Clean Slate

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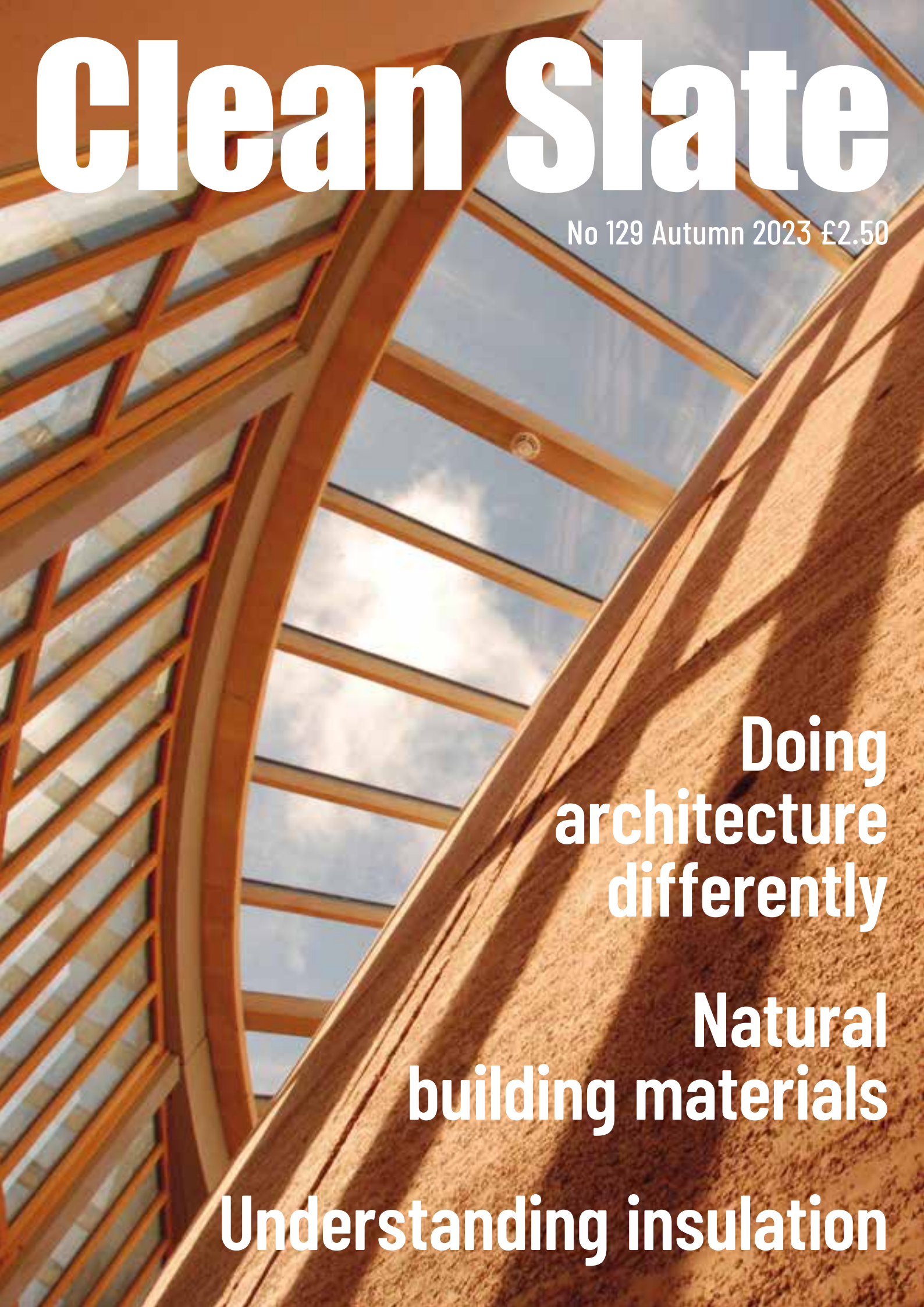

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EDITORIAL

Eileen Kinsman

Doing things differently

The motto of our MArch Sustainable Architecture course is Doing Architecture Differently. And doing things differently has been at the heart of CAT since the very beginning, 50 years ago.

Our pioneers set out to show that an alternative way of life was possible. From new approaches to the buildings we live and work in to the energy we use to power them, they set out to experiment with putting new ideas into action.

Today, CAT's influence reaches further than ever before, as we share these ideas with people and organisations that want to play their roles in making a better future happen.

In Birmingham, we are sharing skills on subjects including growing, building and renewable energy with community group Civic Square (page 2). Across the UK and beyond, our free information service is providing people with advice on how to incorporate sustainability into all aspects of their lives (pages 6-9). And here at CAT, we're helping the latest group of Sustainable Architecture students to get the foundation they need on which to build a career that helps revolutionise an industry (pages 10-11).

Business as usual is not an option. It will keep us on a path to irreversible climate breakdown and catastrophic biodiversity loss. We must do things differently to survive and thrive on this planet we call home.

This edition of *Clean Slate* may be smaller than you're used to, as we make every effort to reduce our costs while delivering the most value for our supporters, but it is as packed as ever with inspiring examples of people taking positive action in the climate and nature crises.

Thank you for believing that a better future is possible.

Eileen Kinsman, co-Chief Executive Officer

Celebrating CAT at 50, together

In August, we welcomed hundreds of friends, old and new, to CAT to celebrate our 50-year anniversary. This family-friendly open day was an opportunity to share practical solutions to the climate and nature crises and build the CAT community, while marking an important milestone in our history.

All day, visitors delved deeper into our work – from our graduate school and short courses to our free information service – and received advice and top tips for changes they can make at home. Budding engineers got hands-on with wind power, hydro and solar, while curious minds imagined what the world of tomorrow could look like and explored how to make it happen.

Meanwhile, our anniversary guided tours were a unique opportunity to hear about CAT's incredible 50-year history from some of the people who helped make it happen. We were also excited to share the latest news on our plans for the future.

Thank you to everyone who joined us for this special celebration.

Dieter from CAT's Engagement Team leads a Civic Square workshop in Birmingham.

Sharing skills – street by street

Transition to a sustainable future for all humanity as part of a thriving natural world requires urgent action on all levels, and everyone needs to have the knowledge and skills to help create change.

That's why we are collaborating with community organisation Civic Square to help people in Birmingham create regenerative systems in their neighbourhoods, as part of their 'Skills for Transition' programme.

Thanks to funding from the National Lottery, Civic Square is making this learning available to local people for free. All participants have to do is agree that by signing up to attend a class they will put what they learn into action and share the knowledge they gain with others.

Throughout the rest of 2023 and beyond, we will be running classes, here at CAT, at Civic Square's headquarters and across Birmingham.

Courses have so far included Building and Constructing Skills, Retrofit for Energy Reduction, and Renewables for Households, while upcoming courses include Carbon Literacy for Communities, Community Solar, and Community Retrofit.

Through this curated series of classes, we hope to make people better prepared to take action at home and in their street.

Neighbourhoods alone cannot make the scale of change required, but neither can top-down approaches – we need action at all levels across all sectors, and we all have a role to play in making the shifts we need in the next few years.

A legend retires

In June, we wished long-time Gardener, Roger McLennan, all the best for his retirement.

Roger has spent an incredible 45 years tending CAT's gardens. Through hard work, a love of the land, and a voracious appetite for compost creation, Roger played a huge part in creating our network of gardens and woodlands on what was once bare slate.

Since arriving at CAT with his family in 1978, Roger has worked with (and fed!) hundreds of volunteers and inspired so many people to become growers and gardeners.

Thank you to a true CAT legend and enjoy your well-deserved retirement, Roger.

CAT Members' Conference

Join CAT members, students, staff and volunteers for a weekend filled with inspiration, insight and practical action at a special 50th anniversary edition of our members' conference this November.

From Friday 10th to Sunday 12th November, we'll be coming together for a festival of ideas, including talks, tours, workshops, discussions and more.

As we celebrate CAT's 50th year, travel back through time to explore how things have developed over the past five decades and forward for a behind-the-scenes look at our exciting development plans.

Hear from CAT's experts, trainers and lecturers on ways we can work together to address complex problems in practical ways. Meet some of CAT's inspiring graduates and partner-projects, who are making an impact across a range of industries, from community building to solar start-ups.

Immerse yourself in our beautiful site, to explore our energy systems, our autumn gardens, the wonders of composting and more, before skilling-up with a retrofit masterclass taster session.

Find out more and book your place at cat.org.uk/annualconference – accommodation is limited so book your place today, or get in touch on 01654 705988.

Future Generations Commissioner visits CAT

In September, we welcomed the Future Generations Commissioner for Wales, Derek Walker, and team to CAT. Their two-day team away-day included a programme of talks, tours and activities with the CAT team, exploring future visions, systems thinking and green skills and education, including discussions of how we can work together to build a fairer, safer, healthier, more sustainable future for all.

The Future Generations Commissioner role exists to help public bodies follow the requirements of Wales's Well-being of Future Generations Act, which aims to improve the social, economic, environmental and cultural well-being of the people of Wales without compromising the ability of future generations to meet their needs.

Plans for CAT's development move forward

Plans that will allow CAT to share ways of addressing the climate and nature crisis with many more people are moving forward. Throughout the summer, we have been working on more detailed surveys, planning and design work, building on the initial research, consultation and site planning undertaken last year.

Plans include the creation of new and refurbished education and skills spaces, an inspiring new visitor experience, and additional and updated accommodation at CAT.

Ring-fenced project funding from the UK Government's Shared Prosperity Fund has allowed us to continue working with leading regenerative architects Haworth Tompkins, alongside a team of engineers and project management specialists, to develop plans that showcase best practice in regenerative and sustainable approaches to development.

This includes a focus on reuse and refurbishment, adaptability, energy reduction, increased on-site renewable energy generation, and maximising biodiversity. Thanks to the generosity of our supporters, we have been able to commission detailed ecological surveys to build up a better picture of how developments could actively benefit our local wildlife.

Plans also include smaller sub-projects, creating opportunities for local firms and specialists in specific areas of sustainable build and design to get involved alongside CAT's in-house experts and the lead architects.

The more detailed site plans and a comprehensive business case are needed to help secure funding from a range of sources to bring the exciting plans to reality. Keep an eye on our website and sign up to our enewsletter to be kept up to date as plans develop - cat.org.uk/sign-up

Short course spotlight – Renewables for Households: Insulation

Rethink household energy use and understand the importance of insulation on a one-day course this November.

Many existing buildings in the UK are poorly insulated and draughty, resulting in loss of heat and higher energy demand. Improving insulation of our homes and buildings will help to reduce energy use, cut bills, and make them more comfortable.

This day-course will provide you with an accessible guide to calculating heat loss and understanding 'R' and 'U' values. You'll learn how to identify draughts and air leakage, and how improving them could result in better thermal comfort, efficiency, and economic savings.

Through a mix of lectures and hands-on sessions with CAT Graduate School lecturer Dr Alan Owen, you'll explore different insulation types and understand which materials are appropriate for different locations.

'Renewables for Households: Insulation' next takes place on Saturday 18 November, 9.30am-4pm. The course is part of a series exploring renewable energy technologies for households, with other courses covering heat pumps, solar PV, solar hot water, and wind turbines. The courses can be taken individually or as a series.

Visit cat.org.uk/shortcourses to find out more and book your place.

A tribute to our Chair of Trustees, Sally Carr

It is with deep sadness that we share the news of the passing of our dear friend Sally Carr, CAT's Chair of Trustees, who died in June.

Sally had a lifelong love for CAT. She first arrived for a week's volunteering in 1986, and came back year after year, eventually coming to work with us full time. On retirement in 2019, she was invited to join our Board of Trustees, becoming Chair in April last year.

As Chair, Sally helped steer CAT's development with passion, commitment and kindness. Across her various roles, she worked with hundreds of people in the CAT community, including members, supporters and students, as well as trustees, staff and volunteers. She gave generously of her time and knowledge.

Sally will be so very missed by all who knew her, and our thoughts are with her family and friends. We will be planting a stand of hazel trees in Sally's memory, in a spot with views across CAT and out to the Dulas Valley – in time, it will become part of the web of life in this place that she so loved.

Our Vice Chair, Andrew Pearman, has stepped into the role of Chair for the moment, and we will announce further updates in due course.

Why we teach...
Sustainable Materials in the Built Environment

Next in our series looking at themes and topics explored by students on CAT Masters degrees, **Tim Coleridge** introduces the importance of learning about the sustainability of materials and why our students love the way we teach it.

CAT students benefit from hands-on experience with different types of materials.

The production of building materials leads to carbon emissions and other significant environmental impacts during their extraction, processing, manufacture, construction and disposal. Conversely, materials can have low embodied energy, low toxicity, be renewable, reusable, recyclable, compostable, and maybe sequester carbon too.

Systematically evaluating these issues forms the focus of the Sustainable Materials in the Built Environment module run by the Graduate School at CAT. It covers materials' environmental impacts, wider social and health implications, in-use performance and usability.

Why is the topic important?

Building regulations in the UK and Europe have historically focused on reducing operational energy demand – all the electricity, gas or other fuel used to power a building's daily needs. This has accounted for around two thirds to three quarters of carbon emissions from the UK built environment since 1990.

However, as CAT's Zero Carbon Britain research has shown, tried and tested technologies exist to make new and refurbished buildings extremely energy efficient, and to generate heat and power onsite, dramatically reducing operational emissions, with ambitious buildings achieving zero or negative net emissions in use.

The construction industry is now therefore waking up to the vital importance of the materials our buildings are made from, which includes carbon emissions and broader environmental impacts embodied in their extraction, processing, manufacture, construction, maintenance and demolition. Carbon emissions embodied across the whole life cycle of materials must be drastically reduced to achieve the UK's net-zero targets.

To get an initial idea of the scale of the challenge, it's worth bearing in mind:

- Around 400 million tonnes of materials are consumed every year in the UK for construction – divided equally, that's about 6 tonnes per person per year!
- Worse still, around 120 million tonnes of waste are generated by the UK construction industry every year.
- Demand for materials is ramping up in the UK and globally to build new buildings and infrastructure projects.
- Approximately 90% of non-fuel minerals extracted in the UK are used for construction – that's a lot of stone, aggregates and sand, plus clay for brick making and large quantities of limestone and clay mined and burned at high temperature to make cement.

What are the main aspects to consider?

This module is designed to awaken critical skills in environmental decision-making, enhance understanding of the environmental implications of material choices, and give insight into the performance of sustainable materials in adapting to a changing climate.

The module commences by challenging students to consider what is a 'sustainable material'. Definitions are contested, and the 'answer' may be different in different contexts. Should it be about using local materials? Re-use and recycling? High-tech materials and new structural systems? Reviving traditional and vernacular techniques? Learning from nature – biomimicry? Or a combination of them all?

Students from across CAT's MSc courses choose this module because the sustainability of materials is integrally linked with:

Getting to grips with working with lime.

Experimenting with different ways of using earth.

- Land-use change, hydrology and biodiversity of the regions where materials are grown, extracted or disposed of.
- Energy use, carbon emissions and other environmental impacts during their processing, manufacture, transport and use in construction.
- The health and wellbeing of building occupants and construction workers, including safety, indoor air quality, and connection to nature.
- How behaviours impact demand for products, finishes, fixings and furniture, and how these material choices change over time.
- Circular economy strategies that shed a fresh light on opportunities to reduce construction waste.

Students learn how to apply well-informed and sound judgement to the choice and use of materials in practice, exploring economic, socio-cultural, practical and technical aspects. Teaching activities build a thorough appreciation of how environmentally sustainable materials offer creative opportunities for the use and development of high quality, healthy, ecosystem-enhancing, effective and long-lasting products.

What are the teaching methods?

Teaching activities introduce a range of low-impact and natural materials – including straw, earth, timber, lime and hemp-lime, progressing to consider novel systems and composites, and debate how low-impact materials and products could become mainstream. Theory lectures and demonstrations from experts in the field (such as Rowland Keable, Stafford Holmes and John Butler) complement practical workshops, supporting students to experience the materials first hand – handling and mixing, testing and making, while building understanding of their technical performance and other characteristics.

CAT's indoor and outdoor teaching spaces offer unique opportunities to enrich students' learning of these topics, with teaching led by CAT staff, Graduate School of the Environment graduates, and visiting experts. As they learn and socialise together onsite, students experience CAT's living archive of green buildings from across our 50-year history, including the timber frame Eco-cabins, Walter Segal Self-Build House, Straw Bale Theatre, and the award-winning WISE building.

Quantitative and qualitative understandings are encouraged during the module, with experiential learning bringing to life theoretical information from module texts and professional organisations. After the residential week, learning continues online with discussions and study skills seminars. Students map the availability and function of raw materials in their home region to gain a deeper applied understanding. In these ways, the module creates inter-disciplinary encounters both onsite and online for students from across CAT's food, ecology, green buildings and behaviour change MSc programmes to playfully explore low-carbon building materials and discuss their wider impacts and implications.

Students learn in buildings constructed with low impact materials. Image shows the circular rammed earth walls of CAT's Sheppard Lecture Theatre.

How do students use this learning?

Several students have pursued research in natural materials and low-impact construction for their independent dissertation that completes the MSc. This includes technical studies of novel bio-composite, plasters and renders, as well as social studies into the challenges and opportunities for the industry to adopt low-carbon materials and construction techniques.

Steve Coles undertook research into the thermal and moisture performance of alternative fibres (such as miscanthus) and binders at Aberystwyth University.

Scott Simpson co-founded IndiNature, which has recently opened the UK's first hemp fibre insulation factory in the Scottish Borders.

Tom Robinson founded Adaptavate and is working with Jeff Ive and other CAT graduates developing breathable plasters and a hemp-lime based plasterboard for mass production.

About the author

Tim is an architect and Programme Leader for the Sustainability and Adaptation and Green Building Masters programmes at CAT. He is passionate about sustainable design and adaptation in the built environment, regularly lecturing and leading seminars and practical workshops in low-impact development, bio-based construction materials, low- and zero-carbon buildings, and using socio-technical research to close the 'performance gap'.

Study with us

Find out more about CAT Masters degrees, join an on-site or virtual open day, and explore what funding might be available to you – visit cat.org.uk/graduate-school or contact Alis Rees, Graduate School Marketing Officer, at study@cat.org.uk or on +44 (0)1654 705953.

Beyond bricks and mortar:
how natural materials can transform the way we build

How can we tackle the emissions and waste from construction? We look at some of the benefits of using low impact materials.

Many of CAT's buildings showcase natural materials, including our Straw Bale Theatre.

At CAT we've been using natural building materials for many years, and you can see examples all around our visitor centre. We also run hands-on courses and workshops and sell many practical books.

Once the energy needed in the day-to-day life of a building has been minimised, then the 'embodied energy' used in construction becomes a bigger proportion of the building's overall energy use. Therefore it makes sense when planning an energy efficient house to make careful choices about the materials used.

Think also about what will happen at the end of a building's life. Try to choose materials and techniques that will make reuse or recycling easy. Many common building materials will eventually end up in landfill or an incinerator because they cannot be reused or recycled.

Natural building materials

A great way to address the issues raised above is to use natural materials such as timber, straw, hemp, earth, and many other plant or earth based materials.

Some of these materials are from an abundant source, like earth, and are extremely reusable. Other natural materials can be regrown and are therefore from a renewable source. If they absorbed carbon dioxide as they grew, like straw, hemp or wood, then using them in a building will lock up carbon for a long time. This greatly reduces the carbon footprint of a building.

Many eco-building methods are also accessible to amateur builders. For example, building with straw, hempcrete and timber-frame techniques are all methods that can be learned fairly easily and quickly.

Low energy construction

The embodied energy of materials includes the energy used to extract, manufacture and transport all the materials used. Another way of assessing materials is the life-cycle impact, including other types of pollution and adverse impacts. For example, because of the high temperature to which it must be heated, and the associated chemical reaction, the embodied energy and the emissions of carbon dioxide from cement manufacture and use in concrete are very high.

Some low energy buildings will require particular types of material, so it's a matter of balancing the benefits of a method against its impact. For example, a home using passive solar design principles is likely to need a dense material for absorbing and storing solar energy (acting as 'thermal mass'). Perhaps the energy gain from this technique could outweigh the impact of using concrete. However, a lower carbon footprint could be achieved by using an alternative for thermal mass – such as compressed earth, hempcrete, limecrete, or reclaimed stone.

Breathable construction

Broadly, breathability is the ability to buffer moisture – to soak it up and then release it. Most natural building materials are breathable, and you'll need to ensure you don't seal them up behind finishes that will trap moisture.

Creating healthier buildings is not just about indoor air-quality effects from the off-gassing of certain chemicals, but also thinking about breathability. Using materials that buffer humidity and don't trap moisture is great for avoiding damp problems in future.

One example is using lime plasters and renders. Unlike cement, lime is breathable and so is a sympathetic finish or binder for natural materials. Lime bonds well to earth because it is also a soft and porous material. Earth and lime expand and contract at the same rate, so the lime finish will remain stable and well adhered. You can even remove, soak, remix and reuse old lime putty, plasters and renders. Lime finishes will set by gradually reabsorbing the carbon dioxide that was given off during production.

Plant based building materials

Wood is versatile and often beautiful as well. For sustainably-harvested timber, look for the FSC mark. There are several options for building boards made from plant fibres, for example as alternatives to conventional plasterboard. A timber-framed building can be insulated with any one of a number of different natural fibre insulation materials (see overleaf for more on insulation). Some companies offer modular construction options, with structural panels manufactured offsite using straw (e.g. EcoCocon and ModCell) or other natural fibre insulation (e.g. PYC Construction).

At CAT we've avoided chemical treatment of timber whenever possible. The chemical treatment of timber has become almost standard practice in the UK, but it causes pollution problems at both manufacture and disposal. To avoid

timber decay, use good quality, well-seasoned timber and ensure that the building design provides protection or ventilation of all timbers. Rot-producing fungi attack timber that remains damp over a sustained period, so any timber that will get wet must be able to dry out. Instead of using a chemical biocide treatment to improve the durability of lower grade timber, another option is to use modified timber. This term covers thermal modification (heating the timber in a kiln), or chemical modification - such as acetylation or furfurylation (to make products including Accoya or Kebony). When you need a surface finish, look for natural paints and stains made from plant-based resins, oils and dyes. They will biodegrade on disposal, and little energy goes into their production.

Straw is a low value by-product of agricultural production, and building with bales is quick and easy. Hempcrete construction also uses a byproduct – the inner core, 'shiv', of the hemp stalk. CAT's WISE building has thick hempcrete walls, made by mixing hemp shiv with a hydraulic lime binder.

Timber and rammed earth in CAT's Information Centre.

Building with earth

Unfired earth has a very low carbon footprint because very little energy is needed to extract and work it. Earth is not an insulating material, but is a great way to provide 'thermal mass' to buffer heat. This makes it a good alternative to concrete blocks or bricks for internal walls.

There are different ways of using earth in building, and most have a very long history. We've used rammed earth walls and compressed earth bricks here at CAT, in our information centre and in WISE (the Wales Institute for Sustainable Education). Cob building uses a mixture of earth and straw and was traditionally used in the south-west of England and parts of Wales. Clay plasters can provide an original, natural finish to interior walls and ceilings.

Further Information

CAT runs many short courses on the natural building techniques mentioned here as well as our Masters degree in Green Building, and we also offer workshops to visiting groups.

Our online shop also stocks several comprehensive books about natural building materials. These include *Building with Straw Bales*, *The Hempcrete Book*, and *Clay and Lime Renders, Plasters and Paints*.

Visit cat.org.uk or call us on 01654 705950 to find out more.

CAT's Free Information Service is here to help, with advice on a wide range of topics relating to sustainability. **Visit** cat.org.uk/info **email** info@cat.org.uk or call us on 01654 705989.

Understanding insulation

To reduce energy use and cut emissions, we need to insulate millions of UK homes, but choosing the right material isn't always straightforward. We explore some of the options.

Shutterstock / stockcreations

Most of the houses we live in now will still be in use for decades to come – and millions of UK homes need to be retrofitted to radically improve their energy efficiency as we transition to zero carbon. Effective insulation is a vital part of this, but the materials we choose can make a big difference.

Types of insulation materials

There are basically three different types of insulation material:

1. **Organic** – those derived from natural vegetation or similar renewable sources, which tend to require a low energy use in manufacture (a low 'embodied energy'). Examples are sheep's wool, cellulose, cork, wood fibre, and hemp. Some are recycled from waste paper or textiles.
2. **Inorganic** – derived from naturally occurring minerals which are non-renewable but plentiful at source. Likely to have a higher embodied energy than organic materials. Examples are mineral/glass fibre, perlite and vermiculite (from volcanic rock) and rigid foamed glass. Some of these could be from recycled sources.
3. **Fossil organic** – derived by chemical processes from fossilised vegetation (oil) – a finite resource. Fossil organic insulation materials such as expanded polystyrene and polyisocyanurate or phenolic foam are highly processed, resulting in a high embodied energy than either of the other types above.

Which is best?

If possible it is better to choose insulation materials that have not been heavily processed as this will reduce the carbon footprint and environmental impact of your home. The breathability of insulation materials is particularly important in older buildings (with solid walls). But as long as issues like breathability and damp risks are addressed, inorganic or fossil organic materials are better than nothing at all, because insulating your home will lead to energy and pollution savings. Many grant-funded schemes may offer only a limited choice of materials, and there is not an organic insulation material suitable for cavity wall insulation.

The costs of insulation materials vary quite a bit, so do check what the current options are for your project. Some types of plastic foam can be quite expensive, and natural fibre insulations are getting cheaper as companies start manufacturing these on a larger scale within the UK.

If doing the work yourself, think also about the ease of installation when making a choice. Fluffy insulation is good for rolling out in lofts and suspended floors, for a tight fight between joists. Rigid boards are good for solid walls or across the underside of rafters in an attic room (to add to insulation between rafters). Each of these will come in certain sizes and will need to be cut to shape if you have some unusual spaces. Some materials can be cut with a knife, but a few will need a saw. You should still wear a face mask when cutting and laying any type of installation, because it's best not to inhale small fibres of any kind.

With any insulation, the right method of installation is needed to avoid problems such as damp, thermal bypass, and thermal bridging (where a solid material spans across the insulation). Materials will often need to be installed with suitable vapour control layers above and/or below them. Suppliers of materials should have guidance documents on suitable layers for different jobs.

Solid walls could be insulated either externally or internally with rigid boards, fixed to the walls with screw fittings, and rendered or plastered. Solutions are available as a package that will include compatible render or plaster, to give a robust finish. If using a fluffy type of insulation, this will need to be held within a timber framework, and careful design is needed to minimise thermal bridging by the timber.

How thick?

The 'thermal conductivity' of insulation measures the amount of heat loss, so a lower value means less heat loss for the same thickness of material. It measures heat loss in watts, per metre thickness of material, per degree difference (in kelvin, K) – abbreviated to W/mK.

Most natural fibre insulations will have a thermal conductivity of between 0.035 and 0.040 W/mK, which is similar to polystyrene and glass fibre insulation. Some types of plastic foam have a lower thermal conductivity of about 0.02 to 0.025 W/mK, which means they can be half to two-thirds as thick for the same heat loss reduction, but as mentioned they can have issues with breathability in an old house, will have involved more pollution and energy use in manufacture, and will be harder to eventually dispose of.

There are other synthetic materials with even lower thermal conductivity, such as aerogel insulation (like 'spacetherm') at only about 0.015 W/mK thermal conductivity or sealed vacuum panels at 0.007 W/mK – but these have much higher costs and embodied energy.

Meeting the standard for solid walls

For a house with solid walls, adding just a few centimetres of insulation has a big effect. Where space is really limited, about 5 centimetres of something like wood fibre insulation board could cut heat loss through the walls by about 75%. Adding about 10cm could result in about 85% less heat being lost through the wall.

Products that are only a few millimetres thick won't have anywhere near as much effect as adding a few centimetres of insulation, but can cost as much or more. If you have questions about solutions you've been quoted for, you can contact us. The U-value that needs to be met for building regulations can be adjusted depending on circumstances. This value measures heat loss in watts, per square metre (e.g. of wall), per degree difference – abbreviated to W/m^2K.

There's a target U-value of 0.3 W/m^2K for solid walls, but you don't necessarily need to meet that. You need to meet the lowest value that is "technically and functionally feasible" and will "achieve a simple payback of 15 years or less" – and that could be up to 0.7 W/m^2K (the higher the U-value, the more heat loss). About 5cm of almost any insulation can get you below that 0.7 W/m^2K U-value.

Other things will affect the overall heat loss from a house, including the roof and floor insulation, window size and quality, and air leakage through draughts. Some amount of solid wall insulation will be part of reaching a good overall standard.

For more specific guidance on insulating different parts of a house, see the information pages on CAT's website or contact the information service.

Finding eco-builders and further advice

The AECB promotes sustainable building and retrofit, and you can find eco-builders using their directory of members. Another listing site for green builders is the Green Register. For links to other places to find local builders, and for more about specialists in particular building materials and techniques, you can contact CAT's Information Service.

Joel Rawson is CAT's Information Officer, providing free and impartial advice on a wide range of topics related to sustainability. You can get in touch with him at info@cat.org.uk or on 01654 705989, or visit our website for information and advice on a wide range of topics – cat.org.uk/info.

Doing architecture differently

Dr **Carl Meddings** introduces the work of some of the students in the final year of their studies on CAT's Masters in Sustainable Architecture (MArch).

Dr Carl Meddings

As CAT celebrates its 50th birthday, it is wonderful to see this year's final year students' work embodying our mission and that of the original volunteers who began CAT in 1973. They truly are pioneers, often finding themselves in unchartered territory, willing to push the boundaries of their knowledge to discover how they may become the changemakers that the profession so desperately needs!

Studying sustainable architecture is a passion. It is also a mission, which these students embrace wholeheartedly. The ethos of the course and of CAT is one of shared learning, mutual support and encouragement and, above all, a commitment to sustainability; not as a 'bolt on', but as the very foundation stone of the designing and making of buildings and places that respect the planet and its ecosystems and which will stand the test of time.

The students have shown, through their work, that CAT's way of 'doing architecture differently' leads to earth-respecting, socially resilient, life-enhancing designs.

CAT provides postgraduate-level education through the Graduate School of the Environment on a wide range of topics related to sustainability, including a Masters (Part II) in Sustainable Architecture for students training to be architects. This is the only rural-based and sustainability-focused architecture course in the UK.

We break the mould of traditional architectural education with a number of key themes at the heart of how we teach.

- We are a community of learners, with students, tutors and professors learning from each other.
- We provide an aesthetic education – materials, making and craft sit at the heart of what we do.
- We define sustainable architecture by fully doing architecture differently, acknowledging the impact of humanity on our planet and the need to act now.

Hands-on experience during our Materials Week.

Final Design and Dissertation Projects 2022–2023

The final design project provides students with the opportunity to develop a design concept relating to a subject and/or location that resonates with them. These projects follow some of the same stages that are seen in real-life architectural projects, giving students invaluable experience of the different aspects of design. Below are a few examples from this year's cohort.

Georgemma Hunt – Centre for Alternative Materials (CAM)

Georgemma's 'Centre for Alternative Materials' is an interdisciplinary education centre that balances nature recovery and material innovation through a focus on holistic land and resource management. Situated on the edge of a rehabilitated saltmarsh, the project takes a sensitive approach to increasing coastal resilience through the insertion of a porous shingle bank around a swathe of floodplains. The architecture itself is an educational tool through the specification and display of experimental landscape-derived materials that respond to the dry, porous and wetland conditions.

Em Edwards – The Supermarket Reimagined

This project uses the typology of the arcade to reimagine the supermarket as a place of interaction, production and exchange instead of one of anonymity and consumerism. It seeks to create food security in the historic market town of Oswestry within a changing future climate. The chosen site is adjacent to an alleyway, in response to dissertation research that concluded that these routes are made and maintained by walking, predating the car-dominated town centre. The site renovates and extends two existing buildings, a 1930s cinema and a Victorian furniture shop, and connects them using an arcade. Their heritage is celebrated through the new use within these redundant buildings.

Polly Orton – The CORE Centre

The CORE Centre is imagined as a hub for community resilience in Clifton, York. Through her design, Polly explores the development of sustainable self-sufficiency in a deprived neighbourhood. The scheme retrofits and extends a former elderly people's home, which sits between a residential area and an expansive green space. Incorporating a community café, co-working space and library of things, the centre provides a radically inclusive community venue at the heart of an existing neighbourhood.

These and other Final Year Projects are currently on display at CAT. The exhibition is free with entry tickets. You can find out more about our MArch Sustainable Architecture course and other CAT postgraduate degrees at cat.org.uk/gse

Live projects and site trips

Community consultation in Milford Haven – October 2021

This cohort's first full design project was based in the Pembrokeshire port town of Milford Haven. The students carried out detailed group research into the history and context of the local area in order to develop a deeper understanding of the place in which we would be proposing our architectural interventions. The feedback received during the research process went on to inform subsequent design projects.

Materials Week – May 2022

Over the annual Materials Week, the students rotated between various workshops, learning from experts on topics including:

- **Straw Bale Construction**
- **Earth Building**
- **Timber Grading and Structure**
- **Lime**
- **Fibre and Binder (Hemp Lime)**

Scotland trip – September 2022

For the yearly study trip, the group travelled to Glasgow, from where they explored key sites, buildings and other towns and cities of notable interest, listening to a broad range of resonant voices from the different walks and flavours of architectural practice. This was in order to deepen their understanding of the profession, its complex history and widen their horizons to the infinite possibilities and directions in which they could take their own paths forward.

About the author

Carl is the Programme Leader for the MArch: Sustainable Architecture. He is an architect and educator with a passion for educating architects in a rapidly changing cultural and professional environment. Before teaching at CAT, he was the Subject Leader for architecture at the University of Huddersfield and has taught at all levels from first-year undergraduate to final year at masters and beyond. Carl is an active RIBA member serving on Validation Boards, the New Courses Group and the Membership Eligibility Assessment Panel.

CAT conversations: Janna Laan Lomas – Founding Director of Grain Architecture

Janna Laan Lomas graduated from a CAT postgraduate course in architecture in 2014. She now runs Grain Architecture, a design practice specialising in the use of natural low-carbon materials. **Alis Rees** caught up with Janna when she visited CAT to share her knowledge and journey with current students on our MArch Sustainable Architecture course.


Janna Laan Lowmas

Alis: What were the best things about studying at CAT?
Janna: There were so many great things. If you'd asked me this in the first few years after finishing the course, I think I would have said the people. The community that you become part of is amazing, and the inspiration you get from other enthusiastic people is infectious.

But I'm also becoming more appreciative now of the content of the course and the integrated approach to a broad range of topics, not just on sustainable architecture but the whole built environment. I particularly value that we learnt to understand buildings more holistically, thinking about energy-efficient design and building performance, but also how buildings impact all the different systems that support them and their inhabitants, from health to ecology. That kind of holistic and integrated teaching was really valuable. It definitely influenced everything I do and the way that I think.

AR: How did your experience studying at CAT influence your journey after graduating?
JL: I've always been interested in the environment, but I think more from an ecological point of view, so although some of the building techniques and materials were completely new to me, other sustainability concepts weren't. I've always loved nature and had a desire to be self-sufficient, since I was a child. But going to CAT opened my eyes to a lot more. My understanding of sustainability broadened massively, thinking about energy, carbon, pollution, resource depletion, water, soil, air, and material circularity.

After CAT, I desperately wanted to use what I'd learned and have maximum impact on the world, especially with the urgent need to act on the climate and biodiversity crisis. So I set up a business!

AR: What is Grain Architecture?
JL: Before I set up Grain, I'd been speaking to people, including other architects, and realised that not many architecture projects or practices were using natural materials. I had all this knowledge from CAT and thought I can surely apply this and offer it to clients. So I started working on small projects, which became larger projects, and that turned into me setting up my own practice. At the time I started Grain it was just me and occasionally freelance architects helping out. There have been some challenging times such as during covid, but we've generally been steadily growing and are now a team of four, including fellow CAT graduates Andy Hales and Jen Rawlings.

We're a small ethical design practice, specialising in the use of natural low-carbon materials. We aim to create healthy, breathable, beautiful spaces supporting land and ecological regeneration, carbon sequestration, using safe materials, high-performance design, cradle-to-cradle analysis, retrofit, and Passivhaus techniques. We're quite niche (sadly) and there are still very few other practices doing what we do, but I definitely see our dedication as our strength, and the specialism helps us focus on having a positive impact on both the environment and the people we work with.

AR: Why is it so important to you that we educate students, architects, builders and designers about using natural materials?
JL: It's *so* important. Our natural ecosystems are in severe decline and the impact our building sector has on the environment is huge. We have so much work to do as an industry; using sustainable building techniques in new-builds is essential, and there's an awful lot of retrofit that needs to happen. But it's key that this is done without using carbon-intensive materials and methods, otherwise the carbon footprints could outweigh the carbon savings of improved performance. It's absurd that embodied carbon is still not regulated.

So we need everyone in the industry to understand a whole range of materials that are different to the conventional materials currently used. Upskilling builders to use natural low-carbon materials – timber, wood fibre board, hemp, straw, clay, lime and so on – and grasping the physics that goes with that, i.e. understanding moisture and condensation, would actually help tackle the health crisis too.

Ultimately I want other architects to know and do what Grain does. Sustainability should be embedded in training and education so that it becomes the norm.

What CAT is doing is great. With my employer hat on, I look at a student who has studied at CAT and instantly know they're going to have good holistic knowledge of environmental issues and sustainable architecture broadly, which is such a positive thing. What I learned at CAT is what everyone should be taught. The teaching gives you not just the background information about materials, but also teaches you how all things link together, which is what makes it so incredibly valuable.

About the author
Alis is CAT's Graduate School of the Environment Marketing and Communications Officer. You can get in touch with her at study@cat.org.uk or discover more about our postgraduate degree programmes by visiting cat.org.uk/study

If you have a CAT story to share, please contact members@cat.org.uk. We love hearing about the work you're doing and how CAT has inspired you.

"A lasting statement of what we aspired to be in life"

Throughout CAT's 50th year, we have been sharing a series of personal legacy stories, and we have been deeply moved by some of the common threads and distinct motivations behind our supporters' giving.

As we celebrated our 50th anniversary at CAT on our August open day, I heard from Mike, who wrote of the life-long generosity of his late father Bernard, who remembered CAT with a residuary gift in his Will.

Bernard was a long-term supporter and friend to many staff at CAT, including our much-missed late Chair Sally Carr. A warm thank you goes to Bernard, Mike and his family, for their kindness.

Many of our supporters leave CAT a percentage of what is left of their estate, after they ensure their family and loved ones have been taken care of. This type of gift is known as a residuary gift. It is easy to add to an existing Will without interfering with any specific sums you have left to family or friends. As it is a percentage of an estate, it has the benefit of protection from inflation (unlike fixed sums, which can have their value gradually eroded over time). This really helps charities such as CAT to make the most of your generosity.

To find out how you could explore this type of giving, please get in touch - you can email me at freya.randall@cat.org.uk or call me on 01654 523015.

Freya Randall, Fundraising manager.

Bernard's story

My late father was always very passionate about the environment and doing everything possible to reduce humanity's effects upon it.
He first heard about CAT in the early 1990s, while he was in Wales researching a lead on our family history. He decided to visit while he was in the area almost on the spur of the moment. When he came home, although he had successfully found and met a "new" relative, he was just as excited about what he had seen at CAT and all the great work the team were doing. The Cliff Railway had recently opened at that time.
My dad recycled before kerbside collections were a thing; he was a keen gardener and was very proud of his composting system. After a visit to CAT, my parents installed solar panels for their bungalow in the early 2000s and became further inspired to commit to low impact living. He would have loved to have visited more frequently to see the developments that have been made to the site, but sadly in his later years was unable to travel as easily. He remained a keen supporter over the next 30 years.
My dad understood the importance of giving to charities. Leaving a residuary legacy to CAT was a natural extension of his general generosity. He wanted to give money to deserving causes, because he was wired like that.
I think gifts in Wills are a very powerful thing. Not only for the beneficiaries, or even the tax advantages. Leaving a part of our estate to charity is a lasting statement of what we aspired to be in life. Our Will is quite literally our final act and legacy to future generations.
My parents' Wills summed them up as people; they both left me the better part of their wealth, but were incredibly generous to the causes that they cared about. In all honesty, I love and respect them both even more for this, than had they been more generous to me. The team were very kind and helpful to us while we went through the administration and probate application, and I hope that we'll be able to make a visit ourselves next time we're in Wales.
Mike

Clean Slate 128
Crossword Solution

DYING WYE. WHY?

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Dale Vince
Ecotricity Founder

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