they are actually on board with it
Officers need more powers to be able to change people's behaviour.

Tingdene Homes Environmental Management Questionnaire

This questionnaire is being conducted as part of a research degree with the University of Northampton. It is designed to gauge your attitudes and opinions surrounding environmental issues and waste management at Tingdene Homes.

Please DO NOT write your name on the questionnaire to ensure the results remain anonymous.

Job Title:

Department:

Section 1. General Environmental Opinions

	True	False
1. I consider myself to be environmentally friendly	<input type="checkbox"/>	<input type="checkbox"/>
2. I believe that climate change is affecting the natural environment	<input type="checkbox"/>	<input type="checkbox"/>
3. I believe that protecting the natural environment is important.	<input type="checkbox"/>	<input type="checkbox"/>
4. I believe that my actions can make a difference to the state of the natural environment.	<input type="checkbox"/>	<input type="checkbox"/>

5. Please indicate which categories you fall into for your recycling habits at home.

	Weekly	Fortnightly	Monthly	When I remember to	Never
How frequently do you recycle your household waste?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

6. Please list TWO items that you recycle at home:

7. Please indicate the extent to which you agree or disagree with the following statements.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Recycling helps to protect the environment	<input type="checkbox"/>				
Recycling reduces the amount of waste sent to landfill	<input type="checkbox"/>				
Reducing the amount of energy I use helps to preserve natural resources	<input type="checkbox"/>				
Recycling saves money	<input type="checkbox"/>				
Reducing my water consumption is good for the environment	<input type="checkbox"/>				
Being environmentally friendly is a waste of time	<input type="checkbox"/>				

Section 2. Work Place Environmental Opinions

	True	False
8. I conserve materials at work	<input type="checkbox"/>	<input type="checkbox"/>
9. I believe that resource conservation at work can make a significant difference to the natural environment	<input type="checkbox"/>	<input type="checkbox"/>
10. When not in use, I ALWAYS turn the lights off at work to conserve energy	<input type="checkbox"/>	<input type="checkbox"/>
11. When not in use, I ALWAYS turn the taps off at work to conserve water.	<input type="checkbox"/>	<input type="checkbox"/>

12. In my opinion the MAIN resource that is wasted at work is:

13. Please indicate how strongly you agree or disagree with the following statements.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
I DO NOT believe that recycling and reuse of materials is good for Tingdene Homes	<input type="checkbox"/>				
I believe that waste minimisation and recycling at work benefits me	<input type="checkbox"/>				
I consider environmental management to be a major issue at work	<input type="checkbox"/>				

14. Please indicate how strongly you agree or disagree with the following statements, if you were unsure about where to put an item of waste.

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
If I had a question about waste I would ask the Environmental Officer	<input type="checkbox"/>				
If I had a question about waste I would ask a supervisor	<input type="checkbox"/>				
If I had a question about waste I would ask a colleague	<input type="checkbox"/>				
If I had a question about waste I would look at the notice boards	<input type="checkbox"/>				
If I was unsure about where to dispose of an item I would simply put it into the general waste bins	<input type="checkbox"/>				

15. Please indicate how strongly you agree with the following statement.

I would not use a recycling scheme at work because I:-

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
Have no interest	<input type="checkbox"/>				
Don't have enough items to recycle	<input type="checkbox"/>				
Can't be bothered	<input type="checkbox"/>				
Don't know what to recycle	<input type="checkbox"/>				
Don't know which bin to put things into	<input type="checkbox"/>				
Don't have enough time	<input type="checkbox"/>				
Don't have the motivation to do so	<input type="checkbox"/>				

16. Please indicate how strongly you agree with the following statement.

I would recycle more at work if:-

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
It was convenient	<input type="checkbox"/>				
I was instructed to do so	<input type="checkbox"/>				
I knew what went where	<input type="checkbox"/>				
My work colleagues did	<input type="checkbox"/>				
There were incentives	<input type="checkbox"/>				

Section 3. Socio-demographics

17. Please indicate the number of years you have been employed by Tingdene Homes

	<1 year	1-5 years	6-10 years	> 10 years
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

18. Please indicate your gender by ticking the appropriate box

	Male	Female
	<input type="checkbox"/>	<input type="checkbox"/>

19. Please indicate your age range

<u>18-25</u>	<u>26-35</u>	<u>36-45</u>	<u>46-55</u>	<u>>56</u>
<input type="checkbox"/>				

20. Please indicate your educational level

GCSE	HNC/D	Professional	Degree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

THANK YOU FOR TAKING THE TIME TO FILL IN THIS QUESTIONNAIRE.

If you require any further information regarding this questionnaire, please contact:

Joanna Walker	Tingdene Homes
	Bradfield Road
	Finedon Road Industrial Estate
	Wellingborough
	Northamptonshire
	NN8 4HB
Telephone	07974 439554
E-mail	Joanna.walker@tingdene.co.uk

ALL INFORMATION WILL REMAIN STRICTLY CONFIDENTIAL AND THE RESULTS WILL GO TOWARDS IMPROVING ENVIRONMENTAL MANAGEMENT AT TINGDENE HOMES AS PART OF A RESEARCH DEGREE.

Tingdene Homes Workforce Environmental Questionnaire

This questionnaire survey is being conducted as part of a research degree with the University of Northampton. It is designed to gauge your attitudes and opinions surrounding environmental issues and waste management at Tingdene Homes.

Please DO NOT write your name on the questionnaire, as the results are to remain anonymous, however, please state your job title and department in the space below.

Job Title:

Department:

1. General Environmental Opinions

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
1a. I consider myself to be environmentally friendly.					
1b. I believe that conserving resources (e.g. materials) can make a significant difference to Tingdene.					
1c. I believe that conserving resources (e.g. materials) can be beneficial to me					
1d. I believe that conserving resources (e.g. materials) at work can make a significant difference to the environment.					

2. Your Environmental Behaviour

	Always	Regularly	Some of the time	Once or twice	Never
2a. I recycle at home					
2b. I recycle at work					
2c. I conserve resources (e.g. energy/water) at home					
2d. I conserve resources (e.g. energy/water) at work.					
2c.If I witness someone wasting materials or putting waste into the wrong bins, I would say something					

3. What factors limit/stop you from recycling at work?

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
3a. Time/target pressures					
3b. Knowledge/training about what to do with the waste					
3c. Location of the bins/bins being full					
3d. Other (please state)					

4. What would make you participate in recycling and resource conservation more?

	Strongly Agree	Agree	Not sure	Disagree	Strongly Disagree
4a. Greater numbers of recycling bins					
4b. Supervisors and managers telling you to					
4c. More training, so you know what you need to do					
4d. If the people around you participated more					
4e. Awareness and knowledge					
4f. Other (please state):					

5. If I was unsure of how best to dispose of my waste I would...

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
5a. Ask the environmental manager (Jo)					
5b. Ask one of the environmental officers					
5c. Ask a supervisor					
5d. Look at the posters and notices around the company					
5e. Do nothing					
5f. Other (please state):					

6. Environmental officers and environmental awareness

	Yes	No
6a. Are you aware of who your environmental officers are?		
6b. Have you attended environmental training, either as part of you company induction, or as part of the training undertaken in 2007?		
6c. Have you read the environmental notices/emails on Tingdene's environmental performance?		

	Very useful	Useful	Not sure	Not useful	Not bothered
6c. How useful have you found the training for improving your knowledge about environmental initiatives at Tingdene					
6d. How useful have you found the environmental officers at improving your knowledge of environmental initiatives at Tingdene					
6e. How useful have you found the notices/emails at improving your knowledge of the initiatives at Tingdene.					

	Significantly changed	Changed slightly	Not sure	No change	Made me less positive towards environmental improvements
6g. How much would you say the environmental training has helped to positively change your attitudes/behaviour towards environmental improvements?					
6h. How much would you say the environmental officers have helped to positively change your attitudes/behaviour towards environmental improvements?					
6i. How much would you say the environmental notices/emails have helped to positively change your attitudes/behaviour towards environmental improvements?					

7. Attitude and behaviour change

If you feel there have been any other factors that have helped you to change your attitudes and behaviour towards environmental improvements, or you have any other comments to make, please state them here:

--

8. Socio-demographics

	<1 year	1-5 years	6-10 years	> 10 years
8a. Please tick to indicate the number of years you have been employed by Tingdene Homes				

	Male	Female
8b. Please indicate your gender by ticking the appropriate box		

8c. Please tick to indicate the age range into which you fall

<25	26-35	36-45	46-55	>56

8d. Please tick to indicate your highest educational level

GCSE	HNC/D	Professional	Degree	Other
				(Please state)

THANK YOU FOR TAKING THE TIME TO FILL IN THIS QUESTIONNAIRE.

If you require any further information regarding this questionnaire, please contact:

[REDACTED]

ALL INFORMATION WILL REMAIN STRICTLY CONFIDENTIAL AND THE RESULTS WILL GO TOWARDS IMPROVING ENVIRONMENTAL MANAGEMENT AT TINGDENE HOMES AS PART OF A RESEARCH DEGREE.