

Roadside Picnic:

The trade of reclaimed building materials in the UK

"There are objects for which we have found uses. We use them, but almost certainly not the way the visitors use them. I am positive that in the vast majority of cases we are hammering nails with microscopes."

**Boris and Arkady Strugatsky,
Roadside Picnic, 1972**



Prelude

On June 28th 2018, Charlie Rowley, a British citizen aged 45, could not believe his luck. He had found a discarded box with a fancy perfume bottle, the whole still under wraps. As an experienced scavenger, he was not very suspicious of what others threw away. Especially the dumpsters near shops and supermarkets contain so many items that are discarded for reasons quite incomprehensible. Perfume does not expire.

Two days later, he offered the perfume to his girlfriend, Dawn Sturgess. She opened the package and immediately tried it on. She sprayed a few drops on her wrists and rubbed them together. Less than fifteen minutes later, she started feeling terribly ill.

On 8 July, Sturgess died after doctors made the decision to switch off her life support. Rowley regained consciousness on 10 July and started piecing things together. The couple had been exposed to a Novichok, a nerve agent much similar to the one used in the poisoning of Sergei and Yulia Skripal in Salisbury, 13 km away, almost four months prior. Home Secretary Sajid Javid stated the most likely hypothesis was that the Novichok was in an item discarded after the Skripal attack. This led the leader of Wiltshire council, Lady Scott, to issue a warning: "If you haven't dropped it then don't pick it up!"

For anyone interested in reuse, the story is a perfect nightmare. It confirms all of the prejudices associated with waste materials. An item may look like a perfume bottle, a sound wooden beam, a perfectly useable floorboard, but when found in a dumpster; they may also be not. After all, someone decided for some reason to get rid of those materials. When dealing with waste materials, one cannot trust anything that has not been verified. Wood may contain worms or have been treated with toxic chemicals, steel profiles might have internal damage do to stresses, carpet might carry lice. The instincts that work so well in a DIY store (if its a dark green, it is waterproof) do not work outside of the commodified marketplacemarket place.

That is not to say that there aren't a whole bunch of materials in perfect condition being discarded. The amount of waste materials produced by the construction and demolition industry is astonishing. In western europe, rates of 300 to 500 kg of wasted building materials per capita per annum are fairly common. When an office tower is remodelled after just ten years, its entire content of partition walls, suspended ceilings, doors, raised floors, lighting fixtures and sanitary installations is being gutted, the motivation is typically not an infestation of the building by lice. More likely, the ambition is a 'freshening up' at the end of a lease, to give body to a change in corporate identity, or -in the case of total demolitions- to monetise on a spectacular rise in land value.

An assessment of the reuse potential of a component or material cannot be made without knowing the reasons why they ended up superfluous in their first use. One can reuse materials (documented, specific, conditioned), but to reuse waste (heterogenous, undocumented, bulky) is a risky undertaking. Furthermore, the usefulness of any material is conditioned by economical, logistical, technical and political systems. A fire rated door, even if properly marked and dismantled, can only be considered a fire door if its paperwork is in good order. Otherwise it is just a heavy door, impractical to install. To assess the merits of a used paver, one needs to know how pavers are being used, installed, and sold. An understanding on One needs to know how contractors operate as well as architects is necessary. Are pavers a dangerous waste material after having been ran over for decades by oil and gasoline spilling cars? Considerations on reuse of building materials are not just transdisciplinary, they are transversal.

Image: Household Building waste in Croydon, London.



The trade of reclaimed building materials in the UK

In northwest Europe less than 1% of building materials are salvaged after demolition. The disregarded materials are instead either landfilled or down-cycled. **Opalis.co.uk** is part of an attempt to reverse the trend.

Building materials are energy intensive to produce and ship. They contribute significantly to increase greenhouse gas levels in the atmosphere. Reuse of these building components extends their useful life, reduces the need for new materials, while creating very real economic benefits in the form of jobs. It is a valuable and often overlooked strategy for ecological transition.

Opalis.co.uk currently contains about 60 companies that are active in the salvage trade. We believe these companies are pioneers in a practice that should become the norm. Through research trips across the United Kingdom, we have visited these resellers to better understand how they operate within the design, demolition, construction and recycling industry. Our work is not finished, at least a few hundred more companies will have to be added to have a complete overview of the sector. Where traditional and antique materials are the most frequently traded, we envision a salvage industry that has a broader scope and also deals in more contemporary materials.

The Opalis UK project is an initiative of Rotor, a non-profit based in Brussels. The work was realised as a collective research with 13 students at the Architectural Association based in London.

“So where are we now? Well, in terms of reclamation the world has gone backward. Salvage used to be fairly easy and popular. The quantity of reclaimed building material reused in new modern sustainable and eco-friendly buildings is now minuscule. While demolition has increased, reuse has decreased. Indeed, a five star rated green building is allowed to have no reclaimed building material at all.”

*Thornton Kay,
on Salvoweb.com*

Image: Rose Green Tiles and Reclamation, Bristol

Identification panel for metal and wood, retrieved from Powerday recycling station, Willesden (London)

This panel is intended to help waste sorting workers to recognise different types of metal on the plant's conveyor belts. Typical recycling practices consists of shredding materials, using brute force, in small pieces, then sorting these in fractions (metals, wood mulch, plastic chunks...) that can be melted or glued together again in other facilities for the production of - often second-rate - new products. The process causes a huge entropy increase. Materials that enter recycling chains quickly turn unrecognizable. Reuse, on the other hand, transforms building elements only minimally; great care is taken to limit damage to the components during disassembly and transport, and to conserve their original shape and properties.



The attitude to rejected bits and pieces goes through two stages. First they are recognizably out of place, a threat to good order, and so are regarded as objectionable and vigorously brushed away. At this stage they have some identity: they can be seen to be unwanted bits of whatever it was they came from, hair or food or wrappings. This is the stage at which they are dangerous; their half-identity still clings to them and the clarity of the scene in which they obtrude is impaired by their presence. But a long process of pulverizing, dissolving and rotting awaits any physical things that have been recognised as dirt. In the end all identity is gone. The origin of the various bits and pieces is lost and they have entered in the mass of common rubbish. It is unpleasant to poke about in the refuse to try to recover anything, for this revives identity. So long as identity is absent, rubbish is not dangerous. It does not even create ambiguous perceptions since it clearly belongs in a defined place, a rubbish heap of one kind or another.

Mary Douglas

Purity and Danger. An analysis of concept of pollution and taboo, London and New York: Routledge, 1966

Reuse vs. Recycling

Let us start by distinguishing reuse from recycling. When an object or material is recycled, it is first broken down into small bits and loses its original form. Metals for example, a group of materials that are economical to recycle because of their high value, are shredded, melted, mixed with new ore, before finally being recast into a new form. These processes are typically spread out over several continents.

Reuse, on the other hand, is the practice of repurposing an element without much changing its original form and characteristics. The energy needed for recycling is much greater than the energy needed for simply retrieving and displacing the material locally, keeping it in its original form. Moreover, recycling processes usually greatly reduce the technical qualities of the materials involved which has led critics to refer to the practice as 'downcycling'. Recycling creates very little added value. It typically is little more than a waste management strategy, creating very low grade materials.

In the building trade, reuse practices have always been very common. The ancient Greeks, for instance, would reuse fragments of old ruins as a resource in order to build castles or forts. In 17th century England, it was very common to reuse construction materials such as bricks, as it made sound economic sense. In the period after WWII, in Europe, the practice was gradually marginalized. From the 1980 onwards, confronted with ever increasing quantities of building wastes and with filled up landfills, governments turned to recycling schemes as a way to divert part of the waste-streams.

Reuse is less promising as a waste diversion technique than recycling, because it requires a certain quality in materials for it to be economically and practically viable. However, when it is feasible, the advantages over conventional recycling are tremendous. Reuse creates local jobs and significant added value. And it does so locally.



Here we have an interesting notion... of there being elements of the universe which may make no rational whole in conjunction with other elements, and which, from the point of view of any system which those elements make up, can only be considered so much irrelevance and accident – so much 'dirt' as it were, and matter out of place.

William James,
The Varieties of Religious Experience. A Study in Human Nature Being, The Gifford Lectures on Natural Religion
Delivered at Edinburgh in 1901-1902

Images on preceding pages: Taken at Powerday, Willesden, London





CONSTRUCTION
&
DEMOLITION

&

COMMERCIAL
&
INDUSTRIAL

Powerday

Powerday



On the road

Over the past two months Diploma 18 have travelled through England and Wales exploring the industry for reclaimed building materials. During this time we were searching for businesses, resellers and service providers that would help us gain an insight into the current marketplace, first hand. An inventory of these business and visits can be found documented on our website, Opalis UK.

We first set out about the task of gathering this disparate information by organising the country into its 9 existing regions. No preference was given to either urban or rural territory, and we actively sought out both. Some of the trip itineraries were rigorously planned, and some were impromptu. Our primary source of transportation was by rail and road. In groups of 3 or 4 persons we made frequent overnight stops in villages, towns and pastoral Airbnbs. A car broke down, we crumpled another on some york stone (reclaimed, of course) and one of our fellow Diploma 18 students finally found a name for their newborn child. Throughout these eventful months we have got a taste for the English and Welsh countryside, and an introduction into its array of peculiarities.

A select result of this field research was the accumulation of over 250+ samples sourced from various reclamation yards from around the country. A cast-iron fireplace was transported by hand on a busy commuter train between Bristol and London. Some glass and clay bricks originate from the site of a former mental asylum on the outskirts of Preston. These are but a few brief anecdotes from our trip.

This book, and the exhibition it accompanies, are an attempt to start making sense of the information and materials gathered. Each student was asked to take a cue from a few of the samples gathered, and to speculate on their significance. What can salvage mean to architecture?

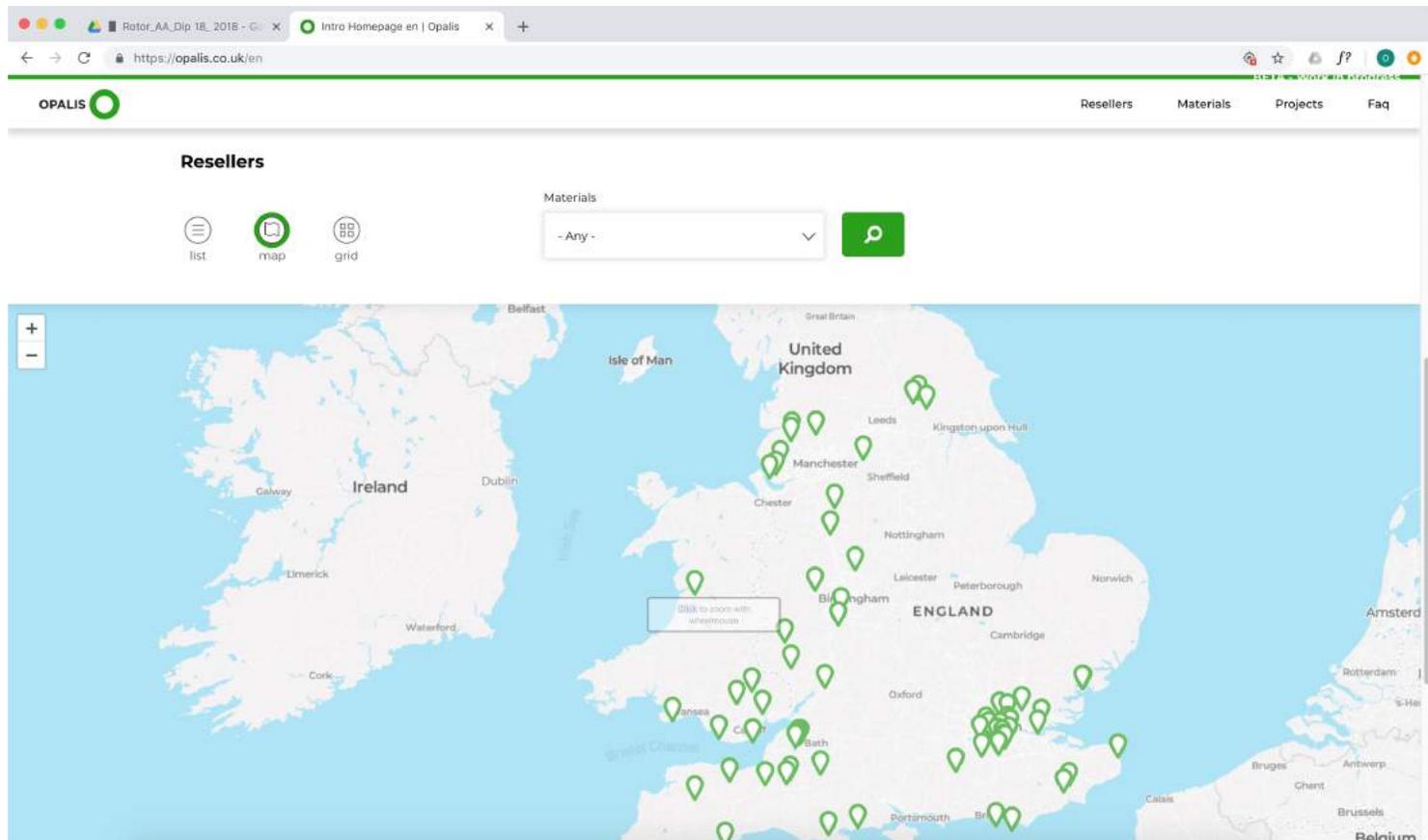
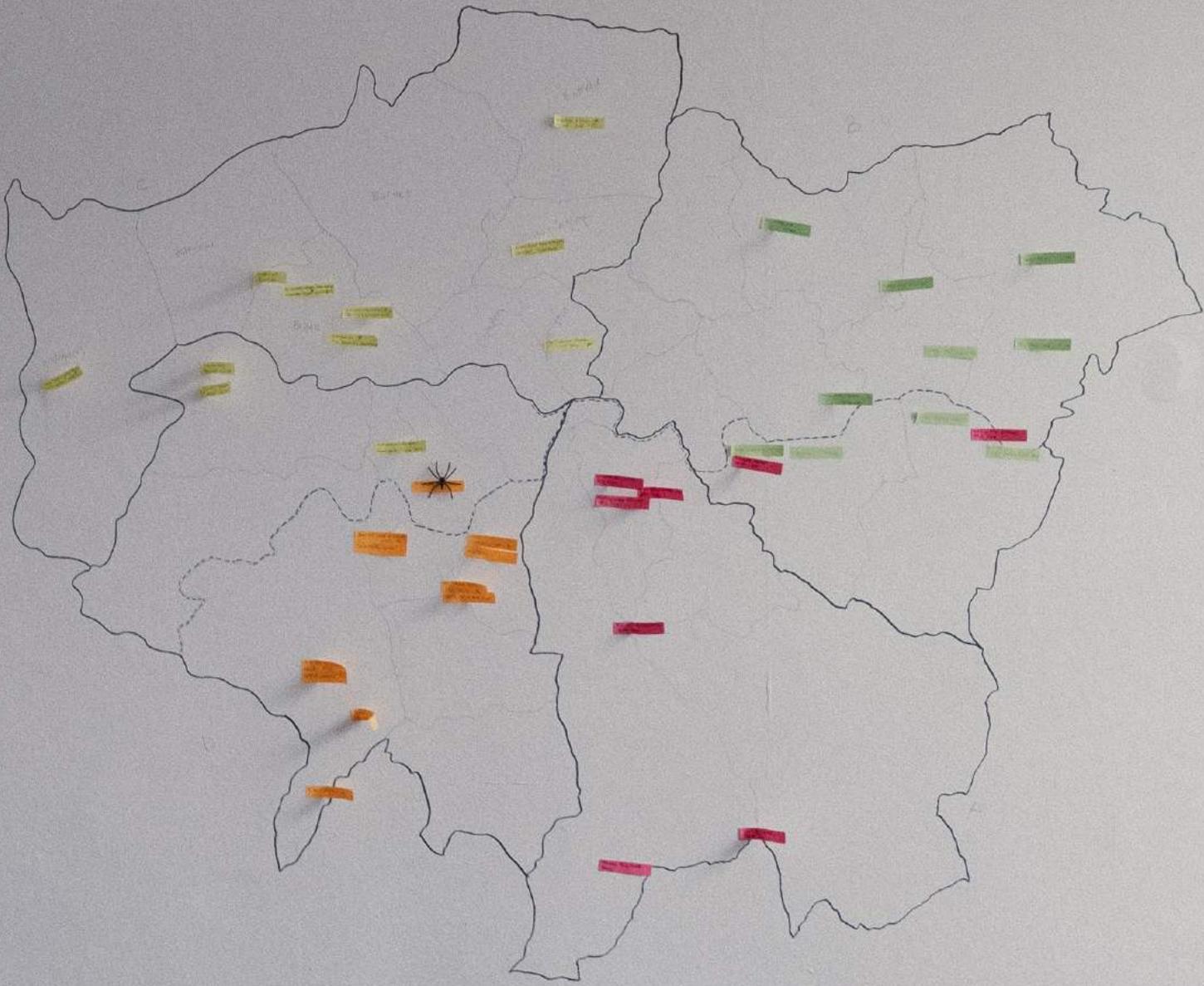


Image: Screenshot of Opalis UK website







Ashwells Reclaimed Tropical Timber

Located in Essex, Ashwells specialize in reclaimed tropical timber. They had been working in the recycling industry for over 50 years, and now for the past 20 years they decided to specialize in reclaiming and upcycling tropical hardwood. The majority of the timber comes from the coastlines from sea defenses. The other salvaged timbers are from fallen trees, landfill sites and demolition jobs. Ashwells works closely with designers, architects and project managers. They are very passionate about reclamation and believe in zero waste. They try to find ways to make use of all offcuts and by-products, which is their way of helping protect tropical habitats for future generations.





*Top Image: Trees felled due to HS2 development, reclaimed and sitting in the yard at Ashwells.
Lower Image: Workshop at Ashwells
Image on previous page: Stock of reclaimed tropical marine hardwood in the yard at Ashwells.*



Greenheart
T01 tropical hardwood
28 x 22 x 5 cm
origin: South America
1890s



End grain
T08 parquet flooring
17 x 9 x 4 cm
origin: America 1890s



Offcut of Greenheart
T02 tropical hardwood
34 x 12 x 2 cm
origin: South America
1890s



Ekki/Alobe
T16
30 x 9 x 1 cm
origin: West Africa



Greenheart
T03 tropical hardwood
56 x 10 x 0.5 cm
origin: South America
1890s



Jarrah wood with
charred edge,
T18 used in flooring,
cladding and marine
construction
38 x 5.5 x 2 cm
origin: Australia



Offcut of Greenheart
T04 tropical hardwood
27 x 5 x 5 cm
origin: South America
1890s



Purpleheart tropical
hardwood
T19
21.5 x 10 x 1 cm
origin: Central/South
America



Jarrah wood
T23 used in flooring,
cladding and marine
construction
55 x 5 x 2.5 cm
origin: Australia



Elm
T22 used in fenders
29 x 20 x 5 cm
origin: -

Samples obtained from Ashwells Reclaimed Tropical Timber, Upminster, East Anglia.

Aging gracefully?

Marion Beatrice Edmee Delaporte

A piece of 1920s wooden floorboard or a used piece of 2010 carpet tile?

Both objects have been used as a skin of a building, a floor, being in direct contact with the user. These materials have been used for a couple of years and that use has left a mark on them. Despite being used in the same way, the lifespan of one is considerably longer than the other.

A reused wooden floor is today considered a luxury material, while reused carpet tiles are without much value. Can we say the carpet tile as a material is doomed to become quickly obsolete, while wood is aging well?

In the case of the wooden floors, ageing made it more valuable. Their lifespan is not really limited. A floor out of solid hardwood can stay in a house without being replaced for decades and maybe even centuries. Furthermore, in today's market, the more a wooden floor ages, the more its looks are appreciated. Wear is a sign that the material has been used and had a lot of attention. Nevertheless, an aged piece of wood doesn't inspire disgust. Its patina increases the value of hardwood, because it still reveals the fact that it used to be a tree instead of revealing that people used to step on it every day.

Instead, wall to wall carpet tiling was invented in the 1960s. The idea was to have the comfortable noise cancelling material throughout an entire floor. Mostly used in large office spaces, these materials are being replaced regularly. Changing in style and colors and being easily replicable, their lifespan is short and this material is hardly being reused. In the UK about 165,000 tons of Carpet tiles end up in landfill each year. Besides the fact of hardly being reused, carpets contain flame retardants and substances to protect them against moths and fungus, which makes it impossible to recycle them. After being used for a couple of years these materials take the trace of the user. One can read the material and understand the time which it went through. Many of the carpet tiles ending up in landfill could technically still be used, but their worn out look makes them visually unappealing to a consumer.

Expecting a material not to change over the years is an illusion. Every material alters its physical state over time. It is a constant process of evolution in which a surface changes its properties. A material like a carpet tile will inspire disgust once being used but can it be defined as a material designed to become obsolete?

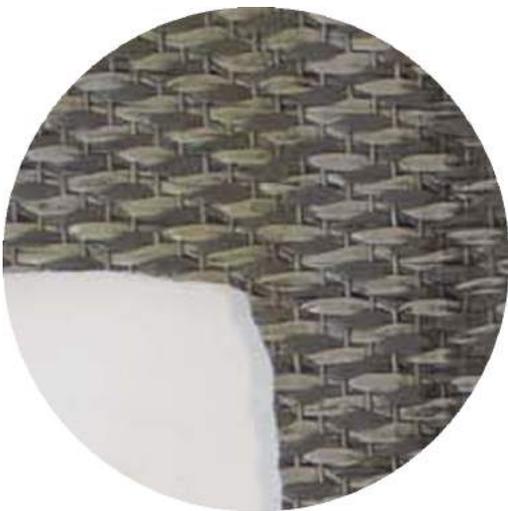
In production, carpet tiles are being replicated by a machine so that each piece looks exactly the same. This gives the user the idea that once a piece of carpet tile doesn't look immaculate anymore, it is flawed and has to be replaced. One could define it as an object that doesn't age well. A piece of wood instead is a material that will never have two exactly equal pieces. It is irregular and our eye is therefore used to see variations of wood and changes over time.

Many of the reclamation yards in the UK sell building materials which were produced before the 1950s. It is a sector that relies on the appreciation of the patina of materials, on affects. The way in which a material alters is crucial for this industry, as resellers want to sell qualitative materials which also have pleasant mental connotations (rural life, handmade things, natural materials, ...). Much of the reuse sector, a kind of a cottage industry in which materials age well and have a long lifespan, defines itself in opposition to the industrial production of new building materials, of which the carpet tile seems the embodiment. As a finishing material it is completely synthetic, cheap, easily replaceable, and has a short timespan. But more importantly, maybe, it elicits none of the pleasant connotations that more ancient, traditional or 'natural' materials carry along. Those connotations that make them candidates to be used and reused time and time again.

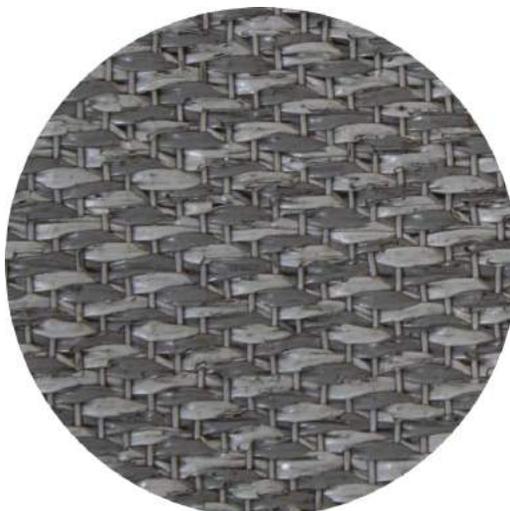
1. The ecology of building materials by Bjorn Berge p.346



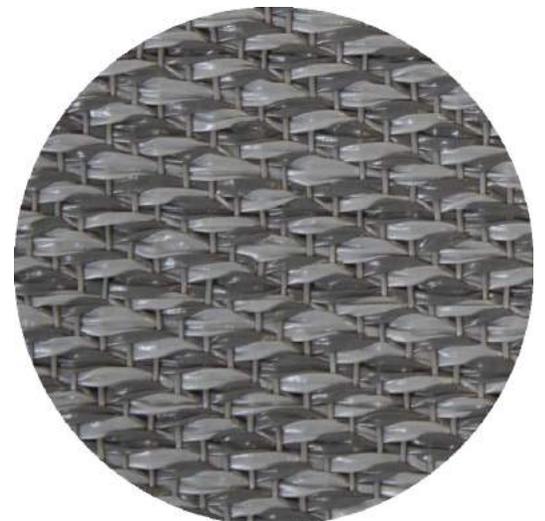
1.



2.



3.



4.

- 1. High-end reused wood
- 2. Damaged Carpet tile
- 3. Carpettile to be reused
- 4. New Carpet tile

CCORRN (Cambridge Community Reuse and Recycling Network)

CCORRN is a social enterprise that has operated from the town of March in Cambridgeshire since 2003. The company has worked with the local council taking used paint from government recycling collection points. Alongside collaboration with the council, it is part of the national Community RePaint Network consisting of 84 business schemes across the UK. In 2015 remanufactured paint was founded and developed in the repaint hub to standardise the colour and quality of the product. A tin of remanufactured paint is around £10. Large quantities of paint can be also applied for via the form on their website.



Images:
Previous page and this page; Images taken onsite at CCORN

Remanufactured paint

Standardising reclaimed material

Chi Tou Lam

In 2015, “Remanufactured Paint” was created at the Cambridgeshire Community Reuse & Recycle Network (CCORRN). The ambition of the project was to reshape the standard for the reclaimed paint market.

CCORRN is a social enterprise operating within March, Cambridgeshire since 2011. Since the opening, the company has been working with the local council that they are only taking used paint from the government recycling collection point in order to collect, test and resell it in a systematic way. Along with the collaboration with the council, it has also been part of the national Community RePaint Network which consists 84 business schemes in total across the UK. The whole network acts as a filter of the construction ecology where the usable leftover paint could still be returned to the chain of use.

The business of reclaimed paint is based on the practice of over-ordering paint for every job.. As construction companies calculate the material required for a building, they typically add a certain amount of excess to anticipate possible design changes during construction or simply to be on the safe side. Other times excess purchases result from bulk orders. It is not uncommon for building or renovation projects to end up with at least a small amount of excess material, whether it's a stack of bricks or a can of paint. Each year, 50 of the 320 million litres of paint sold in the UK go to waste. More than 50% are completely ready to be used again. The redistribution of leftover paint saves part of it from going to landfill. In 2015, an alternative remanufacturing technique was found by the collaboration of Cambridgeshire council, Community RePaint and paint company Dulux.

The remanufactured paint is a complex mixture of reclaimed paint which has undergone a series of operations that produces a consistent colour palette. Previously, unstable colouring caused by mixing paint from different origins limited the market of reused paint. The standardisation of remanufactured paint opens new doors leading to a wide variety of projects at different scales. Currently, CCORRN is working with housing association in the region of Liverpool. Kits including the remanufactured paint, brushes, rollers and sandpaper are provided to the tenants of social housing estates. Every week, around 400 litres are delivered to the region.

The price for a tin of 5L new paint with standard quality is around £24 and a tin of process qualified remanufactured paint is around £10. In an industry that is heavily driven by the economic value of products, designers would not only use reclaimed paint for the sake of nostalgia, aesthetic or ethical reasons, but also simply for economic reasons.

The cyclic economy of used paint is based on the partnership of council and local reclamation community. The centralisation of collecting material by the city council accelerates the redistribution process of the paint. Comparatively, the Community RePaint network encourages the public to use reclaimed paint which ultimately led to the development of the remanufacturing technology. Although the technology was further developed mainly due to the unique material property of paint, it would not have been as successful without the years of extensive negotiations and collaboration between government, business and society which was key to its success.

1. <https://communityrepaint.org.uk/wp-content/uploads/sites/3/2017/06/Getting-started-guide.pdf>



1. Remanufactured paint version 1 by CCORN
2. Remanufactured paint version 2 by CCORN Remanufacturing hub
3. Colour range for remanufactured paint
4. Pre-processed reclaimed paint at the shop front of CCORN Remanufacturing hub

Chip Chop Chip, Slit Slot Slit

Xuechang Wang

The beginning of the Millennium saw the establishment of two distinct wood recycling organisations in the UK - the Wood Recyclers Association (WRA, 2001) and the National Community Wood Recycling Project (NCWRP, 2003).

The WRA with more than 100 members represents over 86% of the UK's wood recyclers¹. They are high-volume limited companies who make panel boards, animal beddings and biomass fuel out of wood chips. However, the medium-density fibreboard (MDF) made from particles of timber bonded with resin comes with an environmental impact and biomass fuel produces air pollution.

The NCWRP is a network of 32 social enterprise franchises that aim to 'save resources by rescuing and reusing waste timber that would otherwise be landfilled (or at best down cycled into woodchip)²', it favours reuse over recycle and energy recovery.

In diverting waste wood sent to large-scale recyclers, it also offers collection service for a charge. After collection, manual sorting wood into piles and subsequent de-nailing would increase the value of wood for resell. Smaller pieces of wood are made into furnitures, whereas leftover wood produced during the process would be chopped and sold as firewood. In all, NCWRP attempts to reuse as much 'waste' wood as possible before sending them for chipping. The whole network collected 21,000 tonnes of wood in the year 2017/18, but it only counts for 0.5% of all the waste wood in the UK and more than half fails to be reused³.

With the social aim of 'creating work and training for local disadvantaged people⁴', in 2017, the network has trained 640 volunteers and created 180 paid jobs⁵ especially for 'local people who might be marginalised from the labour market'⁶. Volunteers are often assigned to conduct tasks such as collection, sorting, cleaning and de-nailing. Such work is crucial to the reselling of timber. Without it, the NCWRP would have to pay someone to clean or de-nail, which would make reclaimed wood more expensive. What's more, the wooden products actually does not involve complicated joint systems as it would take longer and cost more.

On one hand, there are top-down wood recyclers applying only one recycling method; on the other, there also exist those like NCWRP that welcomes all to take or buy reclaimed wood for a little bit DIY job at home. Would it be possible then to create a middle ground that benefit from the advantages of both systems?

1. <https://woodrecyclers.org/about-us/>

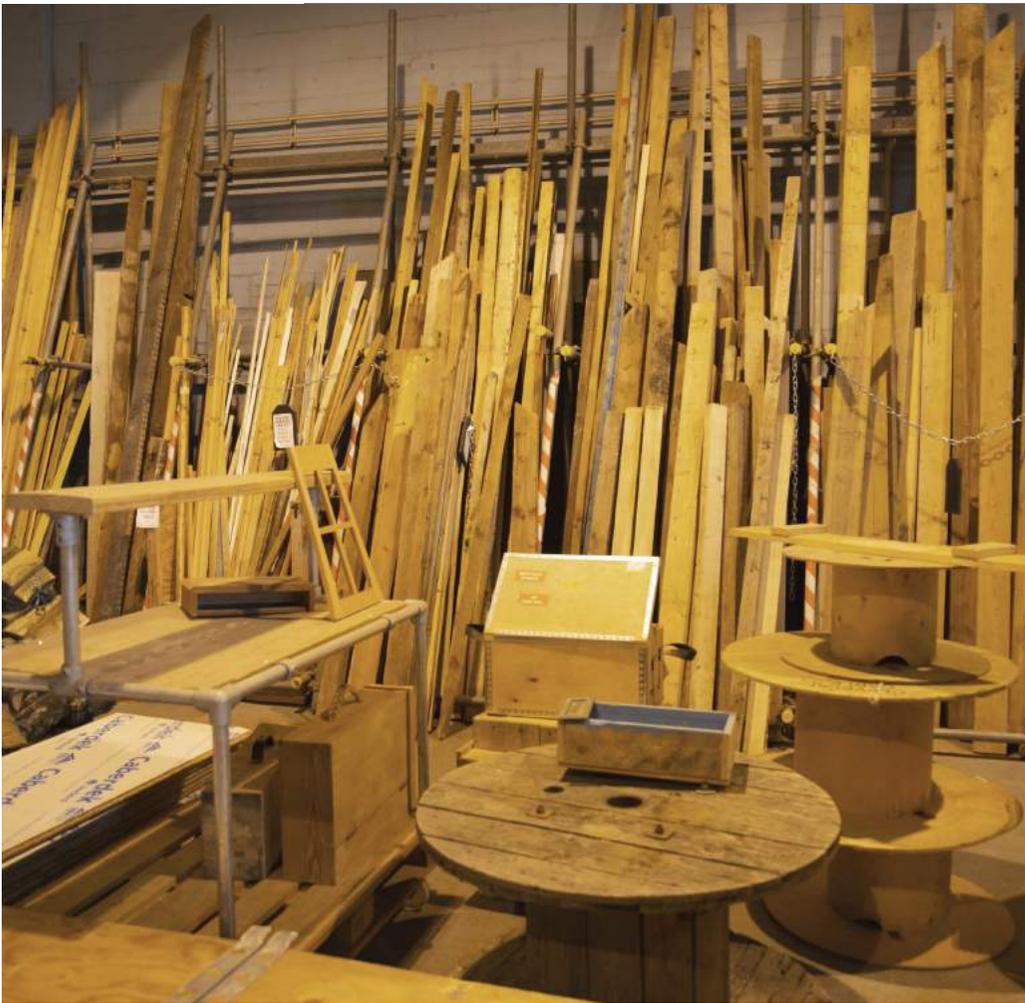
2. <https://www.communitywoodrecycling.org.uk/about-us/>

3. *Environmental & Social Impact - Annual Report 2017-18, Community Wood Recycling*

4. <https://www.communitywoodrecycling.org.uk/about-us/our-impact/>

5. *Environmental & Social Impact - Annual Report 2017-18, Community Wood Recycling*

6. <https://www.communitywoodrecycling.org.uk/about-us/our-impact/>



Top - Wood chips in Powerday Willesden
Bottom left - Reclaimed timbers in Brighton Community Wood Recycling Project
Bottom right Table, benches and other products made from reclaimed wood, BCWRP





Portal Power

Portal Power is a company based in Kenton near Stowmarket in East Anglia. They supply new and used steel portal frames to a range of clients, with a significant market within UK agriculture. With the second hand frames the company can oversee the entire deconstruction process, through any modification then to its reconstruction in a new location for a new client. They have large storage space for many of the kit buildings it is yet to find a buyer for.



*Previous Page Image; Workshop at Portal Power,
Top Image; Elements of Portal Frame being stored at Portal Power, including galvanised 'cleat' pre- attached to rafter.
Lower Image; Elements of Portal Frame being stored at Portal Power as kit of parts.*

The English Farmer *Guardians of structural steel reuse*

Samuel Little

Steel is one of the most ubiquitous materials in global construction. Its production is a major pollutant and it accounts for up to 7% of global carbon emissions.¹ However in the UK its 'reuse' is becoming an increasingly marginal practice. From the year 2000 to 2014 the amount recovered from demolition sites and reused structurally decreased from 11 to 6 percent.² This is surprising because apart from a few minor exceptions structural steel does not degrade with use.

Miraculously, the agricultural sector is now one of the last vestiges of this reuse practice that remains. It offers us a pertinent case study when looking at the reuse of structural steel and the wider reuse industry in the UK. What can we learn from the resilience of this specific 'niche' economy?

Farmers are subject to specific regulation with regards to what they can build on their land. This peculiar long-standing condition has given an embattled 'reuse' practice space to breathe. Building Regulations, fabrication standards and planning legislation all show considerable leniency towards the industry and it is a major factor as to a farmer's ability to work structurally with reclaimed building materials. These 'exceptional' regulatory circumstances are complimentary to an embedded and ubiquitous culture of reuse within farming that receives very little documentation.

The use of the demountable steel portal frame reflects a 'reuse' practice rooted in agricultural history. From the 13th century onwards in rural England whole timber barns were built off-site and often used in numerous situations. The form and structure of the 'kit of parts' steel portal frame has emerged from a desire for strong rigid structural connection. They respond to the material, steel allows for long distance spans without the use of overhead trusses or vertical columns impairing on the functionality of the interior space. The result is a building unspecific and adaptable enough to cope with changing agricultural practice, using a direct enough construction method to limit the amount of necessary specialist building processes. In other words barns are a typology that has been developed with ease of construction, de-mountability and reuse in mind.

Yet within this niche there are problems. Widespread confusion exists about the status of material resellers in relation to European manufacturing standards. With CE marking for example, resellers are anxious about their legal obligations to conform. High labor costs mean the salvage of any buildings below 460sqm is often not economically viable.³ Heavily compressed demolition programs and current health and safety laws tend to limit the amount of careful deconstruction and subsequent salvage that can take place. Even after steel elements are recovered, limited facilities for their preparation and long-term storage disincentives the practice. Counter-intuitively, a high price for new steel has been shown to reduce reuse rates by encouraging useable second-hand material to be sold off as lucrative scrap. The average turnaround for reused elements in a steel stockist's yard is counted in months and years as opposed to as little as 48 hours for new elements.⁴ This slow turnaround discourages widespread change to the reused steel industry and reduces market expansion or investment. As it is now the 'slow' non-liquid asset of reused steel is an outsider.

This current market position is not out of choice. But rather than being considered a hindrance can this 'outsider' status provide reused steel with an opportunity? Can inherent 'slowness' in fact become an asset? That offers stability over ruthless expansion, growth and profit? The case of agricultural communities in the UK demonstrates that aided by appropriate regulation or clarity, a market for second hand steel is and would be possible. As an economy shielded from the more consumptive forces of capitalism can we acknowledge this 'niche' situation and capitalize on it?

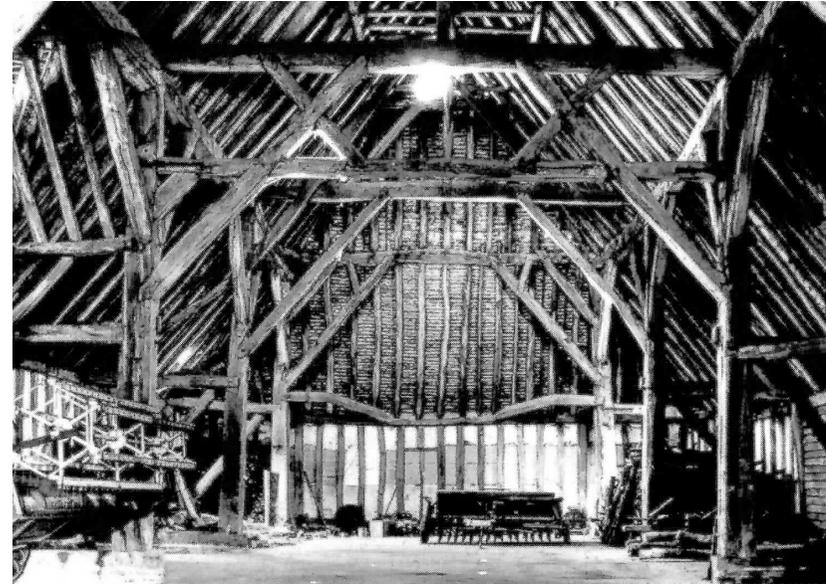
1. SETIS, European Commission, 'Energy Efficiency and CO2 Reduction in the Iron and Steel Industry document', Retrieved on 10/12/2018

2. Danielle Densley Tingley, Simone Cooper, and Jonathan Cullen, 'Understanding and overcoming the barriers to structural steel reuse, a UK perspective.' The Department of Engineering, The University of Cambridge, January 2016

3. David Rose, Owner of 'Portal Power', Oak Tree Farm, Debenham Rd, Kenton, Stowmarket IP14 6JZ. Interviewed on Monday 19th November 2018

4. Cyrille F. Dunant, Michał P. Drewniok, Michael Sansom, Simon Corbey, Jonathan M. Cullen, Julian M. Allwood

'Options to make steel reuse profitable: An analysis of cost and risk distribution across the UK construction value chain', Journal of Cleaner Production, 5 May 2017



Images:

Top left: Classified adverts from recent Farmers Weekly, Farmer's Guide and IEM showing reused steel buildings and portal frames for sale.

Top right: Cut bolted Steel connection featuring two welded end plates.

Bottom Right: 13th Century Barn at Cressing Temple.

Bottom Left: Portal Frame in construction. Photo by Finrose Systems Limited.







Cawarden Brick & Tile Company Limited

Cawarden operates on a vertically integrated business model, where they provide demolition and material reclamation services in addition to being a reseller. Supply of reclaimed materials is supplemented by external sources. They stock a wide range of reclaimed bricks and tiles in a well-organized yard. Additionally, they also stock timber, stone and interior fittings. There are in-house workshops to sort and prepare reclaimed materials. The staff are capable of cleaning around 1000 bricks per member in a day. Other services provided include sample matching through weathering, dyeing solutions and cutting materials to specifications.

*Image above and right: Bricks ordered and stored undercover at Cawarden's Yard.
Previous page: Pigs undercover in the shared yard at Granton Trading, Yorkshire.*



**RED SANDFACED
MACHINE MADE**

How Yellow Stock Became The London Brick? *Prevailing value systems and changing perceptions of authenticity.*

Arvind Roy

Timber was the traditional building material in London during the middle ages. Post 1630, the scarcity of local timber due to deforestation and elevated costs of imported timber, drove the adoption and appropriation of locally abundant resources like coal and clay. New resource networks removed geographic restrictions on brickworks and the savings in material and transportation costs elevated bricks into the new vernacular of London. London stock came in a variety of colours from red through purple, brown, various shades of yellow to off-white. Scarcity of stone quarries close to London made stone an expressive material, signifying dignity and cost. Pale, off-white stocks that replicated the colour of stone were valued higher. The labor involved in extracting, cleaning and processing very limited supplies of the bottom stratum of London clay used to make the yellow stock bricks made them twice as valuable as any other London stock. They were used in the construction of the most prestigious buildings built in the 18th century.¹ The perception of value in the yellow stock brick prompted attempts to artificially replicate their appearance. By mid nineteenth century almost all yellow bricks were made using an elaborate artificial process patented in 1787.²

The production of bricks developed a cycle of mutually beneficial relationships between resource extraction, real estate development and domestic waste networks. These value networks were re-evaluated due to the disruption, unsightliness, dirt and pollution caused by the growing number of brickworks in London and decreasing transportation costs. The brickworks moved out of inner London by 1850 and the only material connection to the geography of the city was through the domestic waste of London that was mixed into the clay mixture. The development of railways and improvements to kilns and brick making machinery meant that the yellow stock brick was now just one of the many varieties of brick available in London and despite being cheaper was not preferred over red bricks due to changing tastes. The inter-war romanticism for the pre-industrial past saw the continued preference for Tudor bricks as the yellow stock bricks were associated with standardised and state sponsored public housing/council houses. This period also saw a surge in the reuse of second hand building materials including timber and bricks to create an effect of instant age.³

Post World War II, regionalism sparked a renewed interest in local materials like the London stock brick and methods of construction in pursuit of a place-specific and communally minded architecture in postwar Britain. The liberalisation of the economy in the twentieth century and resulting privatisation of public institutions produced infrastructure built to maximise profits. Built on the outer reaches of London with lower land values, buildings were often clad in yellow London stock brick to simulate provincially in developments that were often new gentrified landscapes.⁴ The use of yellow stock bricks has also been driven by heritage and conservation practises. The 1932 'Town and Country Planning Act' considered occupied dwellings for preservation for the first time. These policies promoted material practises focussed on replicating the aesthetics of the past.⁵

Today almost 20% of the bricks used annually in UK is being imported from India and China.⁶ The perception of authenticity of the yellow stock brick has evolved with the expansion of its supply chains, from the notions of vernacularity and scarcity to its capacity to signal pastness. Aesthetics provides the path of lowest friction for authenticity to manifest through, as it relies on sensory perceptions that "[are] not restricted to the educated... but also touches the masses independent of their education."⁷ The aesthetics of authenticity is isolated and scaled for the mass market. The production of bricks with an authenticity aesthetic almost always relies on the same supply chains and energy production methods as regular bricks. Authenticity is emancipated from the materiality of the brick and as such we need to question the reliability of authenticity as a value system to drive material reuse.

1. Cox, A. (1997). *A vital component: stock bricks in Georgian London*. *Construction History*, 13, 57.

2. Patent Office Library, Patent No. 1797/2154

3. Stamp, G. (2006). *Neo-Tudor and its Enemies*. *Architectural History*, 49, 1-33.

4. Hatherley, O. (2011). *A guide to the new ruins of Great Britain*. Verso Books.

5. "If you want, or need to make what are described as 'Material Changes' to the Listed fabric - for example taking a wall out to form an ensuite, removing a redundant chimney breast to enlarge a kitchen, you MUST apply for Listed Building Consent to the LA. The application will be reviewed by their Conservation Officer, who will assess the application for its impact on the Listed Fabric. Anything which negatively affects the significance of the heritage asset will be refused. Any material change will be very closely scrutinised - your application will be far more likely to succeed if it does not include material change, or minimises these."

Grade 2 Listed Building Restrictions. (n.d.). Retrieved from <https://www.heritage-consulting.org/grade-2-building-restrictions>

6. The Construction Index. (2018, March 06). *UK brick makers are failing to meet demand*. Retrieved from <https://www.theconstructionindex.co.uk/news/view/uk-brick-makers-are-failing-to-meet-demand>

7. Riegl, A. (1982). *The modern cult of monuments: its character and its origin*. Cambridge (Mass.): MIT Press.



Henry Overend, of the City of Bristol, Gent. : Of "an Invention of a certain Wheel Carriage or Machine, which may be used as a waggon, cart, or dray, in a more perfect and expeditious manner, and with fewer horses, than usually and heretofore done." A Plan of the Invention is drawn at the bottom of the Membrane. Cl. R., 37 Geo. III., p. 6, No. 1. 9 Nov., 38 Geo. 3. 6 Dec., 1797.

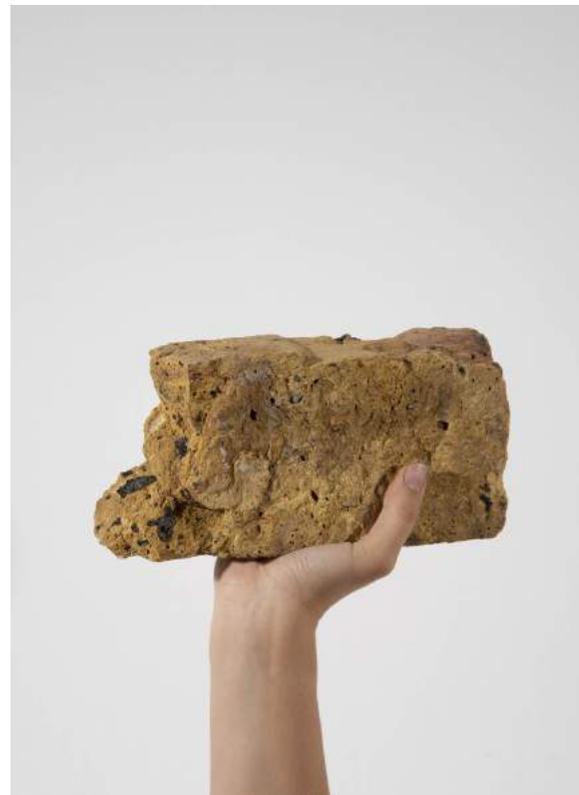
John Passman, of Doncaster (York), Gent. : Of an "Invention and Improvement in Machinery for Drawing, Roving, and Spinning all kinds of Wool, Hemp, Flax, Silk, Mohair, or any other materials." The Invention lies in the construction of the spindle, and in the mode of driving or giving motion to the same without the aid of list, strap, or string, or tooth and pinion, or any other common way usually practised; and the same mode of driving may be applied to every common spindle. A parchment Schedule of Drawings is attached. Cl. R., 37 Geo. III., p. 8, No. 3. 25 Mar., last past. 18 Apr., 1797, 37 Geo. 3.

John Lee, of Lewisham (Kent), Brickmaker : Of "a certain mixture of Chalk, Whiting, or Lime, together with Clay, Loam, or Earth, for colouring and making of Bricks." Cl. R., 37 Geo. III., p. 17, No. 7. 5 Apr., 37 Geo. 3. 2 May, 37 Geo. 3, 1797.

Francis Lloyd, of the Parish of Woolstanton (Stafford), Iron Founder : Of "an Invention of a Furnace or Fire-place, calculated to save a great expense in fuel for all purposes for which the same may be applied." A paper Schedule of Drawings is attached. Cl. R., 37 Geo. III., p. 21, No. 18. 13 Dec., 37 Geo. 3. 9 Jan., 1797.

Robert Ferryman, Rector of Iping (Sussex), Clk. : Of "an Invention of a Machine for Blanching, Grinding, and Dressing of Corn." A paper Schedule of Drawings is attached. Cl. R., 37 Geo. III., p. 22, No. 15. 24 Jan., 37 Geo. 3. 25 Jan., 1797.

Robert Barber, of Bilborough (Notts), Gent. : Of an Improved Machine or Stocking Frame, and a particular method of using the same, (being an addition to and improvement of a certain improved machine called the Stocking Frame [otherwise the Gigger Stocking Frame], which said Gigger Stocking Frame is particularly applicable to the fabricating and manufacturing of hard twisted Jersey Thread, Cotton, Silk, and any kind of hard twisted thread or materials, into double looped stocking frame-work, exclusive of many other kinds of manufacture for which the same and the particular mode of using it may be applied, and for which a Patent was granted 8 Dec., 33 Geo. III.,) which said improved Machine is better adapted for making the like kinds of manufacture described in the aforesaid Patent; and also for making a greater variety of double stocking stitch-work, by a different process, of a very superior quality; and with varying the position thereof, and the particular mode of using it, and by a simple process, is capable of making ribbed stocking stitch-work; and with the application of an additional apparatus occasionally is capable of making various kinds of shag and figured work; and also of a method of making several articles of the aforesaid manufacture upon the Warp or common Stocking Frame, but which frames are not so well adapted for the making



1. 20 % of the bricks used annually in the UK is imported from India and China. A series of reclaimed and imitation yellow stock bridges.
2. Patent No. 1797/2154.
3. Domestic waste mixed into the clay mixture creates a characteristic pock mark appearance.





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LC15 CDF



Epping Reclaim

Epping Reclaim has been a family run business for over 30 years, based in Essex. They specialise in supplying reclaimed materials such as roof tiles, slates, York stone, flagstones and bricks. The reclaimed materials are sourced from all over the UK. Epping Reclaim can ensure high quality reclaimed materials. This is due to their relationship with demolition partners, who carefully use demolition techniques for dismantling. They also import and supply internationally reclaimed bricks, stones and tiles from parts of the world like China, India and the Netherlands. These materials are all carefully selected in person. Epping Reclaim is also proud of their vast range of roofing materials.

*Above image: Yard at Epping Reclaim.
Previous Page: Castle corfe in Dorset.*



Indian brick
B02
10x23x7 cm
origin: India



Chinese Red brick
B06
11x22x6 cm
origin: China



Redland Double Roman
Concrete Tile
RT17
42 x 33 x 6 cm
origin: UK



Sterreberg Courtrai
Flemish Green Pantile
RT11
36 x 24 x 8 cm
origin: Belgium



Clay RoofTile
RT03
26.5 x 16 x 1 cm
origin: London

Samples obtained from Epping Reclaim, Epping, East Anglia.

Can reclaimed material support new housing schemes in the UK?

Seunghun Lee

The U.K government announced new home scheme to build million homes by 2020 and government has set targets to build 245,000 new homes a year to improve the housing supply.¹ The U.K used 2.4 billion bricks in 2017, 1.9 billion were manufactured by locally, leaving a deficit of around 500 million bricks and according to UK Statistics of building materials and components from 2012 to 2017, EU imported brick takes 90 percent and imported 10percent from Non- EU countries. Since 2008 recession, a rapid decline in the housing market associated with the global financial crisis triggers brick production decrease by half. Numbers of brick plants in U.K were either closed permanently or dormant and 27 bricks plants closed between 1998 to 2017. Only few brick manufacturers remained to supply brick for constructing new home. The shortage of brick in U.K affects supply chain and SME business according to House Builders Association. Small and medium companies in U.K have a difficulty to procure brick and wait generally 4-8 weeks and this causes delays to on-going housing projects.

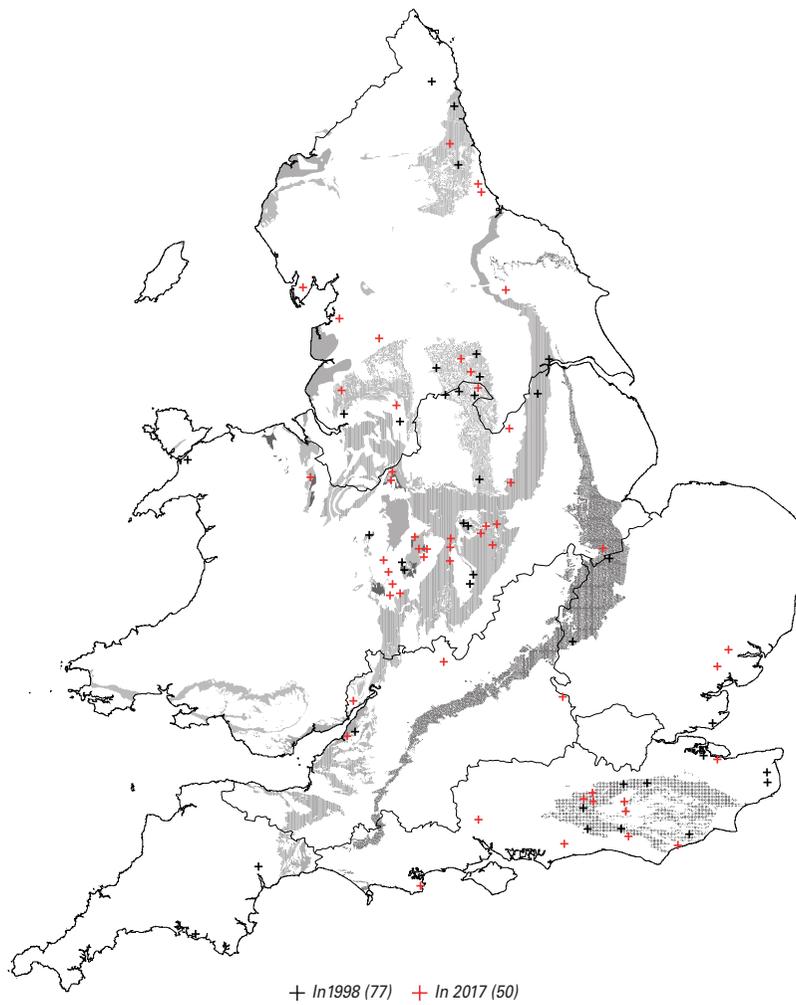
In the construction of housing market, reclaimed brick is treated as no relation with build new homes in U.K. Can reclaimed brick be an alternative way to support this lack of supply for housing?

Today, reclaimed brick plays a role as the means of ornamental service association with restoration, extension of existing building, limitation of use hinders returning its original role of fully being involved with whole building and people have started to regard that reclaimed brick only plays a role for a part of building. the limited quantity due to getting source from demolition site allows reclaimed brick to spread out to different resellers with different its size, colour and quality. The difficulty triggers uncertainty of quantity assures. Reclamation process such as clean off, stack and package by manual labour triggers increase of its price compared to manufactured new brick by machine. Uncertainty of a client who needs reclaimed brick due to the limitation of use leads to storing its stock for a long time, which causes increase of its price.

To tackle this current phenomenon, a network system should collect every information such as quantity, colour, size in order to centralise its quantity by providing each reseller's quality guarantee of its products and reclaimed logistics should be changed. Contemporary logistics of reclaimed brick is that its resellers go to demolition site to get its source and back to reseller's yard to store with small quantity and then depending on a client, reclaimed brick is delivered from its reseller's yard. After that, the yard is empty temporarily, which triggers cost of leasing land and back and forth transportation.

Those factors are interwoven and have a close relationship with urban infrastructure. What if sharing the infrastructure would be an alternative way to tackle those issue?

1. <https://www.theconstructionindex.co.uk/news/view/bountiful-bricks>



Top Image: New, uncleaned and reclaimed brick
Lower Image: Brick manufacturers from 1998 to 2017 according to clay distribution map



DESIMPEL
DESIMPEL
DESIMPEL
DESIMPEL
DESIMPEL

DESIMPEL

Hanson



DOOSAN



Cheshire Demolition & Excavation Contractors Ltd

Cheshire Demolition & Excavation Contractors are a demolition, reclamation and waste management company based in Macclesfield. A large reclamation yard stocks a wide range of reclaimed items from bricks, doors and fireplaces to timber, stone, slate and steel. All waste is sorted on-site with an emphasis on salvage. The company also supply other products such as new and recycled aggregates alongside many assorted construction materials. The company are able to provide delivery and transportation.



*Top image: Reclaimed structural timber, stacked and aired for drying in the yard .
Lower image: Mechanical lifting facilities for palletized reclaimed tiles.
Previous page: Overall view of yard at Cheshire Reclamation.*



*Upper image: Bays of reclaimed stone and bricks at Cheshire Demolition.
Lower image: Sorted slates at Cheshire Demolition and Reclamation.*



55mm Cheshire brick
B32
11 x 24 x 5 cm
origin: Cheshire, UK
supplier: Cheshire
Demolition and Recla-
mation, Cheshire
region: North West



Steel Beam
M05
39 x 13 x 7.5 cm
origin:
supplier: Cheshire
Demolition and Recla-
mation, Macclesfield
region: North West



Basin Co brick
B36
11 x 14 x 8 cm
origin: Fenton, Stoke-
on-Trent, UK
supplier: Cheshire
Demolition and Recla-
mation, Cheshire
region: North West



Offcut of a hollow brick
B45
10 x 11 x 7 cm
origin: UK
supplier: Cheshire
Demolition and Recla-
mation, Cheshire
region: North West



Accrington Brick
B38
10 x 20 x 6 cm
origin: Accrington, UK
supplier: Cheshire
Demolition and Recla-
mation, Macclesfield
region: North West



Oak beam offcut with
protruding joint
T44
50 x 18 x 10 cm
origin: -
supplier: Cheshire
Demolition and Recla-
mation, Cheshire
region: North West



Withnell Terracotta
bulnosed brick
B43
11 x 22 x 8 cm
origin: Withnell, Lanca-
shire
supplier: Cheshire
Demolition and Recla-
mation, Macclesfield
region: North West



tex

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CM CGM

CM

Containers Direct

Containers Direct supplies, refurbishes and converts new and used shipping containers for storage and alternative uses. The company mostly deals in standard sized shipping containers but can also manufacture new sizes in line with individual project requirements. All fabrication work is completed on site by a workshop team, who provides technical consultation services and assists with the design of individual containers. The company has worked nationally and internationally, supplying and remodeling shipping containers to be used for a wide range of uses; such as performance spaces, pop-up shops and offices.



Upper image: Overall view of yard at container
Low image: Used container from John Lewis, for display and show.
Previous page image: Moving objects in the yard at Container's Direct.

The Reuse Excuse *Container Conversions*

Cho Ying Lydia Liu

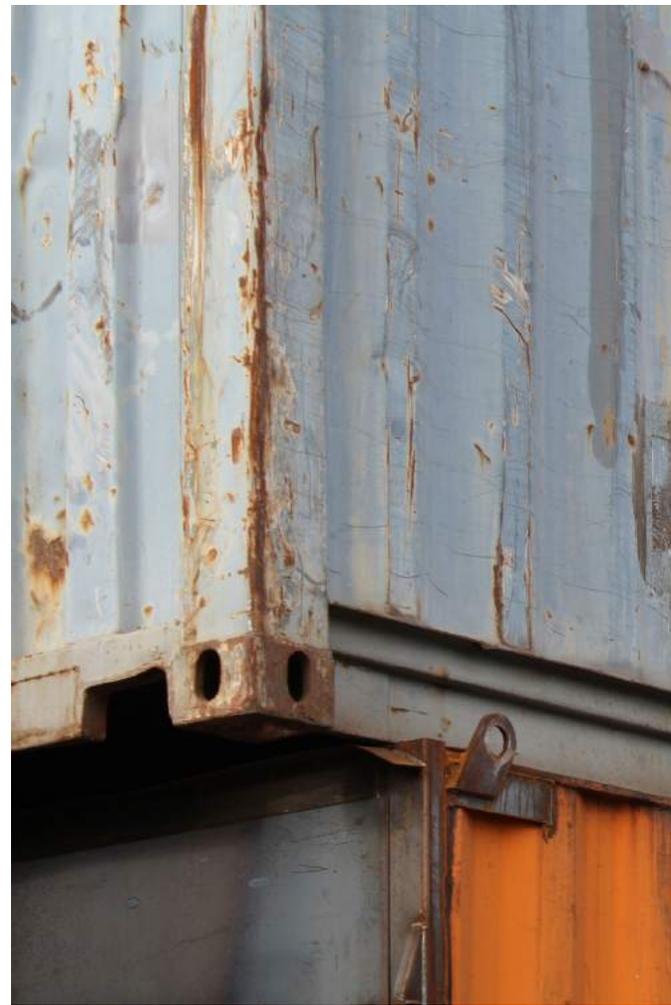
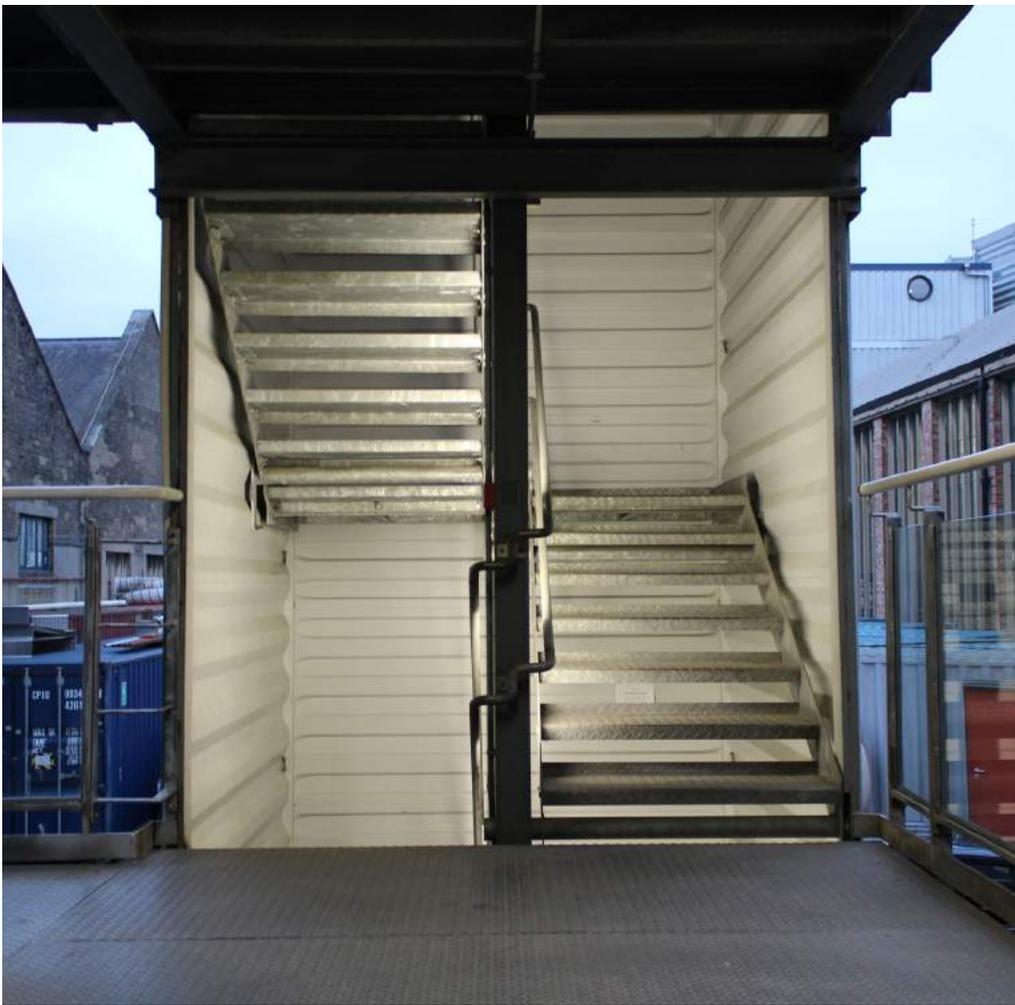
The ISO shipping standard container is known to have optimized and transformed the global transport of goods and economy. It was patented in 1958, designed with specific details to be stacked, loaded and unloaded onto cranes, ships, trucks and trains. Built out of corten steel and given an extra layer of protection with marine graded paint, it can last up to 20 years in the shipping industry, transported by land and sea across the world.

The diversion of used shipping containers into other purposes began in the 1970s in US housing when the self-storage business took off. Many used containers were available very cheap as a result of surplus available in container ports. The manufacturing lines in China had been so streamlined that it costed more to ship back empty containers from Europe or US to China to be reused, than to have new ones manufactured. And so, used containers were transformed into low cost sheds or workshops. By 2008, the demand for container conversions has grown so rapidly that there were virtually no surplus containers in any container port. One of the companies that carry out used container conversions as well as the manufacturing of new containers, is Containers Direct in Liverpool. Their conversions range from storage sheds to pop-up restaurants, and they have even realised an art gallery in London. They have a welding workshop onsite for transforming the hull of the container. The conversion process of a container includes first wirebrushing the steel to remove undesired toxic paint, insulation of the roof and walls and lining the interior with different types materials. Melamine is frequently chosen for spaces that need easy cleaning. Cladding in wood veneer is preferred for spaces that need to be more cosy. After that, electrical appliances, kitchens and other elements can be integrated as desired. Sometimes the containers are even clad on the outside too.

The 15 mm thick corrugated steel used for shipping containers ensures a watertight enclosure. To reappropriate it for human inhabitation, it requires many dissections and transformations. Climatically, steel is not an ideal material to start with. It requires much insulation and forced ventilation. Structural reinforcements are required when openings are created. A lot of the embodied energy in a welded, corrugated steel container is lost during this transformation process. Moreover, as there has been a short supply of used containers from depots, companies have started to manufacture containers from new steel to meet increasing demands.

To the public eye, container conversions, whether made from reused or new material, are sustainable as they are marketed as adaptive reuse. However, today they can better be understood as a case of skeuomorphism, when something imitates only the outer form of another without considering its original function. In actual fact, container conversions are quick and cheap investments. Although modular, they are often short-lasting structures. Once any opening is created in the welded, watertight sealed box, its lifespan is irreversibly shortened from its original 20 year lifetime, creating premature waste.

Land is expensive in London. Wherever there is a small pocket of land available, even for a short period of time, it is exploited by developers. Due to many economic and time constraints, containers provide the easiest and cheapest solution. This is illustrated in the case of Stowaway Aparhotel behind Waterloo Station in London. The WWII site is protected by the railway's asset protection agreement and any project to be built had to be dismantlable within 28 days. As a result, the architect Will Alsop proposed an aparthotel out of containers to suit the constraints. There is a mismatch in the demand and supply of containers; a container that could have lasted for 20 years is reappropriated for temporary use in awkward infill sites. Nevertheless, the construction of temporary infill buildings is seemingly an inevitable economic situation in London. Can there be a third hand purpose for the second hand containers, after their abuse?



Top image: A container manufactured from new black steel, imitating the form of an ISO shipping container built out of corrugated steel.
 Bottom left: Scrap corrugated metal, 50 x 50 box section frame, rockwool insulation, melamine lining panel, timber lining panel with various grain
 Bottom right: A container that is at its true end of its life in the shipping line and will be sent for scrap metal recycling.

Martin Edwards RBM Limited

Martin Edwards Reclamation and Salvage are located south of Preston in the north-west of England. They have been operating for over thirty-five years and focus on all types of reclaimed building materials. Everyday there are new stocks of slate, brick, tile and timber alongside more specialist objects like chimney pots, radiators and interior fittings. They have extensive supplies of local and regional materials. Most of the stock onsite is stored within a former timber drying shed which covers 75% of their yard. The company welcomes clients of all scale and has worked nationally and internationally.





*Upper image: Sorted Welsh slates at Martin Edwards.
Previous page: The yard at Martin Edwards sits within a former timber drying shed.
Lower image: Radiators in storage*



Slate
SL02
27 x 31 x 0.5 cm
origin: -



Slate
SL13
37 x 25 x 1.5 cm
origin: -



Slate
SL03
46 x 23.5 x 0.5 cm
origin: -



Slate
SL12
37 x 24 x 1.5 cm
origin: -



Slate
SL04
51 x 26 x 1.5 cm
origin: -



Victorian Rope Edging
MISC6
30 x 17 x 5 cm

Samples obtained from Martin Edwards RBM Limited







John and James Roofing

John and James is a 50 year old family owned business. The company has a large yard full of different reclaimed tiles and slates. They sell a variety of different roofing materials from different decades and from different parts of the UK. They repair roofs, rebuild entire roofs, and as well sell single slates and roof tiles.

*Previous page image: A landscape of tiles at John and James Roofing.
Top Image: Selection of roofing materials available at John and James Roofing.*



Decorative Ceramic
Roof Tile
RT10
29 x 22 x 4 cm
origin: Bournemouth,
Poole



Cornish Slate
SL18
52x26x0.5 cm
origin: Cornwall



Welsh Slate
SL17
51x25.5x0.5 cm
origin: Wales



Decorative Ridge Tile
RT23
30x27x80cm
origin: Bridgewater



Welsh slate
SL16
51x25.5x0.5 cm
origin: Wales



Barnstaple Concrete
Roof Tile
RT19
43 x 25 x 4 cm
origin: Barnstaple,
Cornwall

A selection of samples obtained from John and James Roofing, Bournemouth, South West

Rough Edges *Remnants of the V&A*

Caterina Miralles Tagliabue

This piece, in particular, is part of what used to be in the balustrade of the Aston Webb Screen built in 1909 as a device to hide the museum's Victorian boilers, contained behind it.

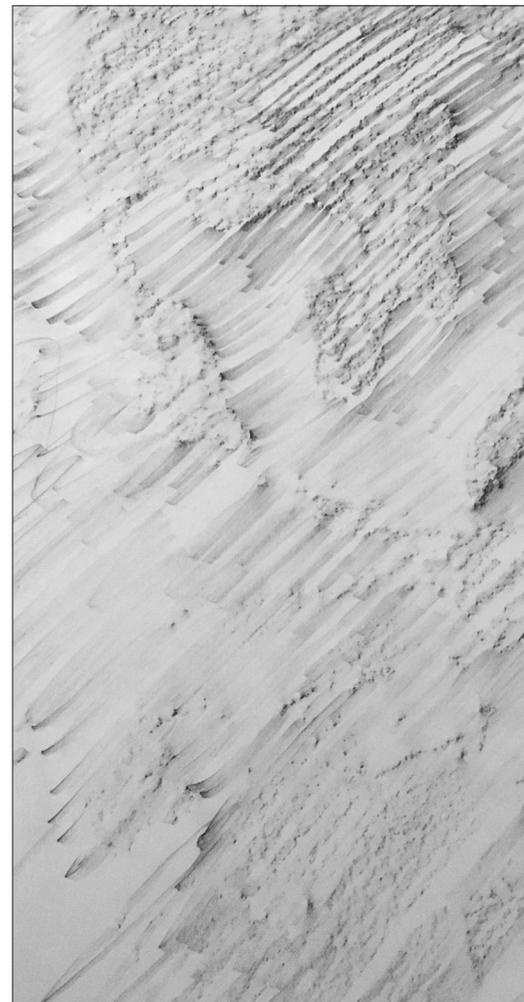
In 1909 in London Sir Aston Webb designed an architectural intervention on the West side of the Victoria and Albert Museum. The project was meant as a device to hide the museum's Victorian boilers, contained behind it. As such, the composition is carefully carved grade I Portland stone featured a thick wall topped by a graceful colonnade that allowed passage by a few discrete views on the buildings behind the screen. An arched gateway, centrally positioned in the screen, gave access to the courtyard behind it.

Almost a hundred years later the wall entered the area for a new design of the new West entryway of the museum. The wall, which is listed, was then removed to protect it and to allow the work to go ahead. The main priority was to remove the fragments leaving them intact. The preservation of the stones was not a question. These fragments were carefully removed, one by one. Each of them was numbered in order to know its location within the overall structure. Each of the pieces, then, is individually traced, studied, named and numbered. Thanks to that most of the screen has been rebuilt on site.

The vision of the new project did affect the wall, it opened it up converting it into a grand door using most of the Victorian stones. The ones which were not used for the new project were stored for the V&A for a short period of time. Later on, those fragments were given to a quarry to store it. Now, these pieces are sitting on a terrain on a side of the quarry, piled on top of each other disrupted of their main function. They have been removed from the urban dynamism, leaving them temporary program-less.

These stones were done in late 1800, their shape is not standardized, the memory of the past seems to be predominating over the present. Hidden symbols are one of the many stories carved inside the covered sections of these stones. They still maintain the identity of their origin, adding to their value, at the same time, their non-standardized shapes make their reuse apparently more difficult. Would it be more profitable to remove the uneven skin of these stones and sell them as big pieces of grade I Portland stone, now that the quarries are suffering depletions?

All the while these fragments, surrounded by vegetation, are dormant, in a moment of standby, in between uses, for their new use if there is one.



1. Fragments of the Aston Webb Screen, with stonemasons marks from the late 1800.
2. Fragment of Portland stone from the V&A window.
3. Pencil rubbing of one side of the Portland stone.

Gallops Architectural Salvage and Reclamation

Gallops Architectural Salvage and Reclamation is located in the middle of breathtaking Brecon Beacons National Park. This family-run business has been a local gem for the past 30 years. Being situated in a conservation area, there are various building restrictions and construction methods that must be applied. This played a major role in the success of the company. Gallops have the expertise and skills to help their clients choose the right building material or perfect architectural piece.



Upper image: Garden ornaments in the yard at Gallops Architectural salvage,
Lower image: The yard at Gallops surrounded by the Brecon Beacons landscape.
Preceding image: Dartmoor National Park





Slated

Sarah deVries

The design of the built environment has always been heavily influenced by the availability of material and craftsmanship. The common roofing material, even before Norman times, were thatch, straw, tiles and slates (Ziba, 1983). The introduction of flat concrete roofs in the 1930's, under the influence of the international style, led to the start of the deterioration of craftsmanship of slaters (Ziba, 1983). It was further reduced by the introduction of substitute lightweight materials such as fibre cement slates (Ziba, 1983). However, many of these substitution materials fell short of their promise.

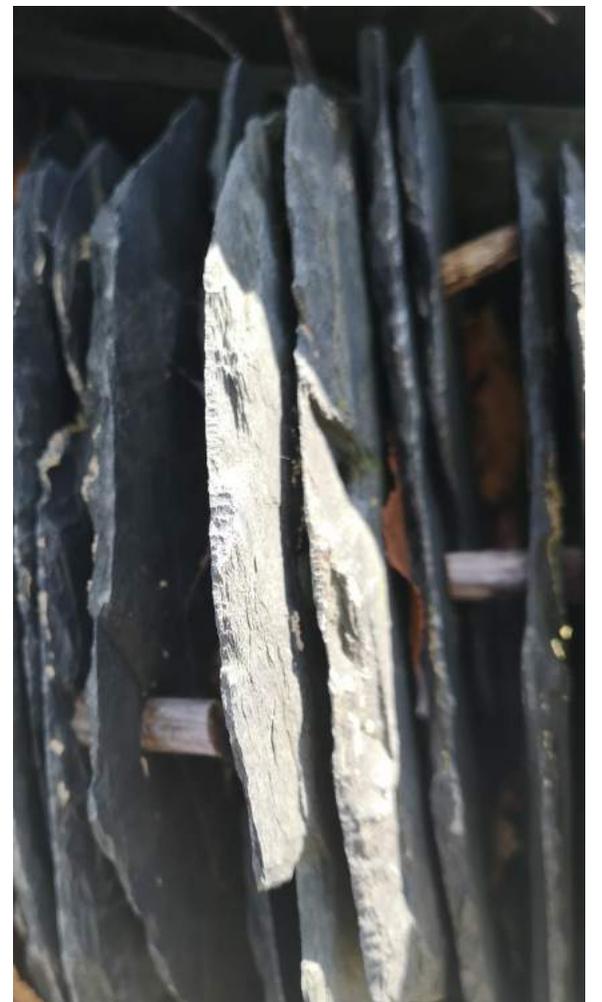
The characteristic of a good roof is a sum of facts: it must be waterproof, fireproof, moderate in cost, practically everlasting, pleasing and dignified in appearance, withstand storms. It also may not absorb moisture, be affected by acid or smoky atmosphere, peel or split under the action of frost or water. Finally, it must have reduced maintenance cost and low thermal conductivity (Ziba, 1983). Slate meets these requirements.

The story behind the past extraction of this 'holy grail', is by no means a light one. During a tour at the Llechwedd Slate Caverns, in north Wales, I had a glimpse of the horror and brutality of the lives of the men and boys working the caverns. The amount of incredible labour, risk, and energy that went into extracting slate is beyond comprehension. Due to the geological formation, volcanic and tectonic plate pressure morphed this specific bedrock into a 33-degree angle. The inclination of the strata governs the method of attack. Slate has a grain to it. It is like wood. If you put an axe on a piece of wood, the wood cracks along the grain. Similarly, to drill holes in slate, rockmen hung from chains to drill at the proper angle.

The tour guide Richard, who worked in the mine, explained, "It is very brutal and barbaric. It will mark that leg in a big way. That chain must go on the same spot all the time. It is very painful. But the body is an amazing thing, that leg will adapt to that chain because the bruises will fade, and the skin will callous and harden." This is just one of the harsh realities they had to face, among many other health issues leading to shortened life expectancy. It wasn't until the 1900s, when trade unions stepped in to fight for them, that slate-workers could start expecting better lives.

Rockmen had no idea if the blocks of slate they were extracting were worth anything until bringing them to the surface to be chiselled into roofing tiles. The amount of waste, to produce just one single successful piece, was astronomical. Fortunately, this has reversed thanks to technological advancements in open air quarries.

To just throw slate away haphazardly shows an immense disrespect and lack of appreciation towards the men who risked their lives to retrieve such an incredible and everlasting material. The reuse of local slate not only honours past sacrifices but ensures the avoidance of similarly brutal extraction techniques in areas far away. An education on where products are coming from and going to is vital because it impacts the world at large in ways that are far beyond our reach.



*Top image: gray-blue slate roofing tile with original wooden peg
Bottom left: Lechwedd Slate Cavern - quarry and mine attraction
Bottom right: Stacking of slates from West Wales Reclamation*

The Conservation Value

Selin Arisal

What we have noticed throughout our trips is that some of the building materials we have come by are immensely more expensive than the rest. They are oddly so much more expensive to use in restoration or construction than newer and imported versions, which felt unexpected. As we started looking into what materials these actually are, it became obvious that the reason is more about the demand for these specific materials rather than their face value.

A lot of the areas in and near Wales are conservation areas – so any construction or restoration project in the area is meticulously scrutinized. There are very specific requirements regarding what materials can be used in order to protect the area, especially near Brecon Beacons National Park. Reuse of materials is encouraged in all the conservation policies, but demolition is not. This creates a vast material shortage for works to be done on local buildings. Once the original materials become incredibly rare to come by – their price significantly increases, which puts reclaimed materials out of reach of most people's budgets. This creates a market for an alternative solution, which are the old looking new (imitation) materials. These materials can also pass through the conservation policies, as they protect the overall appearance of the area.

The way the conservation policy is shaped aims to protect the buildings and increase the use of local building materials, however, it does exactly the opposite. While small amounts of quarrying are allowed, they are generally discouraged – so none of the newer material is actually the original materials from the area. Most of it is imported and treated, which has a significantly bigger ecological impact. While the policy is trying to conserve, it has a destructive impact with the unintended consequence of increasing the value of materials.

Two companies located at the border and inside the Brecon Beacons National Park respectively – Merthyr Reclamation and Gallops Architectural Salvage - try to source these ordinary protected materials to their clients. Merthyr Reclamation is one of the only few in the area that can supply the local Welsh Blue Pennant Stone, which is used as paving stones and walkways in the area. However, they do mention that they are lucky to have a large stock and once it runs out, they might no longer be able to supply the amounts in demand. Gallops Architectural Salvage on the other hand is the only company in the area with a supply of Red and Green Sandstone, which predates slate in the area.

What both of these materials have in common is that neither of them became valuable because they were precious stones. They were chosen to be used in construction at the time because of their practical properties. Sandstone is easy to cut to size, and can easily be cleaned. It is weather resistant, and doesn't get slippery. Similarly, the Blue Pennant Stone is resistant to very low temperatures and doesn't get slippery. Their valuation has shifted from their function to simply their existence – nowadays they are sought after for their visual properties encouraged by the conservation policies, rather than for their material properties.



*Top image: Blue Pennant Stone - Merthyr Reclamation
Bottom left: Red Sandstone - Gallops Architectural Salvage
Bottom right: Green Sandstone - Gallops Architectural Salvage*





Ren-new Traditional Building Materials

Ren-new specialises in the supply of reclaimed building materials including traditional handmade, wire cut and pressed bricks, roofing tiles and slates, railway sleepers, reclaimed timber frames and flooring panels. They are associated with Imperial Bricks and complement their supply of reclaimed bricks with replica bricks that imitate the colors and textures of traditional bricks. Additionally, they provide brick matching, laying and design services to clients. They salvage and source reclaimed materials from demolition and renovation sites nationwide. Ren-new has a workshop on site to sort and clean materials.



Above images: The yard at Renew Traditional Building Materials/Imperial Bricks.
Previous page image: Former site of Whittingham Asylum, a building demolished in 2014 and harvested for its raw material by many UK resellers.



Upper image: Stored timber and arranged bricks at Renew Traditional Building Materials
Lower image: Imitation 'Yellow Stock' bricks, including the appropriate characteristic black marks that they had been testing for.



Glass Brick
G07
20 x 20 x 10 cm
origin: Whittingham
Hospital, Preston



A set of two
interlocking floorboards
with tar coatings
T46
23 x 15 x 2 cm



Glazed yellow stock
brick
B28
13 x 11 x 8 cm
origin: UK



Two Broseley brick
slips and the remains
of the brick.
B46
2 x 24 x 8 cm, 6 x 24 x 8
cm, 2 x 24 x 8 cm
origin: Broseley,
Shropshire, UK



Handmade Stained
Clay Tile
RT07
26.5 x 16.5 x 1.5 cm
origin: -

A selection of samples obtained from Renew Traditional Building Materials, Shifnal, West Midlands

Value adding processes on reclaimed materials

Cuicheng Zhang

After salvage, several processes take place on reclaimed materials to prepare them for a return on the market. These include sorting, cleaning, cutting, polishing, re-painting or restoration. Some of the 'side-products' resulting from these alterations are materials offcuts. The term 'OFFCUT', in a material sense, refers to pieces which have been cut from larger samples. These leftover pieces are considered waste or doomed to recycling.

To better understand the nature of these processes, let us look at two distinct instances where materials are transformed by cutting.

1. The case of salvaged marine wood

Tropical wood found in constructions along the UK coast is degraded by a wood-munching marine pest named gribble. These worms eat the surface of submerged timber by as much as 1 centimetre per year. Consequently, marine constructions such as decking, posts and wooden boats need to be replaced periodically. Resellers slice down the eaten surface and reclaim the sound part of this piece of greenheart. The outside pieces, damaged by gribble, are sent to recycling.

2. The case of salvaged Broseley brick

Broseley brick has a typical texture that is very difficult to reproduce today. Its colour results from the specific firing clay that is no longer quarried. As there is no new production of Broseley bricks today, the large demand for such bricks for façade restorations is entirely met with salvaged bricks, which pushes prices up. One reseller slices off the two surfaces of the brick and mounts them on cladding panels. In this way the usable surface is doubled. The offcut, in this case the inner core of the brick, is chipped and downcycled.

In both cases, value is added to the reclaimed material by cutting. In the first case the aim is to reveal the inner, unaffected wood. The material is processed to increase or reveal its technical qualities. In the second case, bricks are stripped from their structural role and reduced to a cosmetic texture.

The first process can be understood as a reduction of the specificity of a material, the piles are standardised. In the second, the value is derived from the aesthetic specificity of the material.

However, both of these processes pervert the intrinsic nature and body of a reclaimed material. Reclaimed materials are not understood fully for their technical, aesthetical, narrative qualities. With all the effort apparently concentrated on the supply side of the salvage industry, can we imagine treating reclaimed materials as found objects? Can the construction industries envision salvaged architectural components in a way that would preserve all of their specificities? As found objects coming with their original technical, aesthetics and narrative qualities could original qualities of reclaimed materials support the expression and meaning of an architectural project?

1. *Greenspec*

2. *Designing Buildings Wiki*

3. *Alternative Hardwood Timbers for Use in Marine and Fresh Water Construction*

4. *AshweelTimber.com*

5. *History of Anchored Masonry Veneer*



1. One Piece of Broseley Brick was Cut into Three Pieces
2. Greenheart after Slicing Down the Eastern Surface
3. Greenheart's Surface Eaten by the Gribble was Sliced Down





Ronson Reclaim

Ronson Reclaim is a family-run business that has been around for over 40 years. Within its large storage yard it stocks all manners of reclaimed building materials. The company primarily specializes in reclaimed stone and roofing tiles for restoration. They have extensive knowledge of local materials including Cotswold and Forest stone. They have an onsite workshop where stone can be cut, squared up and prepared for resale.

Right image: Stone-cutting at Ronson Reclaim.

Previous page image: The driveway to Ronson Reclaim on the outskirts of Gloucester, West Midlands.





*Upper image: Overall yard at Ronson Reclaim.
Lower image: Reclaimed slate stacked in the yard.*



Redland Green
Concrete RoofTile
RT14
42 x 28 x 7 cm



Yorkstone
S17
37.5 x 10 x 4 cm
origin: York
supplier: Ronson
Reclaim, Gloucester



Bath Stone
S26
12 x 16 x 5 cm
origin: Bath



Granite
S32
12 x 12 x 10 cm
origin: -

A selection of samples obtained from Rondon Reclaim, Gloucester, West Midlands



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Abacus Stone Sales

The Abacus Stone Sales is located in Holmfirth - the heart of the York stone region. They are among the largest stone merchants in Yorkshire, as well as one of the leading companies of reclaimed York stone in the UK. Both new stone and reclaimed stone are sold here, and they provide for delivery transportation all across the UK. Abacus Stone Sales are also experts in matching stones for extensions, refurbishments or conversions



Previous page image: Stone Cutting at Abacus Stone Sales

Top image: Stocks of reclaimed Yorkstone in the yard.

Lower image: Cutting of reclaimed stone by hand to a specific dimension of 15cm. The width prepares it for the market and fits with current regulations.



*Top image: Stones laid out ready for London paving at Abacus Stone Sales.
Lower Image: Stone tumbling machine for artificial weathering of new stone.*



Reclaimed
Yorkstone
S14
19x12x7 cm
origin: UK



Newly Quarried
Yorkstone
S14
19x12x7 cm
origin: UK

A selection of samples obtained from Abacus Stone Sales Ltd, York, Yorkshire and Humber

Imitation materials, adding/diminishing value?

Ananya Nevatia

Stone dressing is the act or process of surfacing and shaping blocks of stone.

Tumbled stone is newly-quarried natural stone that has undergone a treatment to give it a distressed look. The stone is tumbled with an abrasive grit, creating a weathered look similar to a reclaimed stone.

Dyed tumbled stones are stones that have been treated with a dye to alter their colour. The purpose of the colour alteration is usually to increase their visual appeal and marketability. The dye is usually a water-based masonry dye applied to natural stone.

The above are treatments and processes applied to newly quarried York stones to imitate the visual aesthetics of old, reclaimed York stones. Interested stone buyers choose to purchase new imitation stones, that have undergone weathering and dying processes to look older, rather than reclaimed stones. A stone merchant explained that it's simply because the newer stones are cheaper. What makes the new 'fake' materials economically viable is the fact that the entire process of salvaging reclaimed materials from buildings is to be labour intensive and time consuming. On top of that, the authenticity of original materials increases the market price of reclaimed stones, paving the way for cheaper fakes. As they are fashioned from new stone they can be accurately cut to generate a product with even dimensions reducing the amount of wastage. Tumbled sets are more standardised and cost-effective alternatives and offer a high degree of versatility with smaller unit sizes. Excavations need not be as deep as is required for traditional York stone sets. Laying is easier due to the regularised thickness. Handling and transportation are more cost effective due to the decreased weight. Newly sawn stone can be artificially aged to create a weathered effect. Brentford Market Place, the National Memorial Arboretum and the Bristol City Centre are some examples of projects that have used artificially weathered sawn stones.

Weathering can be assumed as a romantic form of aging. In the natural environment the material 'weathers', i.e. colour is 'taken away' by natural processes - environmental factors causing weathering through the natural passage of time or sometimes pollution. Interestingly the pastiche material achieves its look through accelerated weathering, by the addition of artificial treatments on the surface like staining and tinting. Liquid Weather is a product used for tinting and blending new materials with old as it perfectly matches years of natural weathering with just one application and a few short hours. Its effect is permanent, irreversible and leaves the surface texture unchanged, resulting in a natural finish. But imitation materials are merely a form of surface modification.

What makes a historic building authentic are the original materials they were built from, how these were assembled and detailed. Listed Heritage buildings date back to other time periods, when construction methods and skills were very different from today's. Heritage assets are irreplaceable resources. The preservation and conservation of built heritage is important as it helps to define a sense of place, identity and origin. What a city visually looks and feels like is a crucial part of its identity. Listed buildings and development within the Conservation Areas have extra legal protection within the planning system. Guide documents provided by the councils recommend using 'like for like' materials and keeping replacements to the minimum.

The romantic vision of heritage, its social and cultural perception and these new imitation materials that get used in heritage sites reveal an interesting relationship. On the one hand there is the real, authentic and expensive reclaimed material, true to its time, and on the other hand there are new materials, available in abundance, that are mere imitations. These historic buildings are significant as they echo all the factors that truly make them what they are such as locally available materials, climate, craftsmanship, social structures, ways of life and economic background. They are real and of their time. Is it appropriate to use these new materials under consideration or do they just contribute to pastiche? Is it the case that authenticity is being significantly diluted by using cheaper imitation materials? There is an effect of loss of authenticity and diminishing heritage value. This loss (by removal/covering over/replacing) greatly undermines the overall character of that building and could diminish the architectural quality of an area. Encouraging York stones reuse could encourage historical building integrity while slowing down the extraction of new stones.



Top image: 'Fake' imitation Yorkstones
Lower left image: Tumbling Machine to weather and age stones
Lower right image: Newly quarried York stone

Reclaiming our timber: *Preserving our precious woodlands*

Sihyun Kim

Timber is widely considered as a sustainable building material. It is excellent insulator with low thermal conductivity and high thermal mass and it has low embodied energy. It is renewable resource and it can be recycled and re-used with ease. Since 1666, the London Great Fire, timber had been banned by building regulation[1]. The navy had needed abundant wood (17 century - 19 century) from English forests for manufacturing their ships. As England's navy grew, the woodland was deforested[2]: From an estimated land coverage of 15% in 1086, England's woodland had dwindled to 5.2% by 1905[3]. After 1970, wildlife, conservation and environment became significant issue and sustainable resource had been emphasized[4]. To achieve sustainability, timber construction has returned back in British construction.

In 2018, forest covers only 13% of UK land, a great improvement on the 5% after First World War. However, it is far less than European average of more than 30%. On the other hand, the demand for timber in the UK increases constantly despite the lack of forests[5]. To fill the excessive demand, wood imports also increased dramatically. According to the Forestry commission, in 2017 the UK produced 10.9 million tonnes of timber but imported more than twice as much (25.1 million tonnes). Given the situation of dire need, the Government decided for a new approach to woodland ownership and management with a growing role for the private sector and for charities, (75%) and a reduced role for the state, in order to gain more financial investment for forest management [6]. Based on Forestry commission, implement of forest privatisation increases the timber production and removal amount of wood 20% as much than before [7]. Moreover, the process of wood production, cutting wood with mechanical chainsaw and transportation, produces more carbon emission than carbon storage in tree.

The construction and demolition industry produces 3.25 million tonnes of wood waste and the Wood Recyclers Association estimates around 2.8 million tonnes of these can be recycled and reused[8]. The main products of the wood recycling process are chipboard; another important use of recycled wood is biofuel. However, the fabrication process of chipboard includes remote transportation and energy intensive factory process which embody more economic cost, carbon emissions and other environmental impacts. Moreover, using wood as biofuel releases stored carbon from timber. The practice ends up being as unsustainable as that of burning fossil fuels

Reusing timber does not entail excessive supplementary costs and carbon emissions since it doesn't require intensive logistic or machine-based processes. Jack who runs a reclaimed wood business in St Albans Wood Recycling points out that his organisation collects 7 tonnes of reusable wood wastes from skip whereby collecting is paid for by the contractor. Collected wood is cleaned and unnailed at their workshop and some of wood wastes are used to make reclaimed furniture. Reclaimed wood is directly sold to the client as timber cladding or timber flooring. Some of the unreclaimable wood waste will be send to the recycling factory. However, due to the heavy use of nailing in timber constructions, a high risk of damage to the wood during reclaiming process remains. Besides, speed and incautious demolition process produce much wood waste with limited salvage value. Wood salvage is not high profit job. It partly contributes to local communities, but there is no specific funding from council or local authority unless business claim as charity.

Regarding to obstacle of reclaiming wood waste, the reclamation process is not initiating from demolition, it is beginning from construction whether production is designed to be reuse or not. Lack of knowledge on how to disassemble used timber induced more recycling than reclaiming. The benefit of using wood as sustainable material lost its key role with obstacles. It is time to reframe procedure of reclamation from beginning of wood construction and it is time people grow awareness of the fact that reclaiming wood from C&D waste contributes to preserving our forests.

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1. St Albans workshop
2. Powerday; collected wood waste for recycling
3. Reclaimed scaffold which will be reused for furniture



In collaboration with:

Main partners: Salvo (UK), Confederatie Bouw (BE), Centre Scientifique et Technique de la Construction (BE), Centre Scientifique et Technique du Batiment (FR), Bruxelles Environnement (BE), University of Brighton (UK), Bellastock (FR)

Associated Partners

- Building commissioners- Befimmo (BE), Beliris (Be), Circolab (FR), citydev.brussels (BE), De ideale Woning (BE), Paris Habitat (FR), Whitewood (BE), Ymere (NL)
- Public authorities - ADEME (FR), DPD/DGO3 (BE), OVAM (BE)
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Contributors:

Selin Arisal
Marion Beatrice Edmee Delaporte
Sarah Ashley deVries
ChiTou Lam
Cho Ying Lydia Liu
Caterina Miralles Tagliabue
Ananya Nevatia
Xuecheng Wang
Cuicheng Zhang
Sihyun Kim
Seunghun Lee
Samuel John Little
Arvind Roy

Unit supervisors:

Maarten Gielen
Lionel Devlieger
Aude-Line Dulière

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Image: Field Trip at Premier reclaimed bricks







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Opposite image: Robert from Woodlands Farm Reclamation in Guildford,
Top image: Mark Haysom from Haysom Quarry in Dorset informing on stone cutting techniques.
Lower image: 'Excess Baggage' transporting a cast iron fireplace on the SouthWestern railway.





Left image: Slates at Colchester Reclaim.
Upper images: An unfortunate incident with a rental car clutch outside of Bristol.
Proceeding pages: Arriving at Granton Trading, Yorkshire.





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