# Building resilience in property repairs through the circular economy

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# Contents






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# Executive Summary

Since the ABI launched its Climate Change Roadmap is 2021, the UK has experienced its warmest year on record[i]. The insurability and cost of climate related risks is of growing concern. The insurance industry is in a unique position to influence more sustainable decisions concerning property insurance claims and building repairs. However, more dialogue is needed between insurance companies, regulators and the construction industry surrounding sustainable repairs, encouraging circularity to reduce waste, and increase the use of low carbon building materials.

Circularity is a practice which focuses on reducing waste and recycling unavoidable waste, as much as possible. Despite the UK government introducing a legislative framework, The Circular Economy Package (CEP) is not construction specific.

The UK could reduce global CO2 emissions from building materials by 38% in 2050, by reducing demand for building materials such as metals, concrete, glass, plasterboard, plastic, timber, ceramics, insulation and packaging. Without government support it is up to those of us working in property insurance and property repairs to dial-up the conversation exploring circularity and find ways to put these ideas into practice.

Consumers make choices every day favouring actions representing either circular or linear consumer behaviour. For example, buying packaged or unpackaged vegetables. These same principles could be applied to the building repair economy. As insurance professionals we can 'nudge' builders and clients commissioning the work in the direction of greater circularity, for example using modular design principles which reduce resource requirements or recycling the 75% of building construction waste that currently goes to landfill.

Moreover, some simple yet effective changes can be made to reduce waste and allow more recycling include keeping records to prevent over ordering or providing dedicated areas for recyclable materials. Plasterboard is one of the industry's most wasted products due to over-ordering, poor storage/transport methods and lack of care when installing. Meanwhile, much of the waste from floor and wallcoverings, plastic, wood (which contributes between 20-30% of all construction debris) could be recycled.

A lot of figures relating to construction material consumption and waste are quoted on the internet and they don't all agree. Apart from one thing – the numbers are huge.

The building repair sector, including those contracts in support of insurance claims, is driven by cost and without legislation, there is little or no incentive to pay more for sustainable materials. Alternatives are being developed but are still more expensive and hard to source and will remain so until more investment is made. There is no silver bullet to reducing the carbon footprint of insurance claims, but perhaps driving dialogue and awareness about the ways in which building practices could change to support the circular economy might help.

This research paper has been created by Woodgate & Clark with that goal in mind.




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# Introduction

This paper from Woodgate & Clark focuses on the circular economy is and why it is important when considering reducing carbon emissions in building repairs.

## The size of the waste problem in construction

A lot of figures relating to construction material consumption and waste are quoted on the internet and they don't all agree. Apart from one thing – the numbers are huge.

Looking at the numbers - DEFRA reported in the February 2018 edition of UK Statistics on Waste that in 2014 the UK generated 202.8 million tonnes of waste. Construction, demolition and excavation (CDE) was responsible for 59% of that number – around 119 million tonnes.

The construction industry accounts for approximately 55% of material consumption, with buildings contributing 50% of total CO2e (carbon dioxide equivalent) emissions.

55% of the global industrial carbon emissions come from the manufacture and processing of five key materials: steel (25%), cement (19%), paper (4%), plastic and aluminium (3%). Of these materials, construction is a primary consumer of cement and is responsible for consuming approximately 26% of aluminium, 50% of steel, and 25% of plastic.
**Source - DEFRA**

It is estimated that half of extracted raw materials go into the world's built environment, that construction creates a third of the world's overall waste, and at least 40% of the world's carbon dioxide emissions.
**Source – BBC Future Planet https://www.bbc.com/future/article/20211215-the-buildings-made-from-rubbish**

It is hard to be exact, but it is estimated that, globally, as much as 30% of the total weight of building materials delivered to a building site is wasted.

It is also understood that 75% of construction waste could be but isn't being recycled or repurposed and that this is due to the lack of integrated waste management framework.
**Source - Yeheyis M., Hewage K., Alam M.S., Eskicioglu C., Sadiq R. An overview of construction and demolition waste management in Canada: A lifecycle analysis approach to sustainability.**




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# The Circular Economy

The circular economy (CE) is described by the **European Parliament** as:

*A model of production and consumption, which involves sharing, leasing, reusing, repairing, refurbishing and recycling existing materials and products as long as possible. In this way, the life cycle of products is extended.*

*In practice, it implies reducing waste to a minimum. When a product reaches the end of its life, its materials are kept within the economy wherever possible thanks to recycling.*

*This is a departure from the traditional, linear economic model, which is based on a take-make-consume-throw away pattern. This model relies on large quantities of cheap, easily accessible materials and energy.*

The fundamental point of a circular economy is to keep materials and products in use rather than just throwing away the old and replacing with new.

The aim is to reduce waste of new materials and reuse or recycle the old to reduce the energy we use and CO2 emissions.

The three R strategies are often referred to in the context of a circular economy - reduce, reuse and recycle. But it is worth noting that in the academic world, this extends to 10R strategies:

R0 - Refuse Prevent the use of raw materials.
R1 - Rethink Make product use more intensive.
R2 - Reduce Consuming fewer natural resources and materials.
R3 - Reuse The product is reused by another consumer, while remaining original functions.
R4 - Repair Maintain and repair product.
R5 - Refurbish Restore old product and bring it up to date.
R6 - Remanufacture Use parts of discarded production in a new product with the same function.
R7 - Repurpose Use discarded product or its parts in a new product with a different function.
R8 - Recycle Salvage material streams with highest possible value.
R9 - Recover Incinerate waste with energy recovery.

**Source: Adopted from (Potting et al., 2017, Cramer, 2022)**

Most case studies show that the building industry still focuses on “reduce, reuse and recycle” while there is less focus on “refuse, rethink and remanufacture”.




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This indicates that while the construction sector is reasonable at consuming fewer natural resources, reusing products and recycling, it is less effective at not using raw materials in the first place, making more effective use of products and using discarded parts in a new product with the same function.

In the built environment and at the highest level, the most effective way to reducing embedded emissions is by extending the lifespan of existing buildings and increasing the intensity of building use. This ultimately reduces the demand for new construction, which consumes more materials than renovating existing buildings.

The first step towards a circular economy in construction must therefore be to focus on reusing or repurposing existing buildings instead of demolition and constructing a new building.

**In the insurance building claims sector, we should be considering repair wherever possible as the most sustainable option because a repair is an essential aspect of circular economy strategies to extend the life of products and materials used in construction.**

Of course, this is not always possible or practical where a building has been substantially destroyed by a peril such as fire. The cost of rebuilding instead of repair can, in some circumstances, be lower than the repair cost, especially for residential buildings where VAT is zero rated for new build (above ground floor slab).

Cost is currently the main driver when considering repair and rebuild options and until the focus changes to sustainability being the driver, this is likely to remain the case. One option would be to try and align sustainability with lower costs, so that sustainability becomes the most attractive and viable option.

The fact remains, that it is more sustainable to repair buildings than rebuild and while sustainability is the end goal, a circular economy is a step towards that end goal.

By 2050, the UK could reduce global CO2 emissions from building materials by 38%. This could be achieved by reducing demand for building materials such as metals, concrete, glass, plasterboard, plastic, timber, ceramics, insulation and packaging.
**Source - UN environmental programme**

However, based on research, the circular material use by society is between 6% to 37% globally today, indicating that 63 to 94% of all the materials and products currently used are managed linearly.
**Source - Haas, W.; Krausmann, F.; Wiedenhofer, D.; Heinz, M. How Circular is the Global Economy?: An Assessment of Material Flows, Waste Production, and Recycling in the European Union and the World in 2005.**
**De Wit, M.; Hoogzaad, J.; Ramkumar, S.; Friedl, H.; Douma, A. The Circularity Gap Report.**

## The principles of a circular economy

**A circular economy is based on three principles, which are all driven by design:**

- **Eliminate waste and pollution,**
- **Keep products and materials in use,**
- **Regenerate natural systems.**

To eliminate material waste, processes need to be designed for both material manufacturing and use that minimise manufacturing more materials than required.

Take plasterboard, one of the industry's most wasted products, as an example.

Plasterboard is traditionally manufactured in a standard 2440mm by 1220mm sheets and although other sizes are available, they are all in modules of this. While it is easier to design a new build to minimise cutting and waste, repairing ceilings and walls does require custom dimensions, as each repair is different.

The result is a huge amount of new material is wasted as offcuts.

Potentially, if plasterboard was available in a greater selection of sizes at a reasonable price, then waste could be reduced.

Keeping materials in use must also be considered. The most common way being recycling but this also includes reusing, repurposing (using the material for something else, often with some form of remanufacturing) and composting (really a form of reuse).
Staying with plasterboard, while it is not easy to reuse or repurpose once it has been used in a building, it should be possible to recycle all new plasterboard waste and keep it in the plasterboard supply cycle.

It is difficult to recycle used plasterboard as it is likely to be covered in paint, incorporate metal beads and nails and be attached to timber. All of which need to be separated to enable current recycling.
Advanced methods of recycling need to be designed and there is currently ongoing research on this subject.

Regenerating nature (natural systems) is about adding positive impacts to our natural environment rather than trying to avoid the negative impacts. For example, avoiding or reducing greenhouse gas emissions or eliminating waste is often discussed, which refers to decreasing our negative environmental impacts.

There is a need to restore the natural carbon cycle, where healthy soils are better able to hold water, reducing the impact of droughts, and are better able to absorb water, reducing the risk of flooding.

While it is possible to see how farmers can influence this during food production, what about building repairs? Construction uses a huge number of natural resources, so extracting fewer resources by reducing this consumption will have a positive impact on the natural environment.

The aim must be to have a system where materials never become waste and nature is regenerated. The world needs an economy where products and materials are kept in circulation through processes like maintenance, reuse, refurbishment, remanufacture, recycling, and composting.

## End of life products

An essential part of a circular economy involves the re-use of materials and products at the end of life. Despite the well-documented benefits of a circular economy, the vast majority of materials and products used by society remain part of a linear economy. The transition from a linear to a circular economy (CE) has, therefore, become a key challenge of the 21st century.
**Source - Ellen McArthur Foundation. Recycling and the circular economy.**




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# The Circular Economy - the issues

The circular economy model faces a number of challenges and barriers, and these can be summarised as follows:

## Material Characteristics

Some materials have inherent physical and chemical characteristics that influence the transition to circularity. Material properties control the value, processing and future use scenarios. Material characteristics include composition, economic value, component/parts, potential to have aesthetic value, stability, hazardousness and degree of contamination. For example, a contaminated product containing many different components that are difficult to separate is likely to require expensive and challenging processing.

## Processing Technologies

The availability of appropriate processing technology is often a key barrier to transitioning to a circular economy. This category depends on material characteristics, technology availability and
readiness, the state of current infrastructure, processing technology location, the ease of processing and relevant costs, all needs to be assessed.

## Environmental Impact of Current Disposal

This is where the environmental impact of the current linear management of an end of life product or material is assessed. A high environmental impact is likely to drive the transition, as it is more critical to rethink the current linear model in this situation.
The environmental impact relates to the embodied carbon and embodied energy inherent to the material or end of life product.

## Organisational Context

The organisations involved in current material management need to be willing to change their current processes and management practices to increase circularity. This is heavily dependent on management support, the organisational culture, and if the resource can be made available to test new ideas to transition to circularity.

## Industry and Supply Chain Issues

Qualitative assessment of industry and supply chain characteristics and attitudes will identify the level of acceptance of the current practice, the affinity to achieving a circular economy,

producer liabilities, infrastructure readiness, storage and handling problems, distribution issues, stakeholder responsibilities and potential communication problems. Practical and logistical considerations associated with transforming to a circular economy are also relevant.

## External Drivers

Some external drivers to change from linear to circular, include the availability of subsidies, end-user/consumer perspectives, industry trends and drivers for research and development. External drivers can have a significant impact, particularly when public perception of an industry becomes an issue or there are government subsidies, grants or tax incentives to make changes. These can be driven by the media, governments, industry or consumers.

## Public Perception

Public opinion can influence the transition to circularity for the specific material or end of life product under consideration. Public perception can induce rapid change to an industry or make politicians aware of the need for change.  Possible public perception issues include public perception of the current linear disposal, the level of public discussion/interest and the visibility of the current linear system.

## Regulatory Framework

Regulations can influence the transition from linear to circular for a specific material or end of life product. Some issues related to the regulatory framework include health and safety, material handling requirements, taxes and fines, legal requirements, transparency and responsibility. This may include issues such as traceability of the material, transparency in the value chain and public health and safety considerations. The current regulatory framework needs to be assessed to understand if it will allow the transition from linear to circular.

## Economic Viability

The linear to circular transition has to make good business sense and needs to be financially attractive/beneficial. Possible issues that influence the economic viability include monetisation (can the material be processed into a new product or raw material for which there is a viable market?), Value and Scale (economic viability can be achieved but will this require major investment in research, development and processing to make it happen), Amount (are the total quantities of the material available appropriate for the potential application(s)?) Context (can the material be used directly without incurring excessive transport costs). Economic viability is influenced and dependent on all the other assessment parameters.

**Source - Analysis of Barriers to Transitioning from a Linear to a Circular Economy for End of Life Materials (Elena Dieckmann 1,2, Leila Sheldrick 1 , Mike Tennant 2 , Rupert Myers 3 and Christopher Cheeseman)**

# What is being done in the UK to address these and other barriers to a circular economy, particularly in the construction industry?

## The need for more financial government support

In July 2023, the UK Government announced new plans setting out its long-term aim to use fewer new resources, drive up the repair and reuse of existing materials and increase recycling. The programme – *Maximising Resources, Minimising Waste* – brings together a range of measures backed by government funding which will help to keep products and materials in circulation for as long as possible and at their highest value, including through increasing reuse, repair and remanufacture, helping to grow the economy and boost employment.

On 27 February 2024, the UK Government published a press release advising that the UK is to establish world's first UN-backed centre for circular economy research.

The centre will develop sustainable approaches to the circular economy and resource efficiency to enable carbon reduction and the transition to a greener future. The UK will help countries across the world to maximise the environmental and economic opportunities the circular economy offers.

Opening formally in April 2024, the centre comprises five institutions: **University College London (UCL), University of Exeter, Brunel University London, Swansea University and the British Geological Survey.**

Co-ordinated by a government funded UNECE research manager based in Geneva, this coalition leverages their expertise to explore circularity in areas such as metals, construction and critical minerals to develop effective data, technological innovation, finance models and policy. The five participating institutions have together contributed £1.85 million to fund the centre's technical activities.
It is clearly early days, but this is a positive move in the right direction.
**Source – [https://www.gov.uk/government/news/uk-to-establish-worlds-first-un-backed-centre-for-circular-economy-research](https://www.gov.uk/government/news/uk-to-establish-worlds-first-un-backed-centre-for-circular-economy-research)**

The industry's professional bodies are also focused on sustainability and the **Chartered Institute of Building (CIOB)** has launched a new sustainability guide for built environment professionals.

*'The guide covers topics including sustainability development goals, green financing, embodied and operational carbon, biodiversity and social value. It offers practical tools and strategies to help readers embrace sustainable practices during the planning, construction and ongoing*

*operation of a building to support national and global efforts to reach net zero, while also improving the environment for surrounding communities.'*

The **CIOB** also offers online CPD courses to their members, covering the circular economy, to promote further understanding and spark interest in the subject.
**Source Chartered Institute of Building** [www.ciob.org](http://www.ciob.org)

## Challenges with setting up an effective circular supply chain.

Despite the potential advantages, the implementation and adoption of circular economy models in supply chains is hindered by a variety of barriers. The barriers include:

- A lack of awareness and knowledge among supply chain actors about the concept, benefits, and best practices of circular economy models.
- A lack of alignment and collaboration between suppliers and customers to share information, incentives, and responsibilities for circularity.
- A lack of supportive policies and regulations that encourage and enable circular economy models, such as extended producer responsibility, eco-design standards, and waste management systems.
- A lack of appropriate infrastructure and technology that facilitate circular economy models, such as reverse logistics, remanufacturing, and recycling facilities.

These obstacles must be addressed in order to ensure the successful implementation of circular economy models in supply chains and while many questions remain unanswered, there are many guides and papers on how this might be approached.

One such paper describes the approach as:
*The circular economy offers an opportunity for supply chain professionals to carry out such a redesign and address their core priorities:*

- *Increasing resilience*
- *Reducing costs*
- *Reducing GHG emissions*

*Traditional supply chains have been built to support a linear 'take-make-waste' model. To create a resilient system that is good for business, people, and the environment, a shift is needed to a circular economy that:*

- *Eliminates waste and pollution.*
- *Circulates products and materials.*
- *Regenerates nature*

*Such a paradigm shift has implications for all aspects of business, including the way supply chains are designed and managed.*
**Source -**
**https://emf.thirdlight.com/file/24/qzvD2i1qzHoww71qzhq5kk9O8/BuildingACircularSupplyChain_Factsheet.pdf**

This looks on the face of it like a sensible approach but while it sounds good, talking about it and actually doing it while remaining focused on the benefits and end goal is another matter. The main point has to be developing a clear vision and obtaining the engagement of all involved in the supply chain.

The focus must be on the benefits of circular economy models for supply chains, which include:

- Cost savings and improved efficiency through reduced demand for raw materials, energy, and disposal.
- Increased competitiveness and innovation through the creation of new markets, products, and services that meet customer demand and regulatory standards.
- Improved reputation and stakeholder relations through the demonstration of social and environmental responsibility and transparency.
- Mitigation of risks and uncertainties through increased resilience and adaptability to changing conditions and disruptions.

## *Why wouldn't everyone be interested?*

### Economic challenges resulting from customer behaviour (see also public perception and economic viability above).

The factors affecting consumer behaviour in the context of the circular economy are all economic factors. These are the balance of consumer needs and what's available, the level of information out there, social factors, and individual consumer preferences and beliefs.

The current policies mainly aim to give consumers information (e.g. eco-labels) and to a lesser extent to make circular alternatives more economically attractive.

Changing social factors and personal preferences by policy measures alone is seen to be more difficult.

Policies aiming to promote circular economy-consistent decisions by consumers will be most effective if they take account of the factors shaping individual behaviour and nudge consumers towards making choices that favour the greatest circularity.

Consumer choices when purchasing, using, and discarding products can potentially promote circular economy principles by increasing the demand for goods and services that are most consistent with circular economy principles. Some products are now beginning to trade on their eco-credentials and being seen to be attractive because sustainability is the priority.

Consumers are faced with consumption choices every day. In making choices, decisions favour actions representing either circular or linear consumer behaviour. For example, the

choice to buy unpackaged vegetables is based on the understanding that material resources are saved in producing the packaging and consumers might feel good about it.

These same principles could apply to the building repair economy to 'nudge' builders and other professionals as well as the clients commissioning the work in the direction of greater circularity.

## Barriers to the redesign of products

Buyers may avoid purchasing circular products that are more expensive than traditional goods. They may also perceive reusable and refurbished products as being lower quality.

Obviously, not all materials are fit for a circular economy. Some contain chemicals that are hazardous to humans or the environment. Additives are often used unintentionally or for performance reasons - such as improving flexibility or durability - but there are often ways to design them out.
By choosing materials that are safe and circular, it is possible to build a better offering for users, while ensuring that the products and services created fit within a circular economy.

Dematerialisation (reducing the resource requirements of designs) is all about finding solutions to deliver the desired outcome by using the minimum amount of material possible. This could mean finding ways of designing a product or service in such a way that it requires only a minimal amount of physical material to create.

A great example of this in construction is modular design.

This makes products easier to repair, remanufacture and upgrade. By making it easy to remove only part of a product, it is easier to disassemble, lowering the cost and effort to swap out components when they are damaged.

Additionally, modular systems are easier to customise and therefore adapt to the variable and forever needs of users, preventing products from becoming obsolete and ensuring they are kept in use for long periods of time.

Modular construction is a process in which a building is constructed off-site, under controlled plant conditions, using the same materials and designing to the same codes and standards as conventionally built facilities – but in about half the time.

The factory-controlled process generates less waste, creates fewer site disturbances and allows for tighter construction.

Modular buildings can be disassembled, and the modules relocated or refurbished for new use, reducing the demand for raw materials and minimizing the amount of energy expended to create a building to meet the new need.

When building in a factory, waste is eliminated by recycling materials, controlling inventory and protecting building materials.

Again, there are many papers on this strategy and some manufacturers of building products are leading the way.
**Example sources -** https://www.wernick.co.uk/article/circular-economy/
https://guidehouseinsights.com/news-and-views/modular-buildings-and-the-circular-economy
https://www.ice.org.uk/media/ljjbypbi/towards-construction-circular-economy_latest.pdf

## Unclear legislation in the UK

The UK Government say that the UK is committed to moving towards a more circular economy to keep resources in use as long as possible, extracting maximum value from them, minimizing waste and promoting resource efficiency. **The Circular Economy Package (CEP)** introduces a revised legislative framework, identifying steps for the reduction of waste and establishing an ambitious and credible long-term path for waste management and recycling.

While this sounds great, it is only a policy paper and there is no corresponding legislation yet. However, there are a series of **DEFRA** directives covering waste, packaging, landfill as well as more specific directives covering waste batteries and electronic equipment, effectively supporting legislation.

There is nothing specifically covering the construction circular economy at this time.

## Building Research Establishment Environmental Assessment Methodology (BREEAM)

**BREEAM** is owned by the **Building Research Establishment (BRE)** which is a profit-for-purpose organisation with over 100 years of building science and research background.

**BREEAM** is quoted as being 'the world's leading science-based suite of validation and certification systems for a sustainable built environment'.

While there is a focus on new construction, **BREEAM** Refurbishment and fit-out standards provide a framework to deliver projects to a sustainable standard and, as they say, 'create positive environmental and social impact'.

A series of technical standards specified by **BREEAM** allows the organisation to then assess a building's sustainability credentials.

Buildings and projects are assessed using 9 basic criteria:

- Energy
- Land use and ecology

- Water
- Health & Wellbeing
- Pollution
- Transport
- Materials
- Waste
- Management

Using specific criteria, assessments are completed at the design stage (resulting in an interim certificate) and post-construction where a final certificate is issued along with a rating.

While this is great for new build and large renovation projects, it is of less benefit to repair and restoration work.

There are fees that apply depending on the assessments and the question must be whether the assessments and certificates actually change anything in practice.

For more information see their website https://bregroup.com/products/breeam

These next two barriers are critical to the building repair sector's circular economy.

## Lack of availability of alternative products at affordable prices

While 60% of UK businesses say the circular economy is important, according to new research by **YouGov**, for 36% of respondents, the perceived cost was the biggest barrier to being more sustainable.

The building repair sector, including insurance claims is driven by cost and there is little or no incentive to pay more for sustainable materials. The sector has seen material costs rise massively since 2020 but this has not closed the gap between conventional, linear economy materials and alternative, more sustainable products. Alternatives are being developed but are still more expensive and hard to source and will remain so until more investment is made.

Incentives to develop alternative materials will come from incentives for the buyers to buy sustainable materials. Currently, there are few, if any incentives to select alternative materials over standard, unsustainable materials.

## High cost of recycling materials

Sustainable materials, such as recycled steel, bamboo, reclaimed wood, and energy efficient insulation, may have higher upfront costs compared to traditional materials. This is a short-term view, and sustainable materials often contribute to energy efficiency and lower operational costs over the lifetime of a building.

Durability and low maintenance requirements can also result in long term cost savings. Materials like recycled metal or concrete tend to have longer lifespans, reducing the need for replacements or repairs.

The perceived high cost of recycling also depends on the material being recycled and a lot of the cost comes from separating the different materials, especially when taking them from a demolished building. Waste and recycling companies require the different materials to be separated and there are high labour costs associated with separating wood from steel and plaster and glass, etc., as this has to be done manually, generally on site. This is not always easy, especially on small sites with only a limited quantity of material to recycle.

However, there is an increasing awareness of environmental issues, and with that comes a growing market demand for sustainable buildings and building methods. Choosing sustainable materials can enhance the market value of a property and attract environmentally conscious tenants or buyers.

As demand for sustainable materials increases and technology advances, prices of alternative materials are likely to become more competitive.

Without legislation, the hope is that as demand increases for recycled materials, innovative recycling methods will emerge, recycling will become easier, and the cost of recycling will reduce.

Legislation making waste disposal more difficult and expensive is likely to accelerate this progress to the point where separating waste is easier, resulting in more materials entering the circular economy.

# A focus on recycling building materials

A paper produced by the Green Construction Board (pa rt of the Construction Leadership Council) called Zero Avoidable Waste in Construction states that at end of life, construction materials should be reused before being recycled, whilst ensuring minimal environmental impact.

Waste Statistics collated by Defra show that in 2016**, 63 %** (120 million tonnes) of the **total waste stream in England (189 million tonnes) was attributed to construction**, **demolition and excavation waste.** Government statistics also record that **over 90% of the construction and demolition waste (C&D) is recovered** and downcycled for future use as aggregates. This still leaves **nearly 5 million tonnes sent to landfill**, about which little is known.

The numbers are huge but means that there are many opportunities for construction materials to be recycled due to the large variety and huge quantities of materials used in the construction industry.

There are also huge benefits associated with recycling waste from construction projects, particularly in repair and refurbishment. Recycling waste reduces disposal costs and carbon emissions. It also helps comply with environmental legislation and restrictions on what can be sent to landfill.

Often the materials used on construction sites are a mixture of waste (new, unused) materials and mixed materials that may already contain a level of recycled materials. This can make recycling difficult as separating the different types is not as easy, just as it is for us when we put out household recycling.

**However, there are some simple, yet effective changes builders can make to their operations to allow more waste to be recycled.**

There are many different types of material that can be recycled from construction and demolition projects, particularly:

- plasterboard
- soil waste
- aggregates
- metals
- plastics
- glass
- wood
- bricks and blocks
- floor and wall coverings




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- insulation
- packaging

The options for dealing with these materials vary, depending on the type of material and how easy and profitable it is to recycle and reuse it.

## Soil Waste

58% of the tonnage received by landfills is soil waste and while soil may not be a building material as such, it is often a byproduct of construction, and its use has a significant impact on the health of our environment.
**Source - Society for the Environment's**

A lot of good practice already exists on how best to reuse, recover and recycle soil material but an awareness of this needs to reach those who work with these materials on a daily basis.

That's where Society for the Environment's (SocEnv) Soils and Stones project comes in. Since 2019, the project aims to expand the adoption of good practice across sectors and influence key decision-makers to implement policies which recognise the value of soils and stones.

The project has three key aims, to lead the way and deliver change, through:

1. Sharing good practice on soils use/re-use.
2. Advocating for policies which recognise the value of these hugely valuable resources.
3. Making connections and finding solutions via collaboration.

The project has gone on to produce several key reports and given evidence to the Soil Health Enquiry in 2023. They have also produced a framework against which existing legislation can be measured and improved.

SocEnv have produced The Ten Principles of Good Soils and Stones Management, and number 6 includes:

***Define the status of any excavated soils and stones according to their value as an end-use resource and avoid the intention to discard them as surplus to the needs of the project.***

The purpose of the ten principles is to give soils a quantifiable value and amongst other things, will 'present a hierarchy of options for excavated soils, stones and dredgings'.

Where excavation cannot be avoided, understanding how soil can be reused and kept within the economy, rather than treating it as a waste product, will reduce landfill, reduce CO2 emissions and have a positive effect on the health of the natural environment.

# Recycling aggregates

Aggregates are raw materials that are produced from natural sources and extracted from pits and quarries, including gravel, crushed stone, and sand. When used with a binding medium, like water, cement, and asphalt, they are used to form compound materials, such as asphalt concrete and Portland cement concrete.

Approximately 275 million tonnes of aggregates are used each year in the United Kingdom as raw construction materials. Of this, around 70 million tonnes are already derived from recycled or secondary sources.
**Source - UK Construction blog**

There is potential to recycle more aggregates from construction, demolition and excavation wastes that are currently being sent to landfill. Higher volumes obviously make the operation of separating the different materials challenging but it should be possible to keep broken up concrete and stone separate from steel, earth and soil for example.

There are already mobile concrete crushing plants suitable to place on larger, brownfield sites such as housing developments, where areas of concrete need to be broken up. The crushed material can then be used to form hardstanding bases for example. This saves on transport and material costs, reducing CO2 emissions in the process.

## Standards in recycling aggregates

Published standards for aggregates describe how recycled and secondary aggregates can be used across a broad range of applications. The standards cover aggregates produced from natural, recycled and manufactured materials. It focuses on fitness for purpose and does not discriminate between different resources.

The quality protocol for the production of aggregates from inert waste deals with the production of aggregates from inert construction, demolition and excavation waste.

The protocol sets a benchmark for recycled aggregate production and for demonstrating the point at which a waste material is considered to be fully recovered and so no longer subject to waste regulations.


**Source – Environment Agency**




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# Recycling plastic from construction projects

It might surprise some, but it is a fact that the Construction sector is the second highest user of plastics after packaging.
**Source - British Plastics Federation – BPF**

Changes to the industry are being accelerated through an increase in demand for housing, coupled with new regulations which are intended to make the industry more energy efficient, manage waste, recycle and take LCA (life cycle analysis) into consideration.

Plastics are one area that has a growing range of applications in the construction industry. They are very versatile, with an excellent strength to weight ratio, they are durable and cost effective, have low maintenance costs and are corrosion resistance. All of which make plastics an economically attractive choice throughout the construction sector.

Potentially, plastics have even more uses as they are easily formable into complex shapes, and their light weight enables them to be easily transported and moved on site.

The construction industry has a tendency towards traditional materials, tried and tested methods and products - but plastics can offer opportunities for innovation.

Currently, plastics in construction are mainly used for seals, profiles (windows and doors), pipes, cables, floor coverings, and insulation.

Piping and Conduit are the largest users of polymers in construction and consume 35% of production. Cabling, rainwater goods, large diameter pipes for sewage, drainage and potable water are all made from PVC and Polyethylene.

Cladding and profiles for windows, doors, coving, and skirting made from PVC-U, exterior cladding using phenolic is replacing timber rather than traditional resins which have a minimum fire risk.

Seals and Gaskets are made from Elastomers whose main construction use is for weather strips, aperture seals, gaskets and expansion joints. The polymers used are chloroprene and EPDM which have weatherability, resistance to deformation and retain elasticity, and PVC in windows and doors, also as a membrane for roofing and linings. In addition, 250,000 tonnes of polymers are used as a base for adhesive systems and sealants.

Insulation is generally produced from Polystyrene rigid foam which is incorporated into panels or sandwiched into construction of walls and roofs. The insulation combines lightness and strength and is simple to install, and enables contractors to meet energy conservation regulations.




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One, often forgotten advantage of plastic is that pipes, particularly drainage and water pipes are very long lasting and act as a carbon 'sink', unlikely to be disturbed for many years.

The main causes of plastic waste include:

- Packaging (around 25 per cent of construction packaging waste).
- Over ordering and disposal of off-cuts and unused materials.
- Over-specified project design.
- Poor storage and handling.
- Site workers' food packaging.
- A lack of recycling options for plastic.

Nearly all types of plastics can be recycled and because plastics are a finite resource, the best outcome is to recycle after their initial use.

Recycling rates in the UK have increased massively in recent years and continue to grow year on year. In 2000 13,000 tonnes of plastic bottles were recycled and last year, the UK collected 390,000 tonnes of plastic bottles for recycling.
(**source UK Household Plastics Collection Survey 2021**)

In the UK:
86% of plastic packaging is recovered (not sent to landfill and repurposed) and 49% is recycled.
81% of post-consumer plastic is recovered and 37% of all plastic is recycled.
**(source www.plasticseurope.org)**

Examples of plastic that can be recycled include:

- Polyethylene terephthalate (PET). (water bottles, etc)
- High density polyethylene (HDPE). (carrier bags, kitchenware, cable insulation, etc)
- Low density polyethylene (LDPE). (heavy duty sacks, gas and water pipes, packaging, etc)
- Polypropylene (PP). (buckets, crates, etc)
- Polyvinyl chloride (PVC). (Window frames, water and drainpipes, flooring, roofing membrane, etc)
- Polystyrene. (rigid packaging, boxes, etc)
- ABS (a copolymer of acrylonitrile, butadiene, and styrene) polymers.

As more plastic is recovered and recycled, it provides increasing amounts of raw material for the recycling sector, which can be used for either 'closed loop' or 'open loop' recycling.

Closed loop recycling means a product is recycled into another, almost identical product. A simple example of this is recycling a PET drink bottle into a new PET drink bottle. Open loop recycling means a product is turned into a new type of product. For example, recycled plastic packaging could end up in a plastic water pipe, a park bench or even a pair of trainers. Both

methods are equally valuable in terms of producing products and keeping the material in use.

However, there are some barriers to recycling plastic, particularly the related financial costs. For example:

- Transportation costs - plastics are bulky and expensive to transport and store.
- Separation costs - different varieties of plastic and mixed plastics contain different dyes and additives which produce poor quality recycled material unless separated.
- It can be cheaper and easier to use new plastic rather than recycled plastic.
- Most plastic can only be recycled once.

**All this involves the builder making changes to their site operations and there is often no incentive to do this. There are some simple yet effective changes that can be made to reduce plastic waste and allow more to be recycled including:**

- **Separating plastic waste made of different polymers to reduce contamination**
- **Providing staff with training in handling**
- **Recovering materials and not sending to landfill**
- **Improving transport procedures**
- **Improving design - e.g. plastic pipe networks can be designed to use as fewer fittings**

### Potential end uses for recovered plastic

Recovered plastic can be used in construction for damp proof membrane, drainage pipes, ducting and flooring. It can also be used in many other applications including:

- As a filler (thermoset plastics)
- Packaging
- Landscaping - e.g. walkways, jetties, pontoons, bridges, fences, and signs
- Textile fibre and clothing - polyester fleece clothing and polyester filling for duvets and coats is frequently made from recycled bottles
- Street furniture - e.g. seating, bins, street signs and planters
- Bin liners and refuse sacks
- Traffic management products and industrial strapping

## Recycling glass from construction projects

Glass is a material made from liquid sand. It is the name given to any amorphous (non-crystalline) solid that displays a glass transition near its melting point which is around 1,700°C (3,090°F).
Silicate glass is the most common form, which is mainly silica or silicon dioxide, $SiO_2$. Impurities or additional elements and compounds added to the silicate to change the colour and other properties of the glass.

Glass is a versatile material used in the building industry for a long time and is used for a diverse range of building materials, including floors, partitions, windows, skylights, and much more.
Innovation has developed so that glass comes in many variations of shape and form and has become a sustainable material.

Although glass is a 97% recyclable material, end-of-life glass used in construction often ends up in landfill rather than being recycled.

In 2018, almost 200,00 tonnes of glass from construction sites in the UK was sent to landfill.
(source UKGBC)

Glass can be recycled indefinitely within construction, creating a sustainable stream of materials. As a result, Europe could avoid 925,000 tonnes of landfill every year.
Every tonne of recycled glass saves 1.2 tonnes of raw material.
**source www.arup.com**

For every tonne of recycled glass added to the furnace, 250-300kg fewer CO2 emissions are emitted and recycled glass reduces air and water pollution by about 20% to 40%.
**source www.glassonweb.com and www.norcalcompactors.net**

Most glass waste is produced by demolition projects and the replacement of windows in refurbishment projects (flat glass) and there are companies that recycle between 75% and 97% of clean and mixed plate glass.

The main causes of glass wastage are:

- over ordering of materials.
- breakages during installation.
- damage during storage.

**source nibusinessinfo.co.uk**

Builders can recycle waste glass produced on a construction site by:

- crushing.
- screening to remove contamination.
- air classification.
- optical sorting.
- size classification.
- washing and drying.

**source nibusinessinfo.co.uk**

Recovered glass can also be used for:

- aggregates.
- decorative materials.
- fluxing agent in the manufacture of bricks and ceramics.

- filtration medium.
- insulation.
- containers.
- sports turf applications.
- abrasives.

**source** [nibusinessinfo.co.uk]

However, there are some limitations on using recycled glass. For example:

- glass extraction and recovery can be expensive
- loading and transporting glass to cullet collection centres can cost money
- flat glass can be contaminated, which requires reprocessing before reuse

Again, this involves the builder making changes to their site operations but some changes to can be made to reduce glass waste and allow more to be recycled by:

- providing staff with training in the handling of materials
- separating glass waste to avoid damage and contamination
- providing dedicated storage areas to reduce the risk of damage
- arranging for materials to be delivered at the time and place on site they are required to reduce the risk of breakages during handling and storage
- arranging transport to move glass waste to cullet collection centres
- keeping records to prevent over ordering and minimise stock held on site

## Recycling wood from construction projects

After concrete and plasterboard, wood is the second greatest source of construction and demolition waste. In the UK, wood contributes between 20-30% of all construction debris and it accounts for almost 10% of all material sent to landfills each year.

It is believed that as much as 10-15% of wood on new construction projects ends up in recycling or waste streams without being used at all.
**Source - National Waste Associates**

Most types of timber can be recycled, and waste wood can come in a variety of forms from medium density fibreboard (MDF) and plywood sheets, packaging (pallets and crates), structural timer, windows and doors (and frames), floorboards to formwork and shuttering.

### Recycling options for wood

The categories of wood which can be recycled are generally considered to be mainly from:

- Manufacturing wood wastes - unwanted, new material, easily collected at the manufacturing premises.
- Reclaimable and recyclable wood materials - generally from demolition and construction, including packaging and the wood is chipped for other uses, excluding architectural salvage.

- Non-reclaimable and non-recyclable wood wastes - could include old fencing, laminated floor coverings and rotten windows and doors where they cannot be chipped or reused.

There is a ready and thriving market in architectural salvage where unwanted timer items are repurposed and incorporated into a restoration project. It is, however, relatively low volume and while useful in terms of keeping waste timber in use, does not make a huge impact.

The real limitations to recycling timber from building demolition and refurbishment are the level of contamination (glue, paint, and nails) and the limited waste management options and facilities on site.

**Builders can make simple but effective changes to the site's operations to allow more wood to be recycled by separating wood waste to avoid contamination, providing a secure storage area to protect the materials, and arranging transport for its collection at regular intervals.**
**All this will also involve training staff in waste reduction and waste handling to ensure wood waste can be recycled effectively.**

There is a low profitability level (mainly due to the high labour input required to 'clean' the material) and a limited market for things like recycles laminate flooring.

Reclaimed wood can be used to produce building materials such as chipboard, oriented strand board and fibreboard, play surfaces, pathways and landscaping and other items such as fibre composites, logs, fuel chips, liquid fuel, and biofuel.

## Recycling bricks and blocks from construction projects

Bricks are widely considered to be man's first manufactured product; they're predominantly used in the construction and manufacturing industries and their popularity means we produce large volumes of brick waste each year.

Bricks have a lifespan of more than 200 years, and we can reclaim or recycle bricks and blocks which have previously been used in the construction of buildings, walls, paving and infrastructure, such as bridges and sewers.

2.6 billion bricks were used in 2019 in the UK and over 500 million of these were imported due to a
shortage in the domestic supply.
**Source UK Green Building Council (UKGBC)**

The most common sources of brick and block waste include items that are damaged during unloading, storage and cutting, and excess due to over ordering but demolition can provide a source of damaged and reclaimed bricks.

Undamaged bricks and blocks can be reclaimed and used in new building projects or sold to businesses dealing in reclaimed bricks.

Damaged bricks and blocks can be recycled to make aggregate for use as general fill or highway sub-base or landscaping and also used to make sports surfaces such as tennis courts and athletics tracks.
There is also a process enabling damaged bricks to produce new bricks and blocks.

However, as with all recycling, there are some limitations when recycling bricks and blocks. The most significant is that bricks can be contaminated by other construction waste, such as plaster, paint, and metal products such as wall ties. Cleaning bricks is labour intensive and not always possible.

While new bricks are expensive and many recycled bricks similar in price, new blocks are cheap to buy, making recycling less attractive.

Finally, it is hard to assess the load-bearing capacity of recycled bricks, so usage is limited to decorative rather than structural applications. Reclaimed bricks are worth more than bricks which are recycled as aggregate. It is easier to source reclaimed bricks left over from new build projects, but more difficult with demolition projects.

**Builders can make some changes to the site's operations to reduce wastage and allow more waste to be recycled but one of the most effective actions is planning during the design stage to minimise the need for cutting bricks and blocks and using a lime-based mortar rather than a cement-based mortar -allowing the bricks to be recovered and reused.**

## Innovation

A research team at Heriot-Watt University has developed the world's first building brick made from 90% recycled construction and demolition waste.
The "eco brick", called the K-Briq, is unfired, producing a tenth of the CO2 emissions of a regular fired clay brick and requires less than a tenth of the energy to manufacture.

## Recycling floor and wall coverings from construction projects

Waste from floor and wall coverings includes:

- Carpet.
- Carpet tiles.

- Vinyl and linoleum.
- laminate flooring.
- Wood.
- Ceramic and terrazzo tiles.
- Wallpaper.

These items can become waste if they are damaged during handling and storage are not cut to fit efficiently when laying. This is compounded if waste is not considered properly at the design stage, leading to excess due to over ordering or if they are wrongly selected and therefore not used.

There are recycling options for floor and wall coverings such as selling waste to social enterprises that recondition and refurbish floor and wall coverings or specialist recycling services which recover carpet fibres as plastics recyclate and sell on to the plastics and horticultural markets.

Floor and wall covering waste can also be used for road cone manufacture, animal bedding material and polypropylene bead manufacture.

However, there are some limitations on using recycled floor and wall coverings.
There is a limited market for recycled 'glued-together' laminate flooring and for recycled carpet at the current time.

It is hard to tell apart the different polymers commonly used across different carpet types - e.g. polypropylene, wool rich and nylon and the composite nature of carpets means the material is difficult to separate.

**Builders and developers should consider making changes to their operations to reduce flooring and wall covering waste by not over ordering and reusing spare tiles or unfinished rolls of material on other projects. They can also allow more to be recycled by storing in areas that reduce waste from water and accidental damage.**

## Recycling insulation from construction projects

Most insulation waste comes from demolition and refurbishment projects. The amount of waste generated during installation depends on the type of insulation. Insulation materials include:

- glass and stone wool.
- Polystyrene.
- sheep's wool.
- spray foam.
- Polyurethane.
- Fibreboard.

The main causes of insulation wastage are similar to other areas and are mainly due to poor process or practice. This includes over ordering or ordering the wrong insulation type or thickness, over-designed projects or poor pre-formed design. Poor storage and handling is a common theme in construction waste.

The options for recycling waste insulation produced on a construction site are limited mainly to direct reuse of off-cuts and making efficient use rather than disposing of them. Otherwise, the waste needs to be stored and sent to a compressed stone wool ceiling tile manufacture or similar, but this involves the removal of impurities such as screws and nails, a time consuming process.

There are other limitations to recycling insulation as well dealing with waste contaminated by mortar, wood, bitumen or asbestos for example. There is a lack of specialised recycling facilities for such a low value of material and a lack of end markets. In addition, low-density waste means large areas are needed for waste storage, which is often an issue on construction sites.

**As before, Builders and developers should consider making changes to their operations to reduce waste by not over ordering and reusing offcuts elsewhere on site or even on other projects. They can also train staff better in the handling of materials and the importance of recovering materials and not sending them to landfill.**

## How to recycle packaging at construction sites

Most of the packaging that construction work generates can be recycled and not sent to landfill. Some packaging for hazardous materials may need special handling, but even this packaging can be successfully recycled. Some of the main materials on site that are ideal for recycling include:

- metals, such as aluminium and steel
- untreated and uncontaminated timber
- paper and cardboard
- plastics

One of the main barriers to effective recycling is that often only low levels of materials are produced. Builders may be able to remedy this issue by collecting waste products over time in clearly identified bins. Training and education about waste and recycling is vital to ensure the maximum number of materials are recycled.

**There are a number of measures builders can put in place that will maximise the levels of waste that can be recycled. There is a national colour-coding scheme for waste containers to ensure waste is separated efficiently and local recycling services can be contacted for collection thresholds and prices. Pallets to be returned to the supplier and even investigating the potential of a shared collection scheme to reduce costs and maximise recycling levels.**

**They could also consider using off-site manufacture and assembly of products - for example bathrooms - that will help to reduce on-site packaging waste and sending any packaging that can't be recycled to a licensed Waste Management Contractor, who will be best placed to decide its destination.**

**Finally, clean cardboard and paper can be composted, so why not find a local community group who can take this material.**




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# A closer look at two areas of recycling – copper pipe and plasterboard

## Copper in construction

Copper has the longest recycling history of any material known to civilization, as it is infinitely recyclable and can be used again and again without losing any of its properties. It is estimated that in the last one hundred years, two-thirds of the 690 million tonnes of copper produced are still in productive use.
**Source – The International Copper Association (ICA)**

The Copper Sustainability Partnership (CuSP) was created by two competing copper tube manufacturers, Lawton Tubes and Mueller Europe, who have joined forces to promote the environmental benefits of copper.
They say that *the demand for copper in construction is arguably greater than ever before, with the urgency of the climate crisis calling for sustainable building materials like copper that meet the needs of the circular economy.*

Copper is an infinitely recyclable material that can be recovered and recycled time and time again without any loss of quality. From copper pipes used in plumbing systems to copper wires found in wiring and roof sheeting, all types of copper products can be recycled.

Since there's no difference in properties between recycled and virgin copper, the two can be used interchangeably across the full range of the material's applications.
**Source - www.cuspuk.com**

Construction and plumbing are known for having a strong circular economy when it comes to the use and re-use of copper, with the demand for the metal met increasingly by a secondary supply of recycled copper.

Scrap copper from old or redundant pipework, roofing sheets or electrical wiring is recovered and sent to specialist copper recycling facilities, where it is melted down in a furnace and then cast into new products.

As recycling techniques improve, the proportion of secondary copper in circulation will continue to increase and the need to mine will continue to decline.

In construction, scrap copper can be recovered from old plumbing, heating and fire sprinkler systems, as well as the valves and fittings used in copper pipework.
In many cases, copper pipes are likely to be fixed to brass fittings and tin soldering and these must be removed before the copper pipes can be recycled.




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Construction is estimated to use 25% of all copper and that around 75% of copper products are manufactured using recycled copper.
**Source – International Copper Study Group (ICSG)**

There are no issues with the quality as recycled copper offers the same standards of performance as virgin copper.
It's estimated that copper recycling uses up to 85% less energy than mining virgin copper and is also believed to be as much as 13 times cheaper.
**Source – International Copper Study Group (ICSG)**

These two facts alone are a sufficient incentive for anyone to use recycled copper and its likely most consumers have no idea whether the pipe or wiring they are using, is manufactured from recycled copper or virgin material.

Surely, this is the most sustainable material in construction.

## Plasterboard

The disposing of waste plasterboard is one of the building industry's biggest issues. More than 2.5 million tonnes of plasterboard is used in the UK's construction industry each year but the amount of plasterboard waste from demolition and refurbishment projects is estimated to be more than 1 million tonnes per year.
**Source** **www.nibusinessinfo.co.uk**

Plasterboard is also one of the industry's most wasted products due to over-ordering, poor storage and transport methods, lack of care when installing and a general lack of consideration, mainly because it is considered a 'cheap' material.

Plasterboard and other waste gypsum products are now considered as hazardous waste and can no longer be put into landfill sites with biodegradable waste. So, the incentive must be to reduce waste (saving costs) and the opportunity is there to increase the amount of plasterboard available for recycling.

While it is relatively easy to recycle plasterboard off-cuts, recycling plasterboard that has been fixed, skimmed and painted is harder because it is mixed with other materials.

Recycled gypsum from clean waste plasterboard can be used in a variety of applications which currently use gypsum from natural or synthetic sources - such as cement and Plaster of Paris - as well as having a number of uses in the food and toiletries industries.

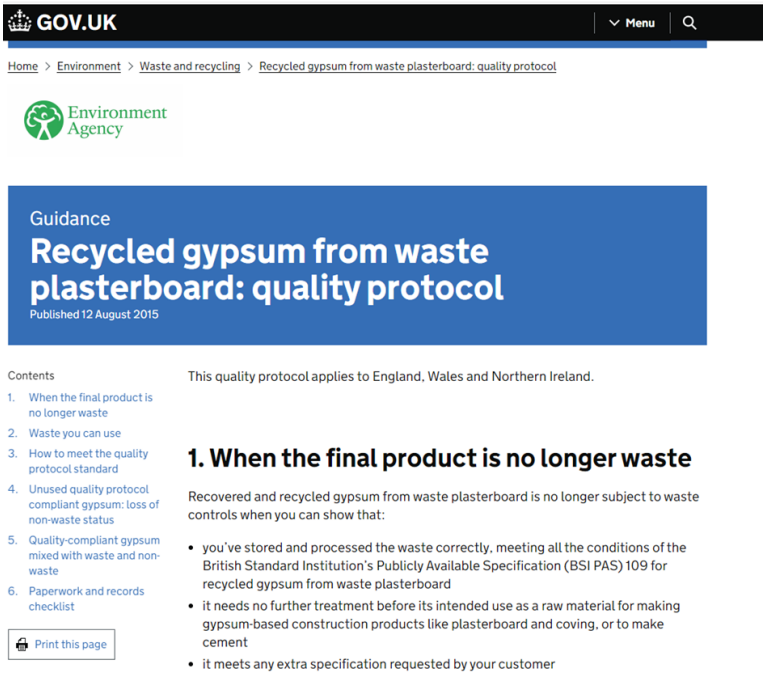
Where there is a problem, there is an opportunity and here, the opportunity is to establish a way to recycle plasterboard and gypsum products and get them into the existing markets.

There are standards and protocols for recycled plasterboard and these standards contain criteria that have to be met. The advantage is  that by complying with a quality protocol also means that waste controls, such as using waste transfer notes when you transport the materials, do not apply.

Publicly Available Specification (PAS) 109 sets minimum requirements for the production of recycled gypsum, covering:

- selection, receipt and handling of input materials
- specifications of product grades
- storage, labelling, dispatch and traceability of the products

It also sets out requirements for a quality management system to make sure that recycled gypsum being produced is fit for its intended use.



GOV.UK Menu

Home > Environment > Waste and recycling > Recycled gypsum from waste plasterboard: quality protocol

Environment Agency

Guidance

**Recycled gypsum from waste plasterboard: quality protocol**

Published 12 August 2015

Contents

1. When the final product is no longer waste
2. Waste you can use
3. How to meet the quality protocol standard
4. Unused quality protocol compliant gypsum: loss of non-waste status
5. Quality-compliant gypsum mixed with waste and non-waste
6. Paperwork and records checklist

Print this page

This quality protocol applies to England, Wales and Northern Ireland.

**1. When the final product is no longer waste**

Recovered and recycled gypsum from waste plasterboard is no longer subject to waste controls when you can show that:

- you've stored and processed the waste correctly, meeting all the conditions of the British Standard Institution's Publicly Available Specification (BSI PAS) 109 for recycled gypsum from waste plasterboard
- it needs no further treatment before its intended use as a raw material for making gypsum-based construction products like plasterboard and coving, or to make cement
- it meets any extra specification requested by your customer

Surely, this is a product worth focusing on to reduce waste and increase recycling?

These two basic building materials are at contracting ends of the recycling spectrum – most of the copper used in construction is recycled but hardly any plasterboard is – yet.

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# Insurance building claims and repairs

While all this is interesting, how does it affect building  claims and repairs following an insurance claim?

It is of some concern to insurance providers that building claim costs continue to increase and escape of water costs has been a hot topic for some years now. The reality is that building repair costs as a whole have increased dramatically since 2020 due to a number of different factors.  As such at this time, it is understandable that insurance providers may not want to pay even more for sustainable materials instead of cheaper, well established building materials.

New and innovative sustainable materials are becoming available and at the moment, they are relatively expensive, mainly because they are produced in limited quantities.

However, recycling new waste and materials removed for repair could be encouraged along with the use of more recycled materials. While it is labour intensive and therefore does incur some additional cost, it would be a more sustainable approach.

This paper looks at the circular economy in some detail but there are a lot of questions that need to be addressed. Insurers and their suppliers are in a great position to explore and answer some of these questions, especially around the supply chain.

We are already seeing the effects of our changing climate so it makes sense to explore what more can be done by the industry to tackle the problem.  This may mean short term pain in increased costs for longer term gain.  Ultimately, embracing circularity in building repairs could help lower emissions, reduce losses and secure a brighter future for property insurance.

# The broader carbon footprint of construction and repair

Embodied carbon is just one factor when considering carbon emissions associated with a material. There is the risk of toxic emission release, such as chloride, formaldehyde, toluene and ethylbenzene. Another major concern is microplastics leaching out from plastic-based materials into waterways, posing a serious threat to marine life.

We also must consider the carbon cost of extracting the raw material, processing it, transport to the place of manufacture, manufacturing the final product, transporting to site, installing the product, wastage on site and disposal when the building is demolished.

A material such as timber, appears to be an ideal material for construction. It has low embodied carbon, it is sustainable, economic and has many uses. However, diesel and petrol

machinery is used to harvest and transport the raw material, gas is used to dry it and convert the logs to planks or sheets. It is then transported by road, rail or even sea, to be processed into the final product or sent to site. Here more energy is used to ensure the timber is suitable for its use, often creating a lot of waste.

Once incorporated into the building it acts as a carbon 'sink' until the building it is in is demolished, at which point - if the timber is burnt - all the carbon is released. It is therefore not a simple case of specifying low carbon materials because they may not be available, suitable for the application or the transport costs might simply outweigh the benefit of the material itself.

The construction industry has accepted a responsibility to reduce its carbon footprint and developments in materials, construction techniques, waste reduction, recycling and transport are continuing.

As discussed in our previous articles, there are some interesting innovations and low carbon materials are being developed as alternatives to traditional materials. The use of recycled materials is also increasing.

The industry will also have to look at reducing waste on site and at 'clean fuels' to power the machinery on site and used to transport materials.

# Longer term view needed

As consumers of the construction product, the costs for all this may be higher than traditional materials and methods until they become the 'norm'. Some of the materials can also be more economical to use in the whole life of the building, so as a building owner and user, the longer-term economics make sense.

Insurers may have a different view as they are not invested in the whole life cost of a building. They are paying for repairs to buildings owned by others following an insured event and will be focused on the repair cost.

The question therefore is what incentive there is for insurers to repair using low carbon alternative materials or techniques, when the cost of doing so is higher than repairing with traditional materials?

Adjusters have a duty to ensure that there is no 'betterment' when it comes to agreeing the repair specification. Any material that is of a higher standard/performs better could be considered betterment, especially if it costs more than the damaged material.




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If, for example, gypsum plasterboard has been damaged, an adjuster could not agree to a repair schedule that specified a low carbon and more expensive alternative under current policy wordings. That is, unless policies were to allow for such alternatives to be considered.

Any such wider view would need to be factored into the economics of the cost of Insurance and in respect of which debate we all have a contribution to make.

[i] https://www.metoffice.gov.uk/about-us/news-and-media/media-centre/weather-and-climate-news/2023/record-breaking-2022-indicative-of-future-uk-climate#:~:text=A%20new%20all%2Dtime%20temperature,in%20records%20back%20to%201884.

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