construction resources & waste platform

SUMMARY

Wastage Rate Report

BRE (Building Research Establishment) has been sponsored by the Department for Environment Food and Rural Affairs (Defra) to evaluate actual wastage rates for a number of key building products widely used by the construction industry.

A detailed study was undertaken to collect waste data relating to construction products selected from the "Design for Manufacture Measurement Programme", otherwise known as the SmartLIFE project, managed by BRE.

Three construction sites participating in this measurement programme tracked the volume of waste removed from site from the start to the end of the construction phase. The wastage rate of the key selected construction products was obtained by recording the amount of material incorporated into the development compared with the waste leaving the sites.

The construction waste product data was compared to the Bills of Quantities information specified and quantity of materials delivered to the sites. This assessment produced actual wastage rates for the 14 key products selected.

The difference between standard wastage rates used when procuring materials and the actual waste measured for the selected products on the SmartLIFE projects is provided in this report.

The True Costs of Waste, taking into account not only the waste disposal costs paid for removing waste from the construction site but also, material and labour costs of waste production (excluding the carbon impacts of the waste product), is given.

The following sites were investigated, and data collected:

- Site A consist of 56 units including 35 steel framed houses and 21 brick and block houses
- Site B consists of 15 insulated concrete formwork houses and 20 brick and block houses
- Site C consist of 15 timber framed houses

Site A overview

- The volume of measured waste was nearly twice as much than the volume of waste estimated by using standard wastage rate figures for the nine construction products selected.
- The true costs of waste of the measured waste was nearly twice as much as it was estimated by using standard wastage rates of the nine products.
- By reducing the measured wastage rate of the selected products to the level that was predicted, i.e. standard wastage rates, Site A could have saved £27,518.
- Plasterboard had the highest actual wastage rate with 32% of materials wasted.
- The measured wastage rate of mineral wool insulation was 3.2% less than predicted using the standard wastage rate figure for this material.

3.2% savings means a reduction of £1,167 in the true cost of waste.

Site B overview

- The volume of measured waste was twice as much than the volume of waste estimated by using standard wastage rate figures for the 11 construction products selected.
- The true costs of the measured waste was 2.3 times as much as it was estimated by using standard wastage rates of the 11 products.
- By reducing the measured wastage rate of the selected products to the level that was predicted, i.e. standard wastage rates, Site B could have saved £35,455.
- Render had the highest actual wastage rate with 51% of the materials wasted.
- The measured wastage rate of mineral wool insulation was 1.3% less than predicted using the standard wastage rate figure for this material.

1.3% savings means a reduction of £351 in the true cost of waste.

SUMMARY

Site C overview

- The volume of measured waste was twice as much than the volume of waste estimated by using standard wastage rate figures for the11 construction products selected.
- The true cost of measured waste from was 2.3 times as much as it was estimated by using standard wastage rates of the 11 products.
- By reducing the measured wastage rate of the selected products to the level that was predicted, i.e. standard wastage rates, Site C could have saved £13,413.5
- Plasterboard had the highest actual wastage rate with 31% of the materials wasted.
- The true cost of waste calculated for mineral wool insulation and polystyrene floor panels was less in the measured wastage rate than was estimated for both of these products by using standard wastage rates.

This represents a saving of approximately £500 for these two products.

Causes of waste

- In order of magnitude (greatest to smallest), the main causes of waste observed on the three sites were as follows:
  - Methods of work – offcuts
  - Over ordering
  - Unsuitable storage / materials exposed to weather conditions
  - Rework done due to unclear drawings / design specification

Recommendations

The general recommendations provided in this report on achieving lower wastage rates across the supply chain are as follows:

Manufacturers

Manufacturers should consider the resource use and waste relating to the products and materials they supply, across the life cycle of that product. This would flag up the need to reduce waste at the point of installation.

Clients

The client / developer and financial backers of a development can influence site waste management from the outset of a development. The procurement method chosen can produce lower costs and encourage greater cooperation with the supply chain. Target setting for waste minimisation can drive the site teams to keep site waste activities on the agenda throughout the project and to measure their performance against the target set by the client.

Procurement route

The procurement process encompasses the whole life cycle of the contract – from identification of the need, design, tendering, appointment processes and contract management, to finalising the contract. The procurement route adopted should tackle a key cultural habit: lack of and/or late involvement of specialist contractors and suppliers in the design and planning process.

Pretender Pre-qualification Stage

As part of this process, clients wishing to encourage waste minimisation and improved waste management should evaluate the tendering companies' awareness and experience of developing and implementing good practice in managing waste onsite, and their ability to motivate and specify trade contractors and waste service providers to deliver the required performance.

Tender requirements

The client requirements for waste management should be clearly described in the tender specification. This is the key intervention point in the procurement process where policy objectives, such as sustainability, can be applied.

Forms of contract

Forms of contract govern the construction industry. Contractual relationships in projects can be complex, with the involvement of many players whose roles and responsibilities vary over the life of the project and beyond. There are various standard forms of contract, which are under constant development in order to reflect best practice, together with emerging case law, legislation and loopholes. Contracts more suited to achieving better waste management and incorporating waste management issues will have the following characteristics:

- Higher levels of client involvement
- Better design man agement integration
- Greater capacity for incorporating change
- Clear lines of responsibility for resolving remedials.

Key recommendations – Forms of contract

SUMMARY

Main contractors and subcontractors (including quantity surveyors)

Contractors and subcontractors are critical in terms of site waste management and improving resource efficiency. It is essential for contractors to have an understanding of the following:

- Type of waste being generated
- Amount of waste being generated
- Cost of the waste – quantity surveyors can play an important role here
- Current waste management routes.

Designers

Designers play a vital role in resource efficiency, with particular need for attention on the following areas:

- Designing the building/layout to reduce the overall amount of material resource usage.
- Designing out waste within the new build/fit out processes by using products/materials that aid waste reduction.
- Designing products/systems/buildings that are adaptable for further uses or can be disassembled. This would require working closely with manufacturers at the product design stage.

Recommendations relating to improving the evidence base on wastage rates are as follows:

- Further studies are needed to validate the information provided in this report on actual wastage rates. This should cover the same products, plus others commonly used in the construction sector.
- A common methodology should be agreed for such studies; for example minimum standards of reporting on the amount of product delivered and the amount of waste produced.
- As these datasets become available, they should be added to the True Cost of Waste Calculator and published in the public domain.
- Discussions should be held with the publishers of pricing books to determine how their wastage rates have been derived and whether they would be interested in updating these in line with actual wastage rates from monitored sites.
- Discussions should be held with the technical team involved in the Green Guide to Specification on whether they would be interested in basing their calculations on measured wastage rates.
- Evidence should be used to inform voluntary industry agreements to reduce waste arising for particular product sectors.
- Provision of benchmarks relating to wastage rates of key construction products can be used in tandem for site-based waste measurement to assess the overall progress of the construction industry towards reducing the amount of construction waste produced by 50% by 2015[1].

1 - Construction Resources and Waste Roadmap 2008 – www.crwplatform.co.uk

PROJECT PARTNERS

defra Department for Environment Food and Rural Affairs

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