

## **“Waste Not” - Construction and Low Carbon Economy**

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### **Introduction**

A building consumes energy from the time a decision is taken to build to the time when the building is demolished. This paper focuses on one part in the energy life cycle of a building - the construction phase.

Although construction contributes to about one-tenth of the national economy, it also produces 70Mtonnes of waste<sup>1</sup> a year. This means about 15-20% of all construction materials delivered to construction sites later leave in skips<sup>2</sup>. Besides adding to the landfills and waste related traffic, every skip is also loaded with energy – the energy used in making the construction materials. The 15-20% of materials wasted generally exceeds the 10% average energy saving targets of the Climate Change Levy Sector Agreements<sup>3</sup>.



**Water-logged pallet of cement bags**

Much of this is due to poor storage on construction sites, leading to spillage and spoilage. By improving the construction site organisation and housekeeping, it is possible to first reduce; then reuse and finally recycle a significant portion of the waste.

Reducing waste in construction operations start with people: from the construction operatives upwards to the project managers and specialists. The operatives need to be aware of the need to manage waste as well as to be provided with opportunities to contribute; project managers need to facilitate waste reduction activities on the construction sites whilst the specialists will be spotting opportunities to reduce, reuse and recycle much of the waste as well as coach the construction site teams on waste management operations. This paper

describes how Bovis Lend Lease addresses wastes to meet all three aspects of sustainable development: economic, social and environmental.

### **The Bluewater Experience**

Between 1996 and 1999, 375 long-termed unemployed restarted their careers with the site services teams during the construction of Bluewater, in Kent. They were tasked with housekeeping at the construction site through a partnership between Bovis Construction as main contractor, Lend Lease as the client, the local Employment Services and North West Kent College of Further Education. This partnership provided opportunities, through a Job Centre at the site, for the long-term unemployed to gain basic skills and escape social exclusion.

The project offered one way to introduce an awareness of waste and its handling to people starting a career in the construction sector, either as part of the construction activities or with the waste management contractors. Although meant initially as a first-step to other career opportunities, there were many who saw their waste management role as a distinct contribution to the Bluewater project and remained in that role.

The training included topics on Health and Safety so that the trainee could qualify for a CSCS card, thus ensuring a continuation of their career in construction. The training also included Manual Handling, a personal development module called “Choices” as well as transferable skills such as First Aid.

Bluewater created a significant impact on the lives of many people. Quotes from the Bluewater Experience video include<sup>4</sup>:

- “This scheme gives you a chance” – a Kent prison inmate

- “I am the 2000<sup>th</sup> person through the scheme and I’d like to stay” – local long term unemployed person.
- “We have managed to resource the work force with the aid of this partnership” – Cliff Harrison, Bovis Construction (Bluewater Construction Management).
- “This isn’t just about jobs it’s also about training” – Barry Burman, Lend Lease (Bluewater Construction Management)
- “Bluewater is the blueprint for the future” – Right Hon Andrew Smith MP Feb 1999.

### Evolution of the Bluewater Approach

“Site cleanup” may not be glamorous, but by keeping a site neat, orderly and by storing construction materials in a proper fashion, it is possible to reduce waste from construction activities. The experiences first gained at Bluewater have allowed Bovis Lend Lease (Lend Lease acquired Bovis Construction in 1999) to continue to examine several opportunities by extrapolating the tasks and activities to reduce waste on site.

**The first opportunity** is to join the thinking behind the site services teams with Lean Construction practices. Lean Construction is about reducing waste and meeting customer demands and one of the foundations towards achieving “lean” is having a well-organised construction site with standardised working practices. A well-known lean technique, **5S**<sup>5</sup> is particularly relevant for the site services application. **5S** was originally developed by Toyota Motor Corporation to provide a clean and organised factory to reduce waste and develop a workforce discipline towards better working practices. It is equally applicable to construction sites.

<b>5S</b>	<b>Description</b>
<b>Sort</b>	Arrangement – This is about sorting and storing items in a work area and involves the determination of the frequency of every item used and how they are stored; and eliminating sources of clutter and manage deliveries.
<b>Set</b>	Neatness – This relates to setting items to enable easy access and that all items should be clearly marked. "A place for everything and everything in its place".
<b>Shine</b>	Cleanliness – This starts with simple cleaning but also shows that clean surroundings will allow the identification of potential problems through a visual sweep of the workplace.
<b>Standardise</b>	Order – By developing and maintaining standardised working practices, it is possible to keep the workplace in an orderly fashion: organised, clean and safe.
<b>Sustain</b>	Discipline– This is about sustaining the commitment to the above four S's through training and awareness-raising to create a discipline for continuous improvement.

There are other benefits to deploying 5S for site services team: 5S is a recognised world class best practice technique. The knowledge that they are practising and achieving a world-class technique will result in a significant boost to the self-confidence and morale of the team members. This is especially true for those re-entering employment or those starting their careers.

Bovis Lend Lease and its partners will be starting a 5S construction project linking lean construction with a low-carbon economy. The project is part-sponsored by the Carbon Trust as part of its Low Carbon Innovation Programme.

**The second opportunity** is to link the activities carried out by the site services team to more definable achievements. Research has shown that the activities of the site services team at Bluewater were broadly comparable to the Vocational Qualifications awarded by the Waste Management Industry Training and Advisory Board (WAMITAB). Bovis Lend Lease and its partners have been exploring the possibility of pilot projects where site services team members can accumulate relevant experiences towards the Waste Management Operations (levels 1 and 2) awards with WAMITAB. This approach allows the development of recognised skills which are also transferable to other sectors.

Not only does this approach provide a systematic way of addressing waste issues on construction sites and develop skilled operatives for the entire construction sector, it also provides those re-entering employment an opportunity to build a solid foundation for their skills. Discussions are underway with partners to tie in both 5S techniques to the Waste Management Operations qualifications as an integrated approach towards reducing construction site wastes.

**The third opportunity** is directly aimed at addressing both training and waste. Bovis Lend Lease is exploring with a construction college ways in which reusable construction wastes can be provided to training centres so that new generations of construction professionals can get sufficient construction materials for their training.

Although discussions are at an early stage, it is envisaged that such a programme can include some of the students contributing to the waste handling activities on a construction site as part of their training. These can be extended to include learning and participating in logistics activities such as sorting the reusable waste at the construction site to arranging for its delivery from the construction site to the training college.

As the volume of reusable waste produced the construction phase of a development may be more than required by the training college. The more ambitious students can also be involved in the identifying local industries that may have a need for reusable construction waste for their raw material and organising such deliveries.

This approach provides the construction sector with a win-win solution: an opportunity to reduce waste through reuse and recycling; the transfer of knowledge to people learning about construction through practical experience; as well as support for the development of the next generation of skilled construction workforce. The first hand experience with waste issues in construction also helps them better understand the importance of sustainable development.

### **Construction and the Low-Carbon Economy**

Bovis Lend Lease is confident that the construction sector can contribute significantly to achieving a low carbon economy. It will need the efforts of everyone in construction working together to realise a sustainable industry. Bovis Lend Lease and its partners have identified the necessary building blocks at the construction site level: awareness raising, skills development and most importantly, opportunities to innovate to reduce waste at all levels. Our research has allowed us to develop projects which address waste at different levels and involve partnerships between project managers, construction teams, specialists, the supply chain and the community.

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