

Matters arising

Some contractors are finding that they can benefit from favouring re-use over recycling of demolition waste

Efforts to demonstrate resource efficiency and minimise the environmental impact of demolition have traditionally focused on the amount or percentage of arisings – secondary or waste products – that have been recovered and recycled.

Indeed, increasingly sophisticated sorting and reprocessing technologies, combined with the need to demonstrate compliance with sustainability ratings such as BREEAM (the BRE Environmental Assessment Method) and Code for Sustainable Homes have enabled some demolition contractors to achieve recycling rates above 98%. Only hazardous waste, such as asbestos, has gone to landfill.

However, there is a category of management sitting above recycling in the hierarchy of waste which is often overlooked. Despite being – by definition – a more environmentally desirable option, the re-use of construction waste is rarely reported separately.

There is some confusion in the industry over the distinction between the two. While recycling involves some processing, such as shredding and melting, and reconstitution of the waste stream, re-use requires little or no treatment. A re-used waste material will often be employed in its original application, avoiding the sometimes considerable energy needed to reprocess it.

Most waste modelling software does not accommodate the recording of re-use but that may about to change with the announcement of a project to develop a BIM (Building Information Modelling) extension software tool, known as DRIM (Deconstruction and Recovery Information Modelling).

The project is being led by United Kingdom-based construction waste consultancy, Waste Plan Solutions Ltd (WPS), and is part-funded by an Innovate UK grant.

“DRIM will complete the ‘circular economy’ for buildings by identifying in advance the re-usable and recoverable materials at the end of a building’s life,” said Laura Ayris, managing director of WPS.

“It will introduce the concept of material recovery at the initial stages of the construction process. This will encourage designers to produce a deconstruction plan and simulate the deconstruction process to ‘build-in’ more efficient recovery of materials

and the use of efficient waste collection and reuse or recycling schemes.”

The system is expected to be available within two years.

BARRIERS TO RE-USE

To be fair, a number of barriers have discouraged or even prevented contractors from considering re-using demolition wastes. Apart from the obvious challenges of deconstructing the various items without damaging or contaminating them, there are issues regarding the quality of re-usable materials. For example, structural components that have been subject to stress or fatigue loading while in-situ need to be tested to provide assurance of their future



Clifford Devlin salvaged more than 15,000 bricks from a listed building demolition in London last year

performance if they are to be suitable for re-use in subsequent construction. Lack of standardisation of recovered materials may preclude them from use in a particular design specification, especially older items that may now be obsolete. There may not be adequate storage space for salvaged items and pressure to complete the demolition phase can rule out the more careful but time-consuming dismantling and deconstruction needed to salvage materials intact.

While data for demolition waste re-use tends to be anecdotal, there are a number of good examples where it has been re-used to

R Collard's re-use of waste steel won the company a Chartered Institute of Waste Management award





explained John Watson, the managing director of R Collard.

"More than 50 steel beams measuring 25 m each were carefully dismantled and sent to a local steelwork pre-fabrication supplier. There, they were cleaned, cut to the specification supplied by our installers, new baseplates fitted, re-painted and transported to our yard to provide structural steelwork for the roof of the new building."

Representative samples were tested using mechanical and chemical analysis by an accredited laboratory to verify their suitability for re-use in structural applications.

Bricks are another good example of building materials that can be re-used. Good quality, undamaged items will typically be treated manually. Loose mortar or other items are carefully chipped away using brick hammers,

and the brick cleaned with a wire brush, rinsed, stacked and left to dry.

Older bricks actually tend to be easier to salvage, according to Charlie Law of environmental consultancy Sustainable Construction Solutions.

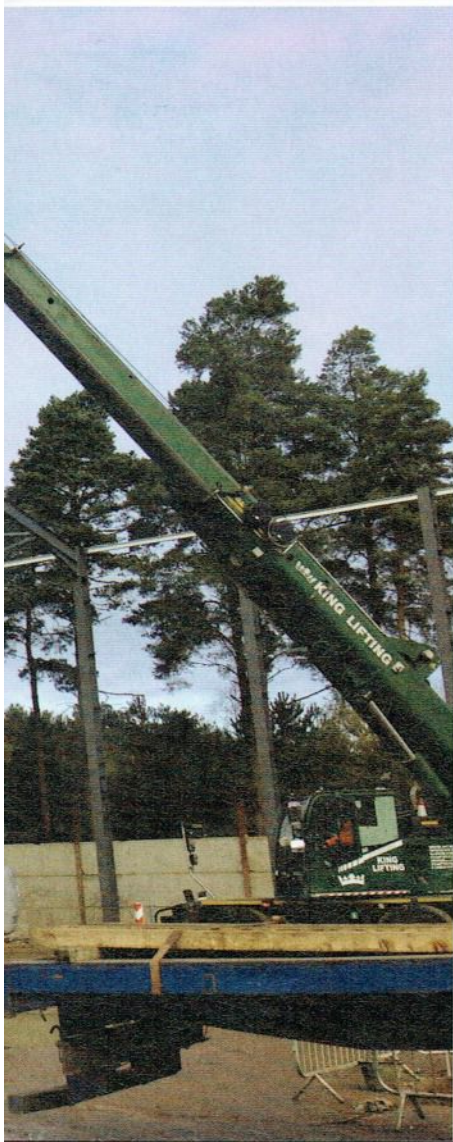
"More modern bricks are normally laid on a cement mortar which binds to the brick and is very difficult to remove at end of life without damaging the brick," said Charlie.

"If we designed for deconstruction, we may go back to laying bricks in a lime mortar, which is easily removed, and explains why there is a good salvage market for bricks from older buildings. Laying bricks on lime mortar does take a bit longer, but due to changes in building methods, this brickwork is not normally load-bearing and is therefore rarely on the critical path of the construction programme."

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make demolition projects more sustainable. Many of the best case studies involve reusing structural steelwork, which is robust enough to withstand deconstruction and intrinsically demountable. Demolition contractor R Collard's winning entry at last year's Sustainability of Resource Awards organised by the Chartered Institution of Wastes Management (CIWM) involved the re-use of 800 t of steelwork from a demolition project.

"During the planning phase, the size and length of some of the structural steelwork in the roof was identified as suitable for re-use in building our new materials recycling centre,"



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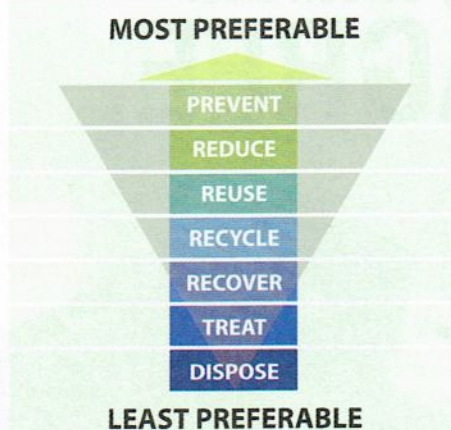
CONSTRUCTION WASTE

There is an established market for salvaged bricks that can be exploited to add commercial as well as environmental value to a demolition project. They can possess a distinct distressed appearance as a result of the reclamation process, making them attractive for period restoration projects.

Other examples of re-usable construction waste include furniture, floor and ceiling tiles, electrical or electronic equipment, architectural items, cobbles, slates, flagstones and railway sleepers. Many of the materials salvaged for re-use are heritage items and planning consents and specifications for the redevelopment of listed buildings are a key driver for re-use in demolition.

Paul Clarke-Scholes, environmental consultant for listed property demolition specialist Clifford Devlin, said: "The process of reclaiming heritage items from a building can be very time consuming. It is always more expensive involving training and instruction for the operatives involved and methods for protecting the materials during deconstruction, transport and storage."

The obvious, eye-catching example is the re-use of the buildings exterior. Façade retention schemes are installed to hold listed structures in place while its interior is removed and replaced with a new modern construction. Planning consents for the redevelopment of the interior of heritage buildings can also specify internal items for preservation.



Re-use sits above recycling and recovery in the waste hierarchy of the most preferable options

For example, at the recent redevelopment of London's Somerset House, Clifford Devlin's groundworks package specified the removal and palletisation of original Yorkstone setts from the east lightwell and Yorkstone paving slabs from the basement which were carefully lifted using hand tools, palletised, packaged in film and removed to a storage area.

The salvage process can often be supervised and monitored by representatives from organisations such as English Heritage and Museum of London Archaeology (MOLA).

"We were required to carefully salvage much of the original panelling and tiling during the redevelopment of a Victorian

bathhouse in Ironmonger Row in Clerkenwell which was used to create replicas for the rebuild phase," Paul added.

While the act of salvaging items in good condition for re-use will typically have a negative impact on programme and costs there are some advantages for the contractor. Construction waste specialist, the McGrath Group, is able to quantify the environmental benefits of re-use through its waste carbon-reporting tool. Its system, which was developed in-house and is certificated against the International Standard for Greenhouse Gases (ISO 14064), calculates the energy expended at each stage of the waste management process, that is transport, sorting and re-processing which is converted into CO₂ data. McGrath estimates that more than 95% of the CO₂ emitted during the recycling of construction waste is accounted for by reprocessing. This means contractors can reduce their carbon footprint and transport costs by re-using materials rather than recycling and submit data to demonstrate the environmental value for BREEAM and in future tenders.

The onus is on the construction industry to find more ways of reducing its environmental impact as energy from fossil fuels consumed in the construction and operation of buildings accounts for around half of the UK's emissions of carbon dioxide. As expectations increase, the debate is starting to move on from landfill diversion to more carbon efficient ways of managing demolition waste.