Technology for circular supply chains

Scaling up construction waste recycling

Hack&Craft

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If you have any questions or would like to discuss these topics please email info@hackandcraft.com.

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According to the OECD, Construction is eating more than a third of natural resources globally.

Around 50% of the urban built environment the world must have by 2050 is not yet under construction.

Cutting emissions isn’t working as the only major push for Net Zero. The UN environment report *[pub. Oct 2022]* concludes that “rapid transformation of societies” is the only credible route left.

It is now critical that the volume of construction waste is slashed by switching to circular economic principles.

The Opportunity

The total market for recycled waste in the UK will reach approximately £27 billion by the end of 2022.

A substantial percentage of this market lies within the construction sector.

Analysis by the Ellen MacArthur Foundation estimates that the application of circular economic principles to five key products could halve the global emissions arising from production. These key products are plastics, steel, aluminium, cement and food.

Construction waste management could be the catalyst to broader societal change by shifting its reliance on linear processes to circular economic principles.

Construction waste stats

While the extrapolation of relevant data lacks cohesion across the UK, the following is based on Defra analysis. In 2018, the UK generated 222 million tonnes of waste. Of this, 138 million tonnes was from construction, demolition and excavation (CDE). And of this, half derives from construction and demolition (C&D) equalling 68 million tonnes and 42% (58 million tonnes) from excavation.

Construction waste recycling and reuse statistics

Around 63 million tonnes of C&D waste is recycled and reused, primarily through downcycling into lower quality aggregates. This leaves five million tonnes heading to landfill.

This figure outstrips EU targets of 70% recycling and reuse and this is largely down to extremely high landfill taxes in the UK. However, construction waste recycling is synonymous with downcycling.

Downcycling and the decrease in quality

Downcycling means reusing materials for lower grade applications – crushing demolition material for reuse as aggregate, for example. This open loop system decreases the value and quality of the material at every step and doesn't reduce the need for virgin materials.

Far greater gains can be made through returning used materials to the production cycle in a closed loop system. Retaining the value of existing materials will be key to successfully managing Construction waste towards Net Zero.

222 million T

waste generated in UK in 2018

68 million T

50% from construction and demolition alone

138 million T

62% from construction, demolition and excavation

What’s the Industry Doing?

In July 2021, the Construction Leadership Council’s Green Construction Board launched its Zero Avoidable Waste Routemap for the UK.

Zero Avoidable Waste (ZAW) means all products, components and materials used within the construction flow should be reused before being recycled, all with the least amount of environmental impact possible. The Routemap aims to reduce costs by 10% by 2030 by strategically designing out waste and efficiently optimising materials, eliminating all hazardous C&D waste and reducing landfill by 75% by 2040.

The circular economy is already here, isn’t it?

It’s a paradox. There has never been more chat about circular economic principles and yes, there are excellent examples already in place across Europe. But there are obstacles to mass adoption that are slowing meaningful progress.

Pockets of strategic excellence using circular economic principles can be seen with Veolia and Dulux cutting landfill one paint can at a time and recycling the paint itself into quality products.

We can see it also with Saint Gobain's clear commitment to achieving zero non-recovered waste.

We work closely with both of these trailblazers and together we’ve identified the barriers to accessible cross-functional action for the sector.

Barriers to a Circular Construction Industry

There is a lot of talk about applying circular economic principles to the Construction sector and to closing the open loop recycling methods used by the majority.

So, how did this get so complicated to implement and why are operators struggling to find ways to keep reusable resources intact and in circulation?

1. Lack of traceability

Traceability is essential to robust and responsive supply chains. For companies to transition to greater reliance on circular streams there must be visibility of the materials flowing through them. Companies need to know quantity, quality, and location of materials. And the lead time on processing. Moreover, companies need forecast analytics to ensure they remain aligned with demand. This isn’t possible with current systems.

2. Lack of scalability

Manufacturers, waste management companies and contractors tend to use siloed, legacy and manual systems to handle waste. These are error prone, resource intensive and inefficient. Scaling up will be impossible without a digital platform orchestrating the flow of materials and information between the parties.

Breaking Down the Barriers – The Hack and Craft Solution

Building on our work within the sector, we've developed a hub and spoke platform that connects manufacturers, contractors, environment agencies, waste management centres, recyclers, and haulage companies. It enables collaboration through configurable workflows and delivers end to end visibility of material flows.

Who needs it

Manufacturers, waste management centres (WMC), haulage companies and contractors all need a scalable process to meet the increasing pressure from consumers, employees and regulators to switch to sustainable production - fast.

For **Manufacturers** the digital hub facilitates data sharing and communication with recycling partners and the essential analytics necessary to accurately assess the quality and volume of the supply chain. Crucially, the platform delivers to the recycling chain the same capabilities as the linear process in a scalable, efficient and streamlined way.

Manufacturers need **WMCs** to use systems that enable deep supply chain visibility and analytics and WMCs need scalability as the sector grows. The platform will allow WMCs to slash high overheads for dealing with haulage companies, for example and eliminate the time wasted in rectifying scheduling errors.

Haulage companies and contractors will benefit from the same simplified and efficient access to larger markets in order to meet growing demands.

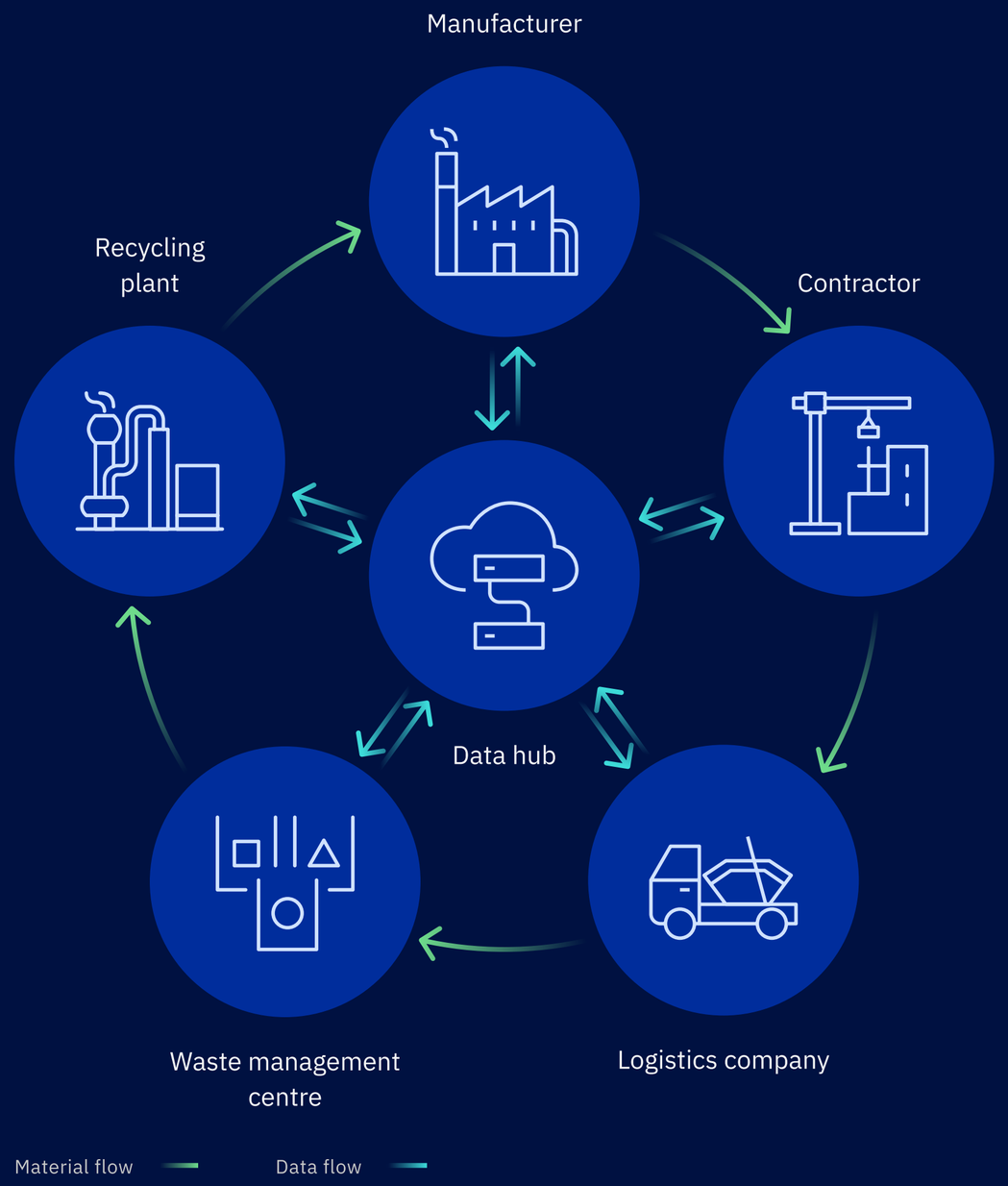
How It Works

Our Connect for Recycling solution can handle the recycling of the complete range of construction materials, including hazardous and non-hazardous, from paint to plasterboard.

Its hub and spoke architecture enables each party in the value chain to connect through a web or mobile app and perform their role. The end-to-end digitisation simplifies the process and allows for scalability. It also delivers end-to-end traceability and robust supply chain planning.

A typical scenario could include the following parties:

- Manufacturer
- Contractor
- Logistic company
- Waste management centre
- Recycling plant



Here’s How a Simple Flow Could Look

1. The contractor buys materials from the manufacturer and then books waste collection from a WMC in sufficient quantities of bags, skips, cans etc. The contractor can indicate here how often they want the waste to be collected and for how long.

2. The WMC receives the order in their WMC portal and can either accept, reject or make changes to the order. If they accept the order, the system automatically notifies the Contractor with delivery dates for waste receptacles. They will then assign the delivery and collection logistics tasks to internal teams or to third party skip management companies.

3. On the day of the collection, the driver arrives on site to load the waste. At this point they enter the quantity collected and digitally sign a Waste Transfer Note, all via the platform. If there is a replacement skip or other waste container they will also record that they have dropped that off.

4. The driver then takes the waste to the allocated WMC where it’s weighed and checked for contamination, the latter typically recorded as a percentage. The waste management company then also digitally signs a Waste Transfer Note in the driver app and assumes custody of the material.

5. The WMC then processes the waste into material ready for shipping to a recycling company for further processing.

6. The material is then shipped to the recycling centre, where it will be further refined before being sold on to the partner manufacturers or back into the general waste market.

Complete visibility and transparency is maintained throughout the entire flow, with options to grant this selectively to necessary partners. The system is also capable of integration with the Environment Agency and its consignment code allocation. The customer ends with accurate forecast analytics as well as an auditable log of the complete chain of waste custody.

Our tech allows for meaningful change

The onus for contributing meaningful solutions to the systemic problems surrounding waste and recycling management has shifted from the individual to organisations.

Construction is at a crunch point in the race to Net Zero and, given the sector’s waste footprint outweighs other sectors, a proactive revolution within waste and recycling management could provide the answer we’ve been looking for to clean up the planet.

Who We Work With

To find out what our tech could do for your circular supply chain contact info@hackandcraft.com

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