

Sustainable highways

Debbie Johns discusses how sustainable approaches to highways construction and repair can contribute towards wider environmental goals

With climate change concerns on everyone's lips and construction totalling 20% of all public sector spend, the case for ensuring highways construction and repair projects contribute towards local and national environmental goals has never been stronger.

Most authorities are looking at procurement of recycled materials and other ways in which highways construction and repair practices can be made more environmentally sustainable.

The policy drivers are clear. One Bill passing through Parliament sets targets to tackle climate change and another to minimise waste. The DEFRA consultation that is currently under way will mean a need to produce Construction Site Waste Management Plans from April 2008 containing targets for waste reduction and recovery based on the composition and quantity of waste generated during construction projection of more than £250k. The Government's Sustainable Procurement Action Plan sets out policies and practices to ensure the public sector's spending power is harnessed to contribute to targets for energy, waste and water efficiency, including a pledge to be carbon neutral by 2012.

There is also a financial imperative, as landfill tax will reach £48 per tonne by 2010 and if European Union targets to reduce landfill are not met, as a nation we could be paying out £0.5m a day in fines.

The challenge for engineers is bringing all of this together and translating it into practical action. There are numerous examples of authorities leading the way in using recycled aggregates and setting environmentally sustainable standards for contracts. These include: Cornwall County Council (see box), Glasgow City Council, Midlothian Council, Newcastle City Council, Sheffield City Council, Tayside Contracts and the Greater London Authority.

Embedding environmental considerations into highways construction and repair projects requires a holistic approach so that engineers can work together with the corporate centre and colleagues in procurement, environment, planning, transport, housing and building maintenance and regeneration departments. For example, situating in-house recycling plants near to major schemes can feed into local transport plans by cutting the number of heavy vehicles driving long distances and causing emissions and bottlenecks on roads.

Once the policy context is addressed and council-wide commitment is in place, it is down to highways engineers to tackle the practicalities. Engineers obviously need to take cost, time constraints and compatibility with equipment into account in the specification process when choosing recycled surfaces, building materials, filling material, capping and sub-base, asphalt base, borders and surfaces. The range of techniques available - such as cold asphalt processes to save on energy consumption and free-draining aggregates to allow for winter workability - must also be evaluated. As well as using recycled materials, good drainage can help towards flood prevention, low voltage traffic signals cut energy consumption and use of bio-fuels can reduce vehicles emissions.

Setting contract standards for a percentage of recyclables to be used and site waste management can reduce the amount of waste going to landfill without compromising on quality and design or increasing costs. But it is necessary to do all of this within existing budgets, which could get even tighter under the forthcoming Comprehensive Spending Review. The National Audit Office report Building for the future: Sustainable Construction and Refurbishment on the Government Estate stated that sustainability must be achieved, 'at no extra cost and be technically and commercially viable'.

The good news is that using recycled aggregates and setting environmental standards in contracts need not add to the cost of highways projects. Peter Moon from WRAP, the organisation charged with raising awareness of recycled materials, told the APSE Climate Change seminar that 'quick wins' can be achieved and it is possible to move from a baseline of 8-16% of recycled content used in roads construction up to 27-29% and remain cost neutral.

As you get more recycled content, this can add to project costs, however. And this is where local authorities can be working closely with each other and with suppliers to be instrumental in developing markets and achieving economies of scale. Authorities are coming together to develop facilities to reuse or recycle materials for roads. For example, Tayside Contract - a joint direct labour organisation between three councils in Scotland - has developed Reed Bed Treatment of ecological gully waste at its Forfar depot, and road arisings recycling, as well as hot and cold mix recycling at their Collace Quarry.

Relations with contractors are crucial in all of this. Suppliers need councils to educate them about specifications to ensure they meet requirements on health and safety. It is essentially about product and service standards that dovetail with both environmental and other key considerations. For example, kerbs made from materials recycled from landfill have been developed which are up to 70% lighter and are therefore useful from a health and safety perspective. Other considerations to take on board include lifespan, as everyone is anxious to avoid creating a reactive maintenance situation.

And we need to build upon all the good practice that is occurring. The Association for Public Service Excellence (APSE) has 260 members from councils delivering front-line council services, including highways maintenance. APSE members have agreed to further share information to identify good practice and standards. This includes disseminating information about the safety and reliability of recycled aggregates. For this reason APSE has agreed to include information about

recyclables for highways projects in data gathered for its performance networks, the largest voluntary performance database in the UK.

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CASE STUDY :CORNWALL

Cornwall County Council, which has won APSE's Service Award 2007 for Best Environmental Initiative, has included environmental considerations for road construction and repairs projects as part of its holistic approach to tackling climate change.

CORMAC, the council's direct labour organisation, was set up in 1992 and employs more than 500 people on work such as building bypasses, car parks, estate roads and coastal defences. Its Constructing Sustainability Initiative sets out both financial and long term sustainability benefits to be addressed during all projects. In terms of highways this means having a clear compliance strategy, using cold-mix road recycling technology and asphalt re-heat technology alongside in-house recycling centres, an environmental management system and considerate constructors scheme.

CORMAC found that while cold-mix road recycling technology is increasing used in the UK, few items of plant existed, and these are generally owned by larger construction companies. Following a period of trial of this equipment, CORMAC purchased a cold-mix (foam bitumen) road recycling plant which is capable of recycling road planing waste arisings. In addition to the cold-mix recycling technology, CORMAC has procured two state-of-the-art asphalt recyclers which recycle road scalpings and larger pieces of asphalt waste to produce a ready to lay hot asphalt.

CORMAC has also developed three strategically positioned in-house recycling centres, each serving a 25-30 mile catchment area. These facilitate the storage and reprocessing of bituminous macadam materials, concrete and soils to form recycled materials for highway maintenance activities. Surplus materials are offered to local communities where appropriate. The recycling centres are used as a production base for foam mix and reheat operations and each facility will reprocess up to 10,000 tonnes of material per year.

The recycling centres are supported by a network of local recycling depots where local reprocessing of material will be undertaken utilising mobile plant. Twenty-six of these smaller recycling depots have been established.

The council estimates that the Constructing Sustainability Initiative will save:

- In excess of 1 million road miles per year;
- In excess of 1,000 tonnes of carbon dioxide output per year; and
- 250,000 litres of fossil fuels.

It forecasts financial savings including:

- Up to 50% saving per tonne by using recycled cold and hot-mix asphalts
- transport cost savings resulting from the setting up of a countywide network of waste management facilities
- Significant savings in staff time.

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