Site Waste Management Plans

The Site Waste Management Plan Regulations 2008 (SWMP 2008) came into force in England and Wales on 6 April 2008 and seeks to achieve a reduction in illegal fly-tipping, and to reduce the quantity of construction waste that is sent to landfill. This legislation applies to all projects with a contract value over £300 000, and whilst it places responsibilities on both the client and main contractor, there are aspects that may affect the structural engineer whether working on site or in the design office.

The first of these issues, reinforcement of the Duty of Care legislation to require project teams to prove that they have checked that any waste contractors used are properly licensed and are using appropriately licensed disposal sites, is intended to reduce the risk of fly-tipping, and will have little impact on structural engineers unless they are responsible for waste disposal operations on site.

However, in the area of waste management on site, and in particular waste minimisation during design, structural engineers can contribute on virtually any project. To put this into context, it is necessary to understand the impact of waste in the construction process.

The waste issue and the true cost of waste

According to national statistics (*Environment in your Pocket*, 2006), the UK generated 335Mt of waste, of which 32% (107Mt) was from the construction and demolition industry, the largest contribution from any industry sector, including mining and quarrying, or agriculture. At the same time the construction and demolition sector contributed 11% of the UK's GDP, so our sector's waste is disproportionate to its value to the economy.

On a typical project, the cost of waste disposal is roughly 0.3–0.5% of a project's value, and it should be remembered that waste is not just the content of skips, but also other materials that may be removed by trade contractors, such as earthworks, excavation arisings, or hazardous wastes. However, recent studies have shown that the cost of purchasing the materials thrown away in skips is roughly 10 to 20 times the cost of their disposal, so the true cost of 'waste' is probably 3–10% of the project value. Clearly minimising waste during design can therefore have a significant impact on project cost, and its viability.

Within the SWMP 2008, whilst the focus is on reducing waste sent to landfill through recovery and recycling during construction operations, there is the opportunity to commence site waste management planning and waste minimisation during design, gaining not only reduced disposal costs, but also the 10-20× implied cost savings through reducing the need to purchase excess materials.

A practical approach

Regarding planning, it may be worth considering at an early stage how the site could be organised during construction, and how the main contractor may operate: Where will the waste be stored? How much space is available for recycling? Is there a suitable space to store materials deliveries to minimise the risk of damage (and consequent waste)? Might making additional space available, even temporarily, actually reduce the cost of the project? By considering these issues early, substantial improvements in waste management could be realised during the construction stage. And there is no reason why the structural engineer should not be the one to raise these issues.

Prefabrication and off-site construction

Another issue that must obviously be considered is that of prefabrication or off-site construction. Whilst it is easy to dismiss this as merely transferring the waste to another location, factory-based fabrication can significantly reduce overall waste. Behind this is an understanding that off-site manufacture typically specialises in one particular construction, and as such is able to maximise materials use and minimise waste, for example by using parts of the same stock sheet for components for different projects that are in the works at the same time. In comparison, the same work done on site does not permit the use of such offcuts on other projects, and these automatically become waste.

Equally, off-site manufacturing plants are set up to recycle many of the component materials they use, either internally (in the case of the precast concrete industry), or externally (in the case of steel fabrication), resulting in a far higher recovery and recycling rate than would be achieved if the same operations were carried out on site.

But behind this must also be considered the issue of transit packaging: Does the completed fabrication now require so much temporary protection that the waste generated by throwing this away on site is greater than that from doing the work on site in the first place? How could this be improved through reusable protection, and how willing is the off-site fabricator to adopt this approach to minimise overall waste? How many engineers consider these questions during design?

Sourcing materials

Beyond this are some more mundane considerations. How often when specifying components do we consider pack sizes, or board widths and lengths, or whether materials will be obtained locally or imported some distance, or are on long delivery periods? These latter points are of surprising importance – when materials are hard to come by for any reason, the temptation is to over-order 'just in case', whilst where materials or components are freely available locally, contractors' will happily buy 'tight', safe in the knowledge that they can pop out and pick up a few more if they need them without risking delays. It is always useful to recognise a very simple fact:

Accurate Quantities + Over-Order = Building + Skips

Not exactly a ground-breaking revelation – but you can only put so much material into a building, and anything that's left over often goes into the skips – especially if it's project-specific and can't be readily reused elsewhere. So reducing the temptation to over-order can reduce waste, and in these days of carbon-sensitivity, its worth remembering that anything manufactured just to throw away wastes carbon, so minimising waste also contributes to low-carbon construction.

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