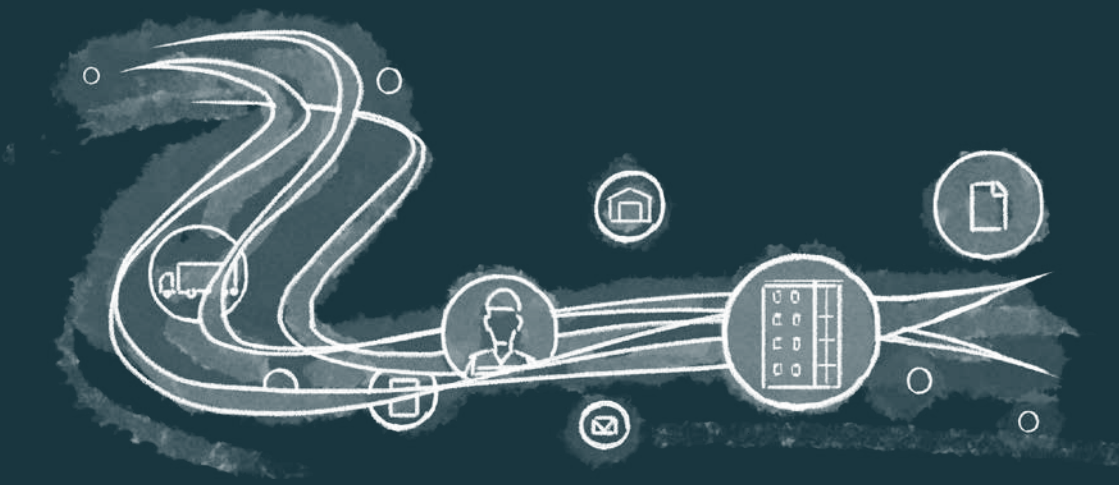
101 innovations that are changing construction



20 YEARS LMC

COMMS FOR CHANGE-MAKERS

Foreword

Effective communication is a vital part of innovation. Without it, even the most ground-breaking ideas struggle to take root.

That's where **LMC** comes in.

For twenty years, we have represented organisations and thought leaders within the built environment who are at the forefront of innovation.

Our passion is to use our skills as communicators to help make positive change happen.

And thankfully, as you know, our industry is never short of good ideas.

So take a pictorial stroll through this first volume of innovations from different parts of property and construction.

We'll leave you to decide which ones deserve to stand the test of time... and which others we've missed.

Contact us at **hello@lizmale.co.uk** to contribute to Volume 2.

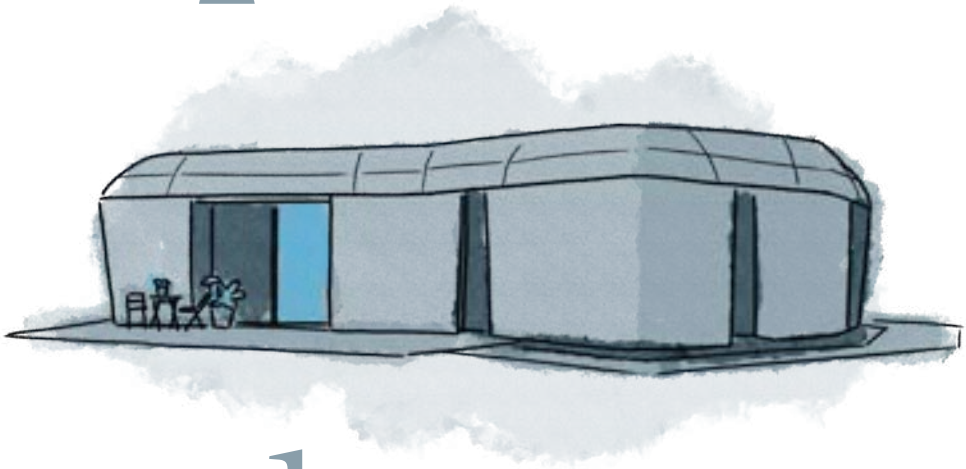
Innovations

001. 3D printed homes
002. 3D Repo
003. 4D, 5D and 6D BIM
004. Accoya
005. ADS 1.1
006. Aerial Additive Manufacturing
007. AeroBarrier
008. Aerogel
009. AI-led construction optioneering
010. AIMCH
011. Algaesys
012. Audette
013. Augmented Reality (AR)
014. Autonomous Construction Vehicles
015. Bee bricks
016. Bendable concrete
017. BIMx
018. Biodiversity Net Gain
019. Biond
020. Cap and Cover
021. Carbon Capsule
022. Career Pathway Hub
023. CCPI
024. Chips Board
025. Cigarette Butt Bricks
026. CleanFiber
027. CobBauge
028. Construction Data Trust
029. Construction Playbook
030. Corrosion sensors
031. CPQP
032. CraneX
033. CReDo
034. Critical to Safety Framework
035. Cross Laminated Timber (CLT)
036. Datacentric heating
037. D-COM
038. DfMA
039. Digital Twins
040. Drones
041. Eave
042. Electrochromic glass
043. Enerdrape system
044. Exo-skeletons
045. Fibre reinforced concrete
046. Fyld
047. Generative design
048. Glued Laminated Timber (Glulam)
049. Golden Thread
050. HAL Robotics
051. Heat3D
052. Heat-emitting wallpaper

053. HOPPE eHandle
054. Improved EPCs
055. Industrial Safetytech Regulatory Sandbox
056. Infrared heating
057. Integrated Project Delivery
058. Invisible fireproof coating for wood
059. K Briq
060. Laser-cut steel
061. LEXiCON
062. Machine Eye
063. Memory steel
064. Metaverse showhome
065. National Land Data Programme
066. NODE flat-pack homes
067. Oculo
068. Pavegen
069. Perovskite Solar Cells
070. Phase-change materials
071. Plantd
072. Plasmonic paint
073. Plinx
074. Point cloud surveys
075. Pulse
076. Q Bot
077. Recycled glass cladding
078. Robodog
079. RPD 35
080. Sandpit projects
081. Scope 3 Made Easy
082. Seismic
083. Self-healing concrete
084. Smart HTC
085. Solar Squared
086. Spiral Tower
087. Stone veneers
088. Sugarcrete
089. System 3E
090. Talentview Construction
091. Tallwood project
092. The Atom
093. ThermoPrint
094. Tomorrow's Architects
095. Translucent concrete
096. Transparent wood
097. TyBOT
098. Value Toolkit
099. Waste water heat recovery
100. Wendy
101. Wool-reinforced Bricks

20 YEARS LMC
COMMS FOR CHANGE-MAKERS

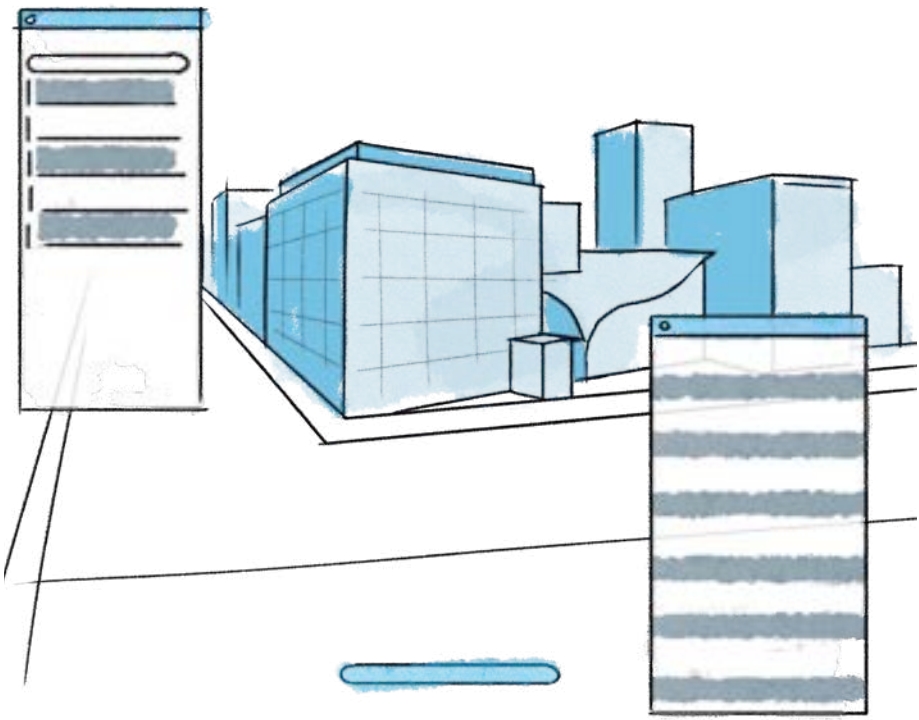
3D printed homes



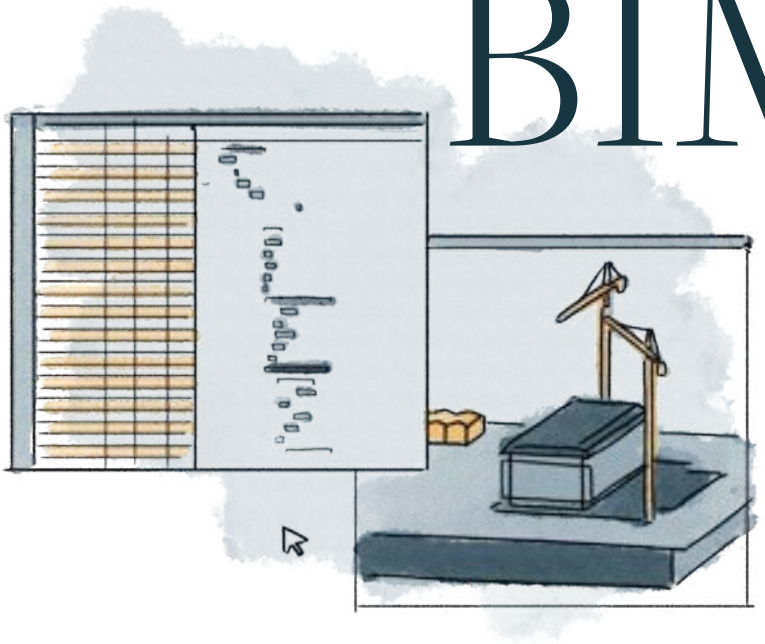
A fast method of delivering housing, with buildings constructed of layers of extruded concrete, often built using robotic arms, sand printers and gantry systems.

3D Repo

A cloud-based platform, recently acquired by Asite, that helps manage BIM data, enabling real-time collaboration and project management for construction projects.



4D, 5D and 6D BIM



Technology that adds scheduling information, then cost information, then facility management information, to Building Information Modelling.

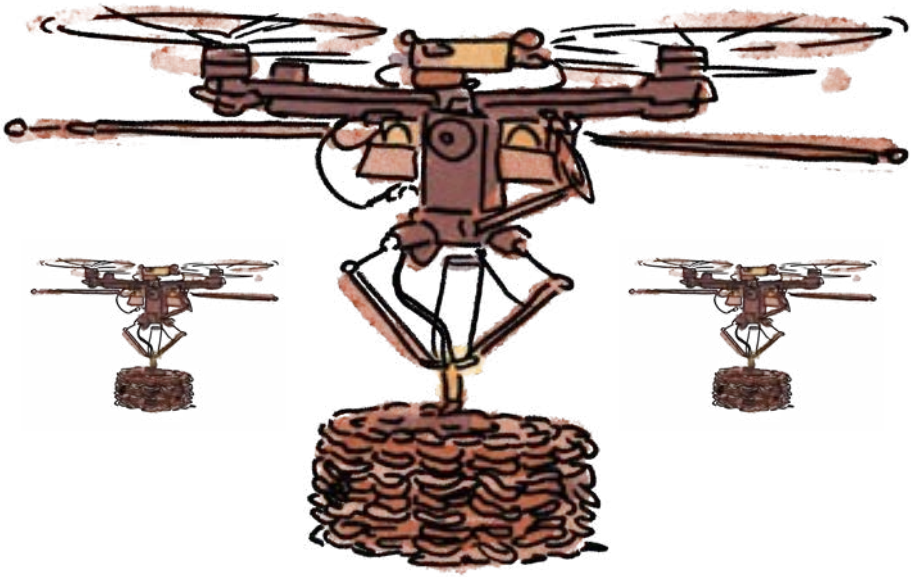
Accoya

A high-performance modified (acetylated) wood, it's non-toxic, highly durable and stable. Commonly used in the construction of windows, doors, cladding, decking and even underwater structures.

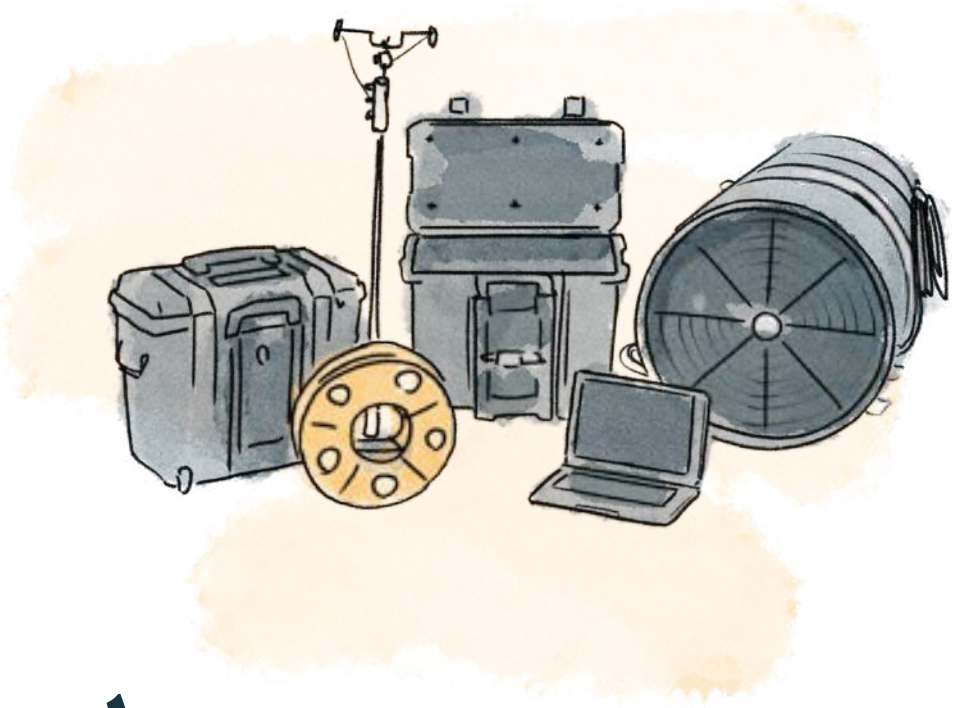
ADS 1.1

LHC developed a new method of scoring potential suppliers focused on social value and EDI, which successfully attracted micro-SMEs and minority-led architecture practices onto the framework.

Aerial Additive Manufacturing



AAM uses fleets of drones working together from a single blueprint to 3D-print structures, depositing materials during flight to build from the air.

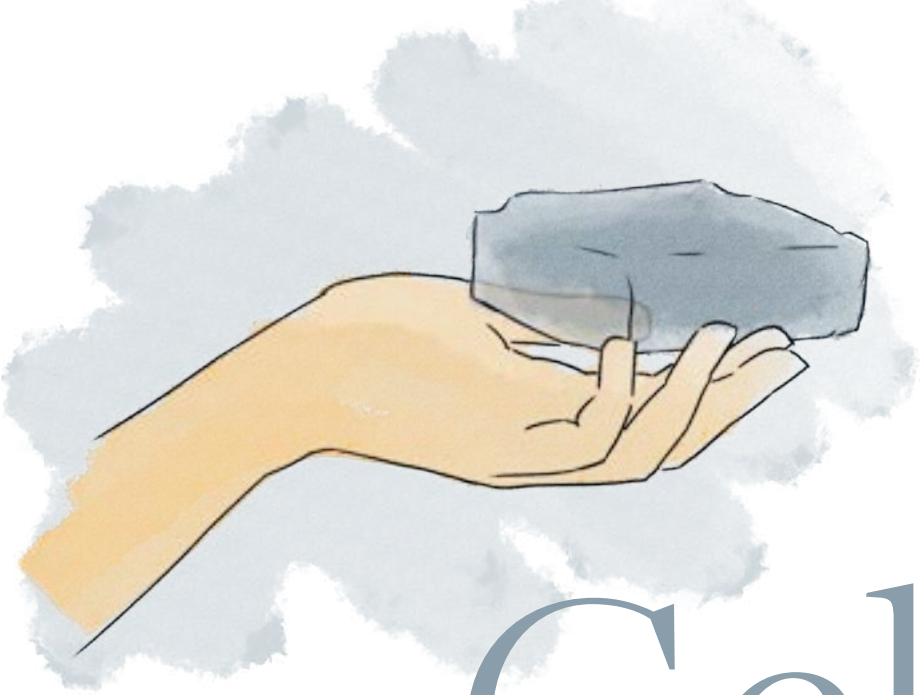


Aero-Barrier

A technology that seals leaks in building envelopes by pressurising the space and injecting a non-toxic aerosol sealant, improving energy efficiency and indoor air quality.

Aero Gel

A lightweight, porous material that has extremely low thermal conductivity, making it an effective insulator for various applications in construction, aerospace, and other industries.



AI-led

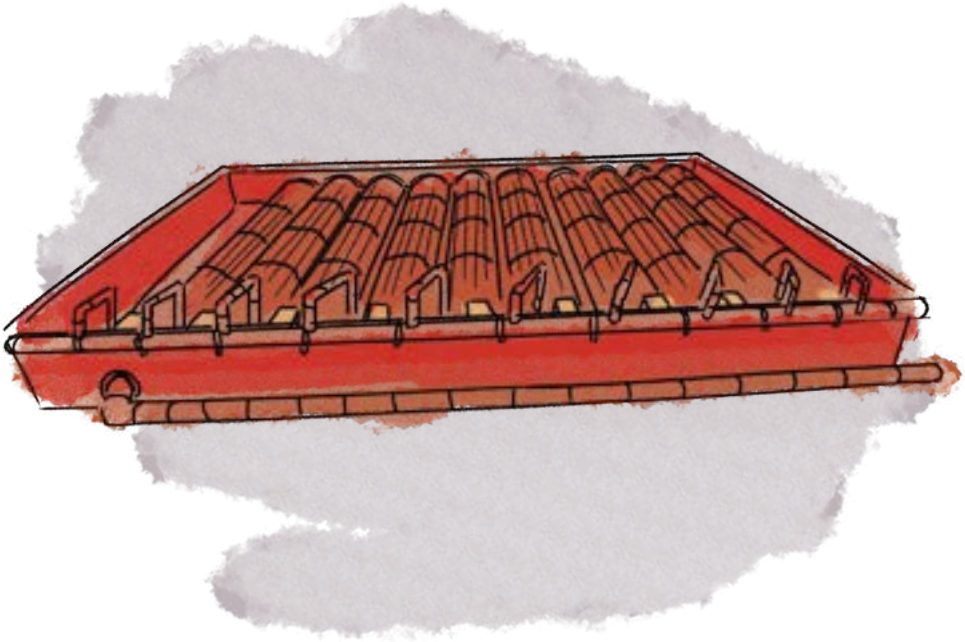
Construction Optioneering

Pioneered by ALICE Technologies, this process uses Artificial Intelligence to optimize the design and construction process by analysing data and generating alternative solutions.

AIMCH

Advanced Industrialised Methods for the Construction of Homes (AIMCH) was a £6.5 million, three-year, collaborative, research and development project. The project sought to identify solutions for workforce challenges, skills shortages and low affordability.

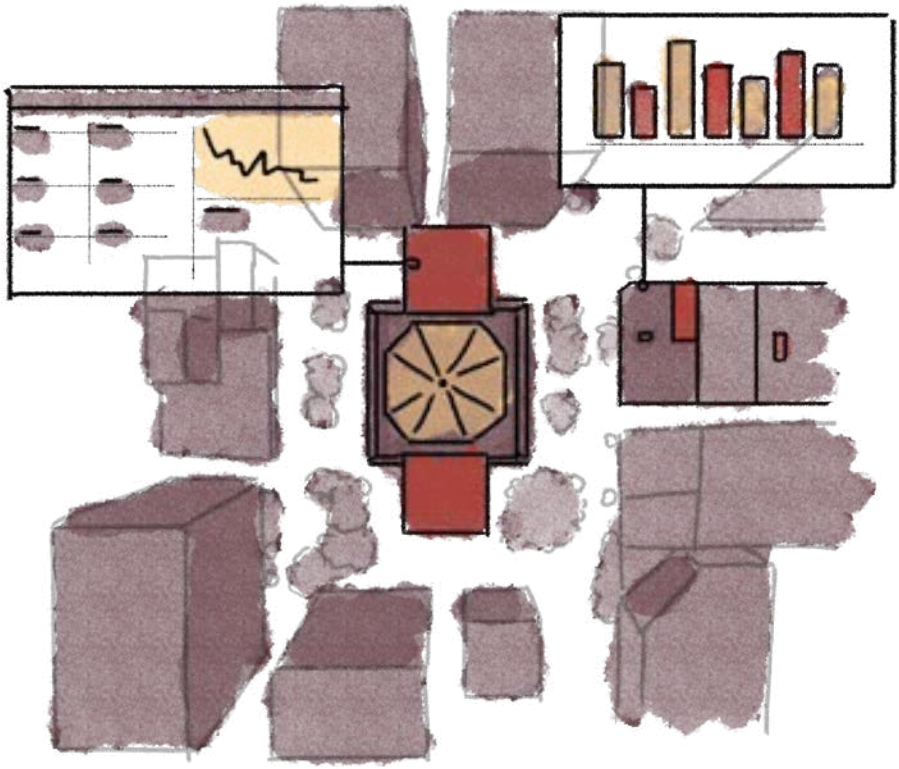
Algaesys

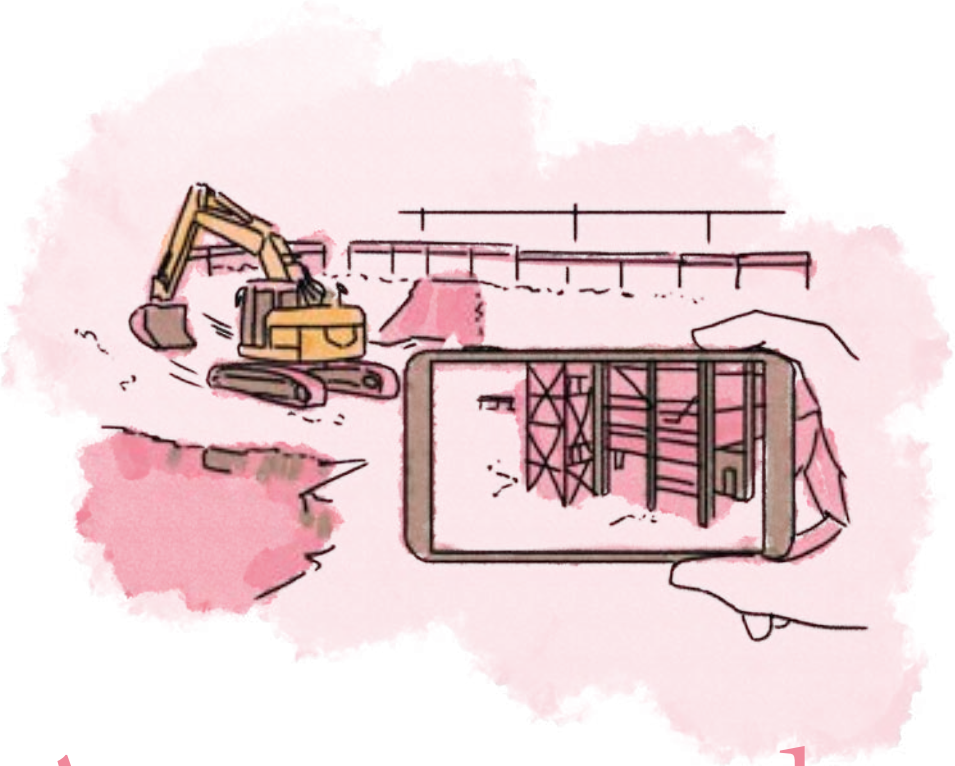


A solar-powered, natural algae-fuelled system that automatically cleans waste water and provides fresh water for construction and agricultural uses in local communities affected by water shortages.

Audette

An AI-powered tool that can analyse a full portfolio of commercial real estate for decarbonisation opportunities and build a plan to retrofit every building in the most cost-efficient manner.



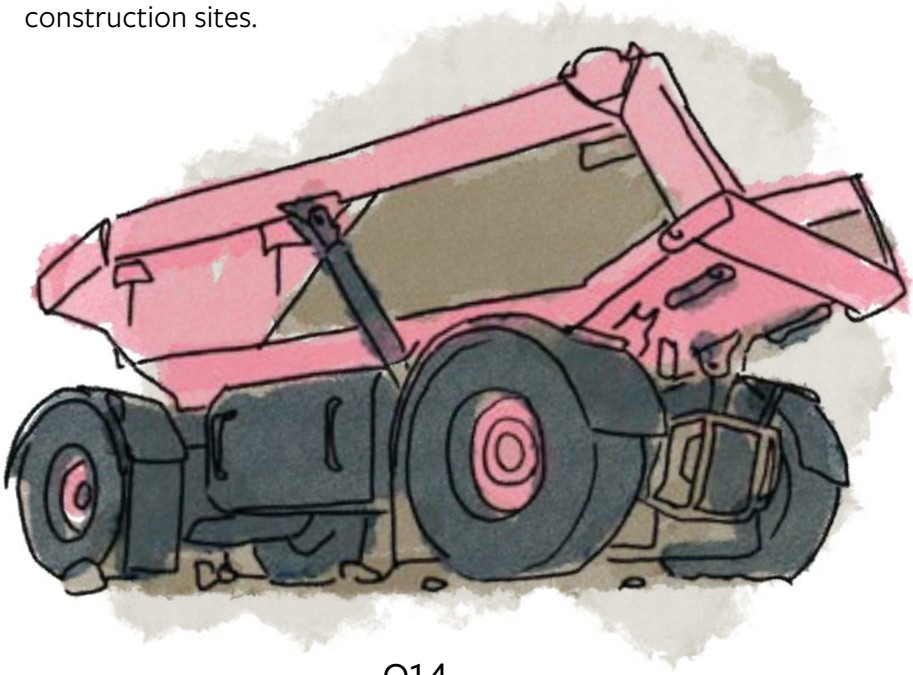


Augmented Reality

AR is being used to improve quality assurance within offsite manufacturing and to guide construction and installation work on-site.

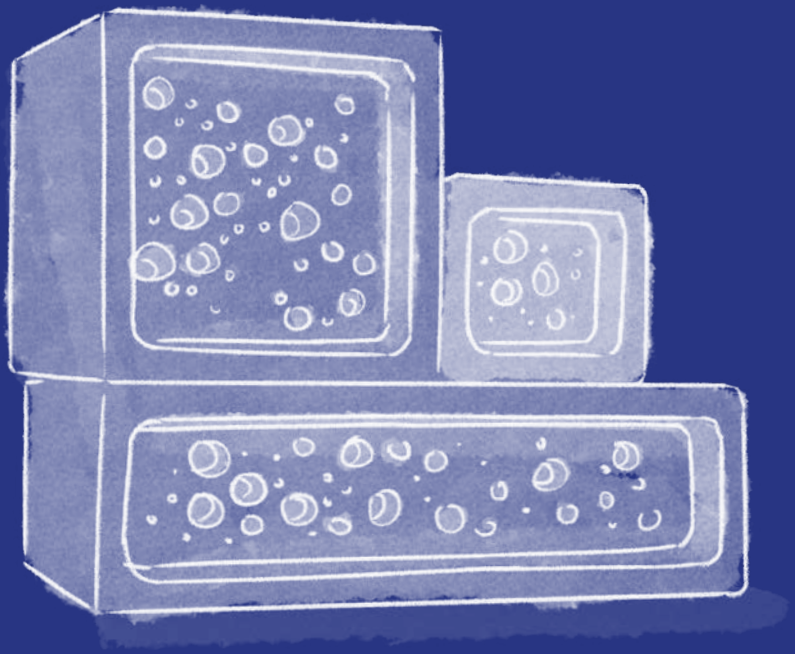
Autonomous Construction Vehicles

Robotic machines that perform tasks such as excavation, grading, and paving without human intervention. They use advanced sensors and AI to navigate complex environments, increasing productivity and safety on construction sites.

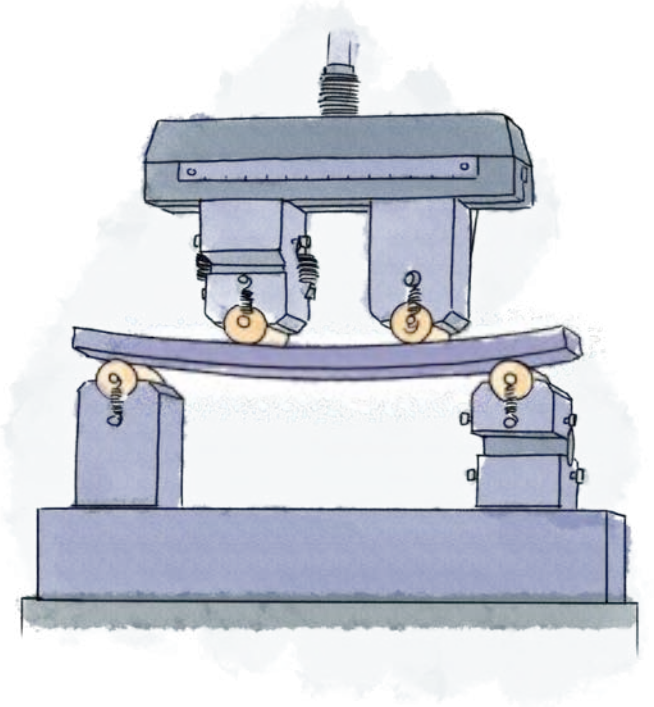


Bee Bricks

Specially designed bricks with holes and grooves to provide nesting sites for solitary bees, helping to support local biodiversity and encourage pollination.



Bendable concrete

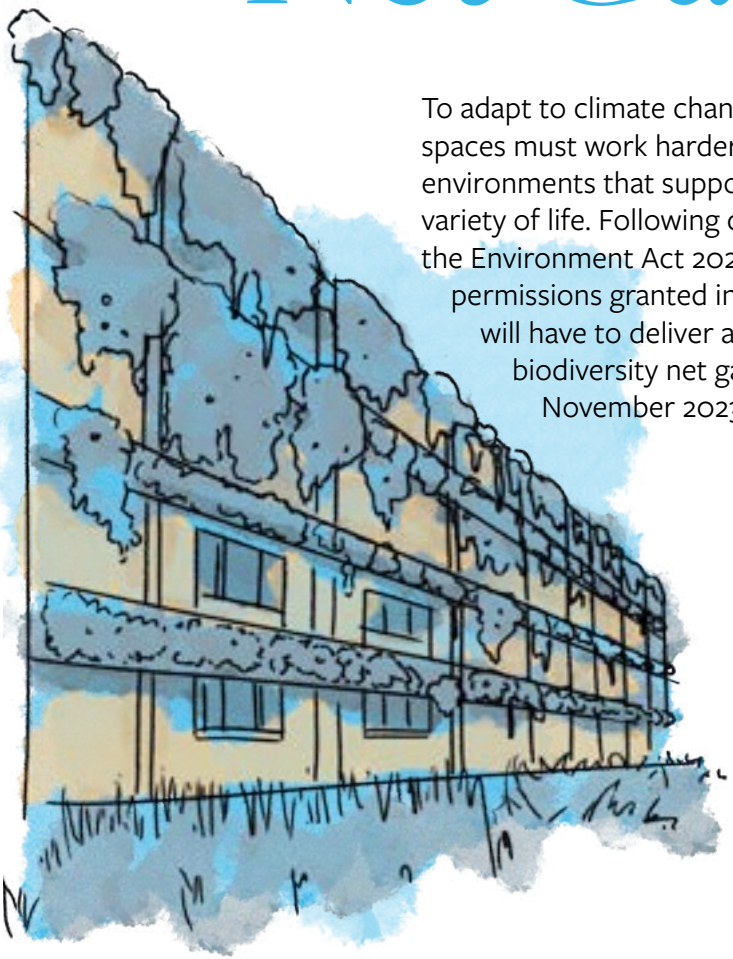


A type of concrete that can flex without cracking, making it ideal for earthquake-resistant structures and other applications where flexibility is important.

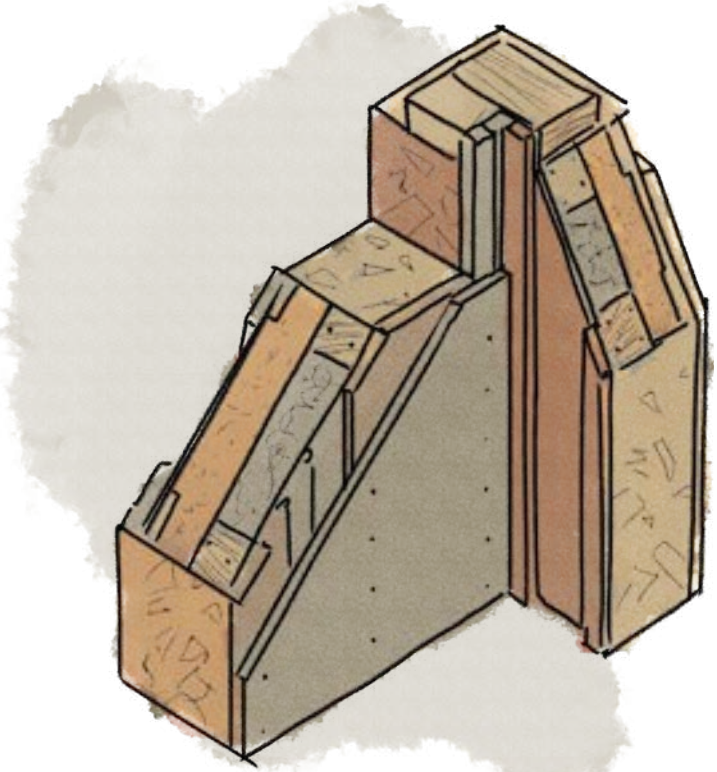
BIMx

Graphisoft's award-winning BIMx enables you to intuitively explore and interact with a Building Information Model (BIM) in Virtual Reality (VR) using mobile and desktop devices

Biodiversity Net Gain



To adapt to climate change, our urban spaces must work harder to create environments that support a broad variety of life. Following changes to the Environment Act 2021, all planning permissions granted in England will have to deliver at least 10% biodiversity net gain from November 2023.



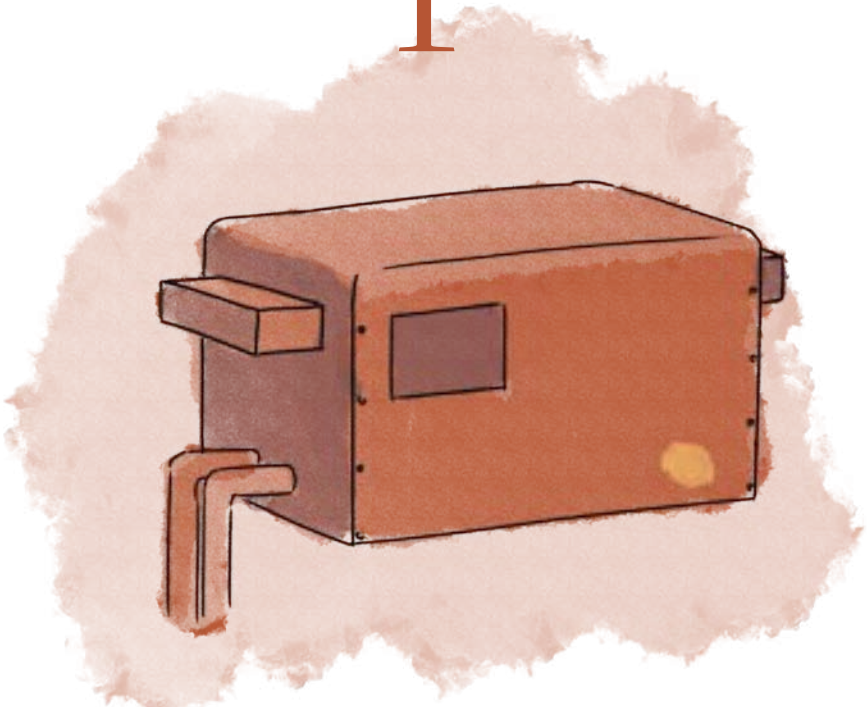
Biond

A closed timber frame panel construction system, insulated with a mix of wood fibre, hemp and lime. Created by Greencore Homes to build its 'climate positive homes', it is better than net zero in terms of embodied carbon, with no offsetting required.

Cap and Cover

A movement in the USA to cover huge busy roads with green 'caps' – parks which can filter the pollution coming from beneath. These projects are expected to help reduce the urban heat island effect, cool cities and undo the segregation and division of communities.

Carbon Capsule



A modular add-on to existing HVAC systems that captures and sequesters carbon dioxide, volatile organic compounds and other pollutants.

Career Pathway Hub

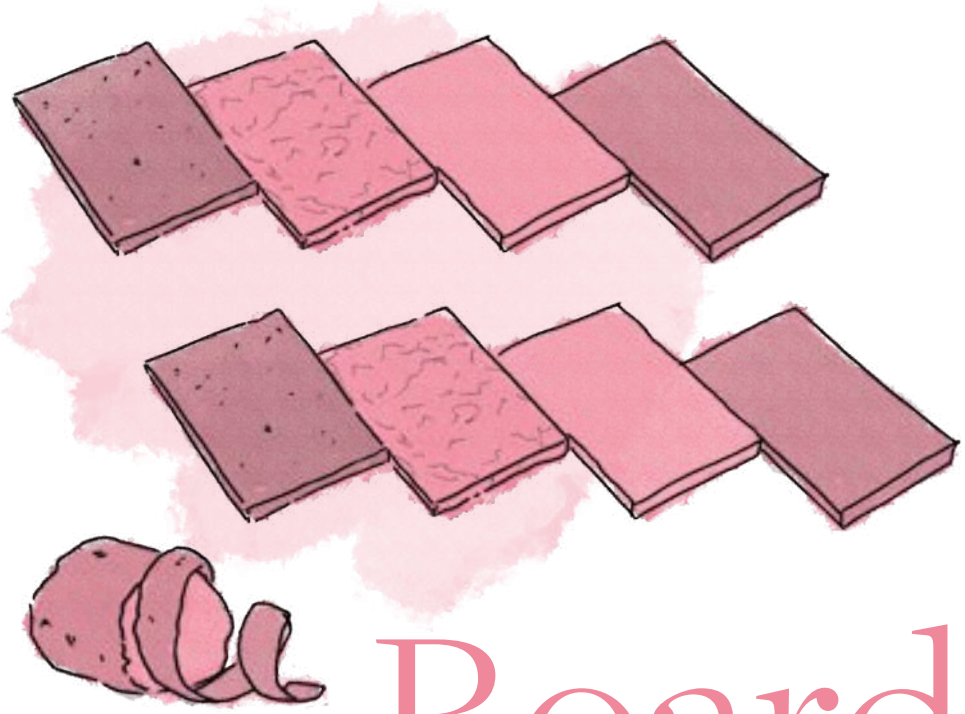
An online portal aimed at defining high-value career pathways for net zero, digitalisation, smart construction and home repair, maintenance and improvement (RMI) work.

The Code for Construction Product Information is a scheme to provide assurance that users of product information have the necessary facts when making decisions about specifying or installing their verified products.

CCPI

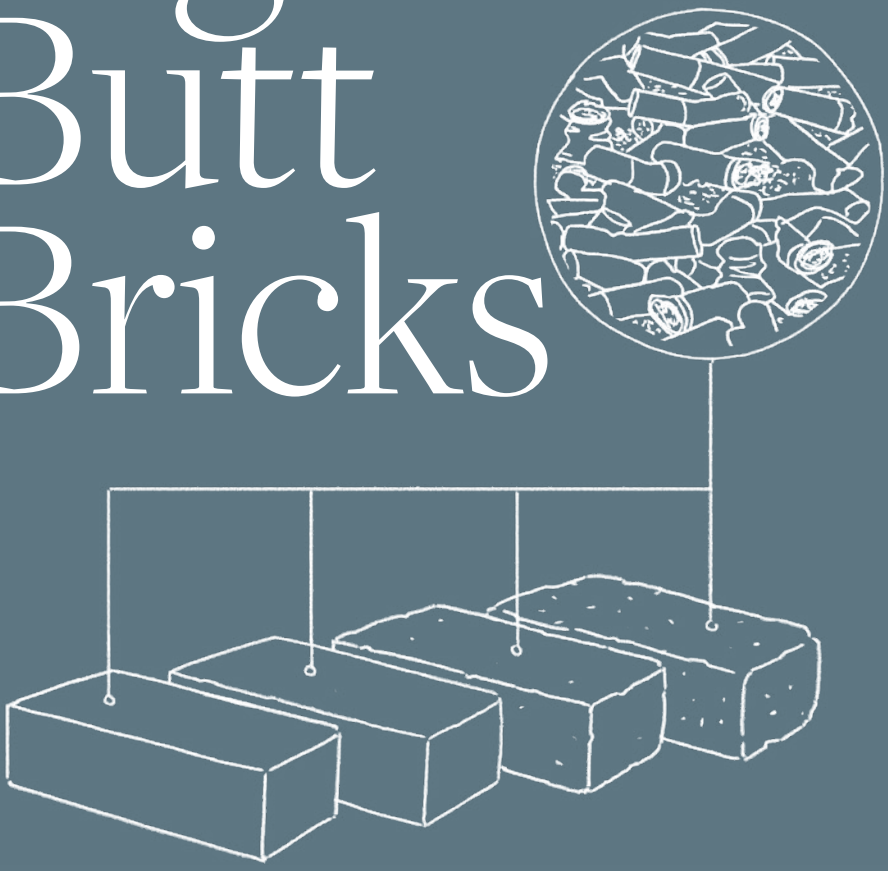
Chips

A type of engineered wood made from potato peel waste and other natural materials. It has similar properties to MDF and can be used in various applications such as furniture, interior design and construction.



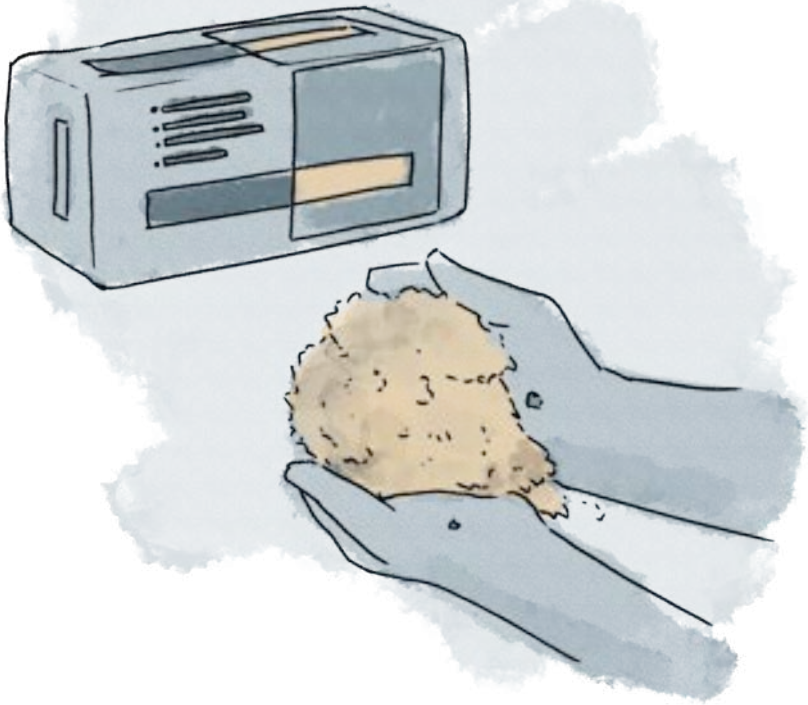
Board

Cigarette Butt Bricks

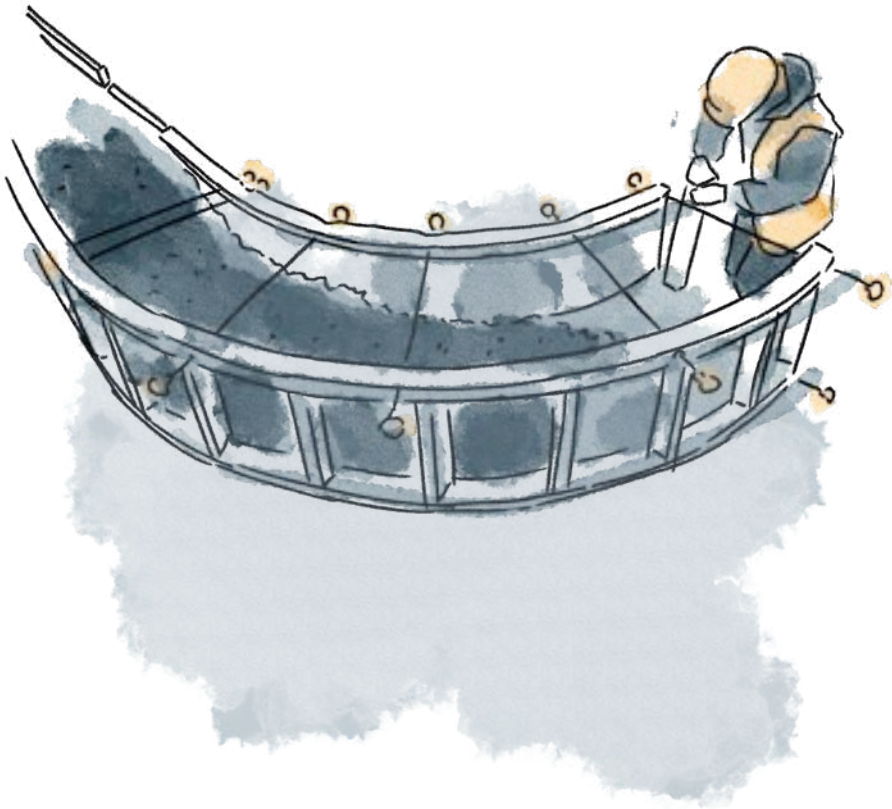


Construction bricks made from recycled cigarette butts, providing a sustainable solution to a major source of environmental waste.

Clean Fiber



A new low-dust, fire-retardant, cellulose-based insulation made from recycled cardboard boxes.

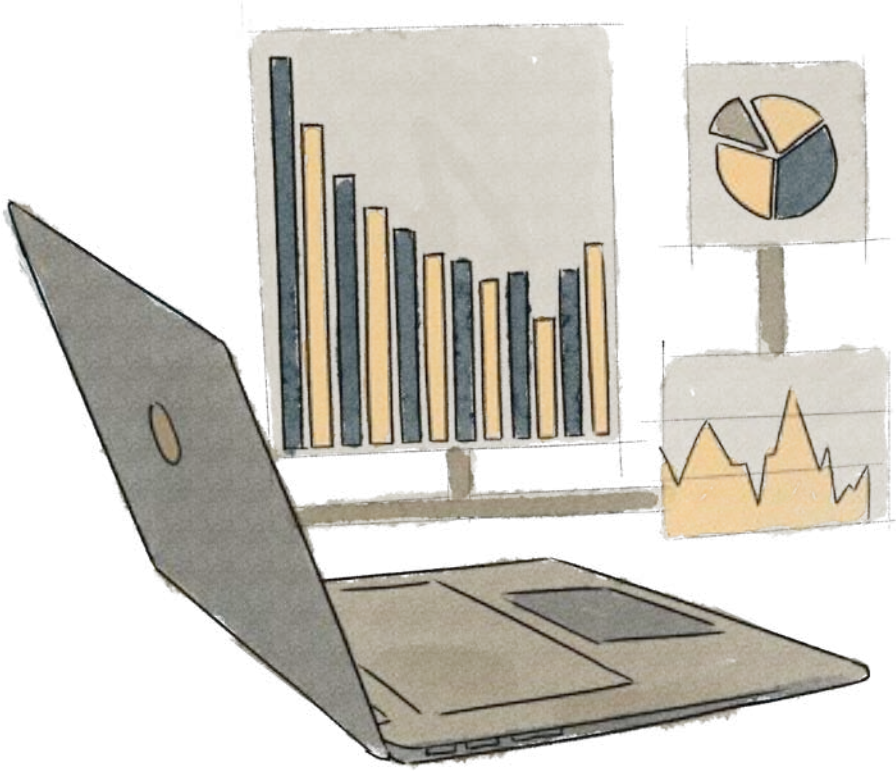


CobBauge

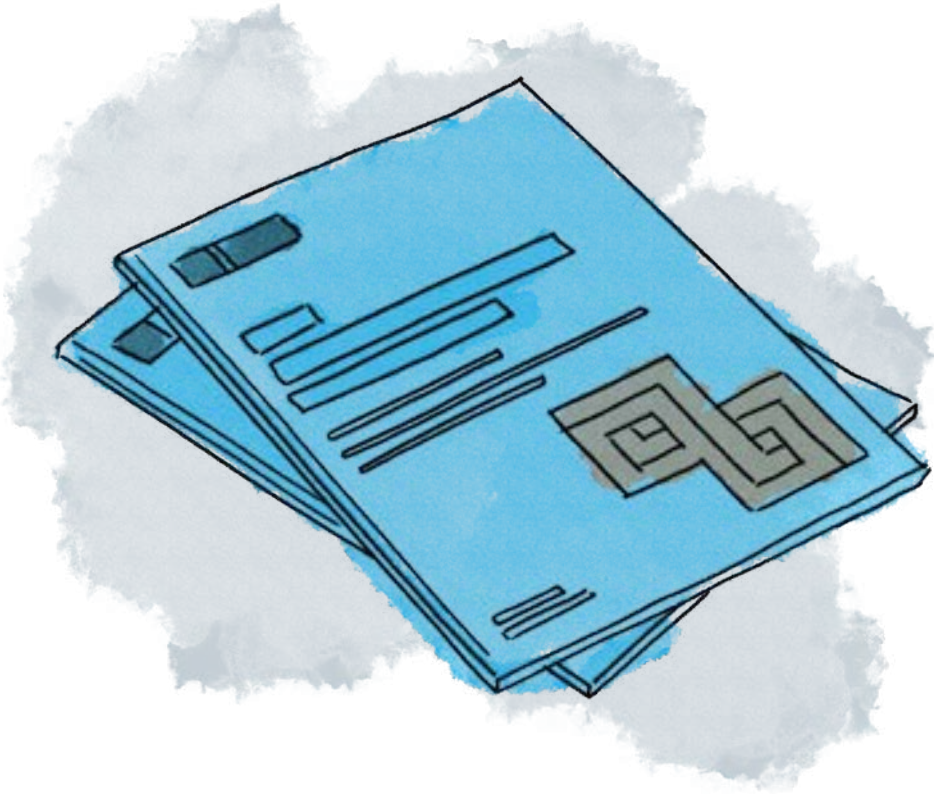
A new composite solid wall construction method, which develops traditional cob construction to meet today's thermal performance regulations.

Construction Data Trust

A not-for-profit initiative set up to collate, share and benchmark productivity data and encourage contractors and others to measure the productivity of their projects.

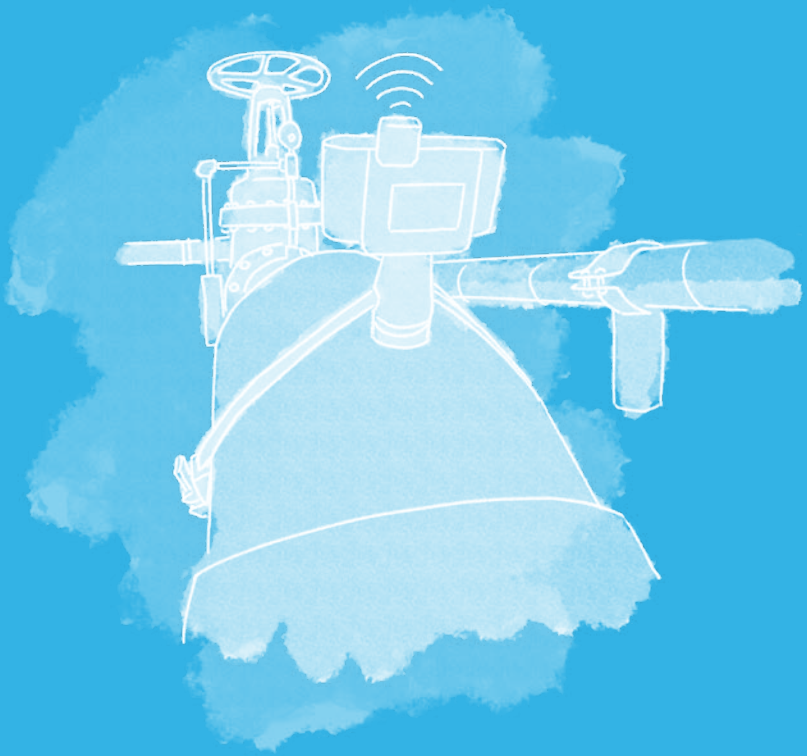


Construction Playbook



A government guidebook that outlines best practices for procurement and delivery of construction projects, promoting efficiency, innovation, and sustainability.

Corrosion sensors

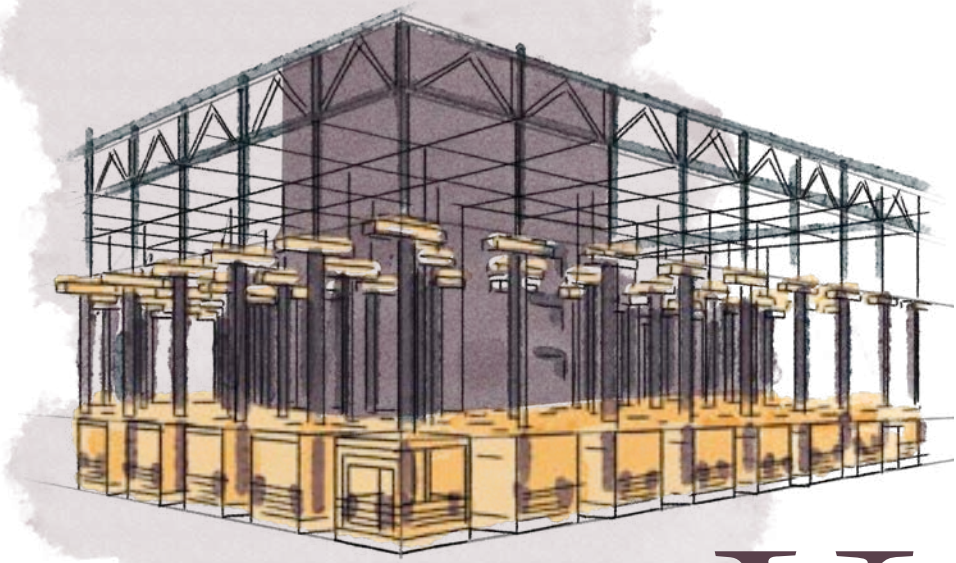


A new generation of wireless devices that can detect defects earlier, improve safety and reduce the need for emergency repairs.

CPQP

CPQP (Construction Product Quality Planning)
is a quality assurance framework for the construction industry aimed at setting out a best practice approach for manufacturers to follow during the creation of new platform systems and offsite manufactured construction.

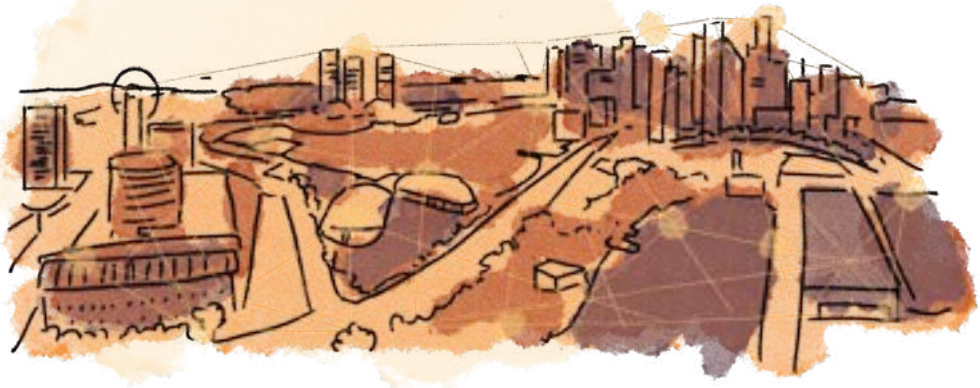
Crane X



A modular crane system designed for safe and efficient construction site operations, reducing the need for traditional tower cranes and improving construction productivity.

CReDo (Climate Resilience Demonstrator) combines location data with asset data for energy, water and telecoms infrastructure in a connected digital twin, to help predict the likelihood of climate-related risks such as flooding and extreme heat, and guide resilience planning.

CReDo



Critical to Safety Framework

Developed by Masonite, this records the multiple production and specification checks carried out on the components and manufacturing processes of each doorset it produces, to ensure that the specification is maintained at every stage of production.

Cross Laminated Timber

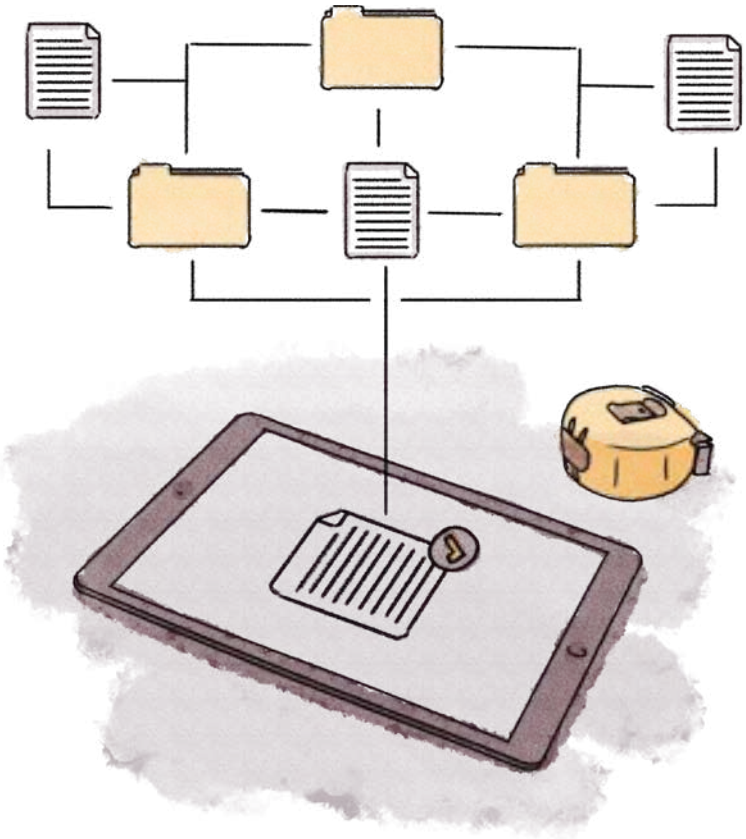
CLT is a strong and versatile engineered wood product made by bonding layers of timber at right angles to each other. It can be used for floors, walls, and roofs in buildings and is popular for its structural strength, durability, and sustainability.

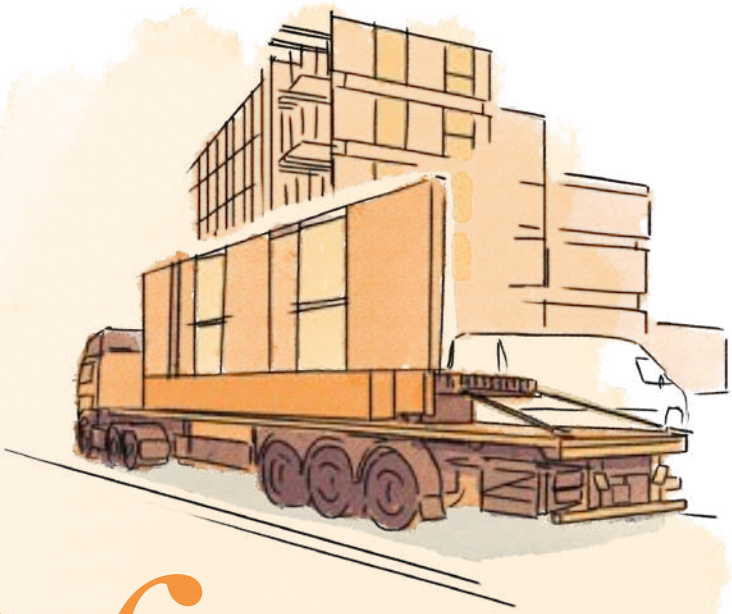
Datacentric heating

A type of heating system that uses data to optimise energy consumption and improve efficiency. It can be applied in various settings such as data centres and residential homes, and can reduce energy costs and carbon emissions.

D-COM

A process that digitises Approved Documents, making them machine-readable and allowing users to check for compliance with building regulations.



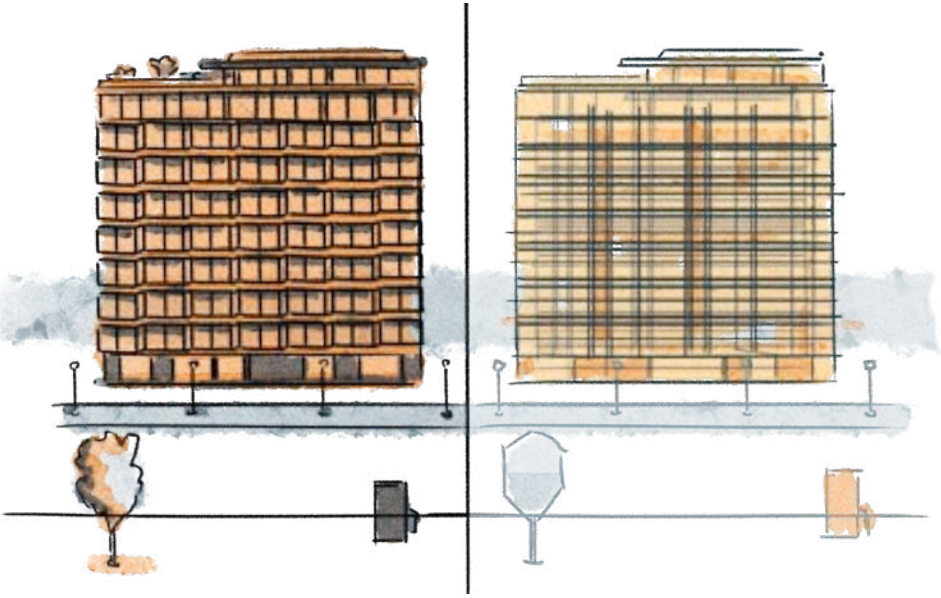


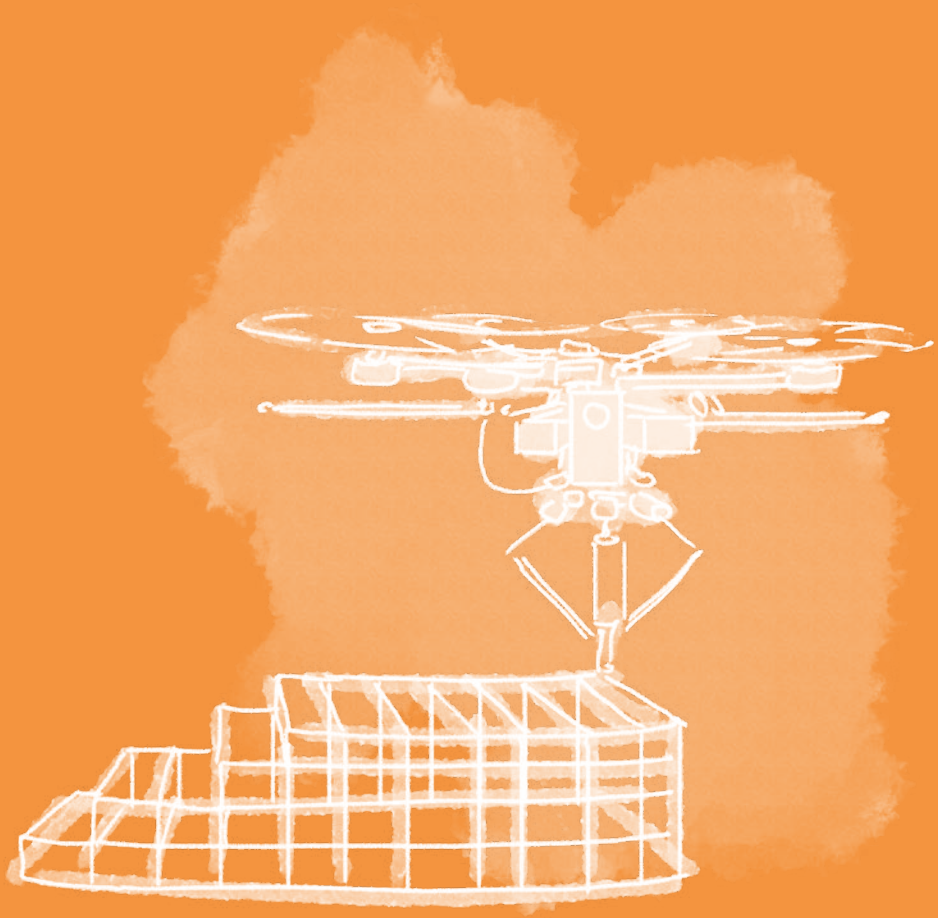
DfMA

Design for Manufacturing and Assembly is a design approach that focuses on ease of manufacture and efficiency of assembly. By optimising the design of a construction component or system, it is possible to manufacture and assemble it more efficiently, more quickly, more safely and at a lower cost.

Digital Twins

Virtual models of physical objects or systems that are created using sensor data and other real-time information. They are used in various industries, such as manufacturing and construction to simulate and optimise performance, detect issues, and improve efficiency.

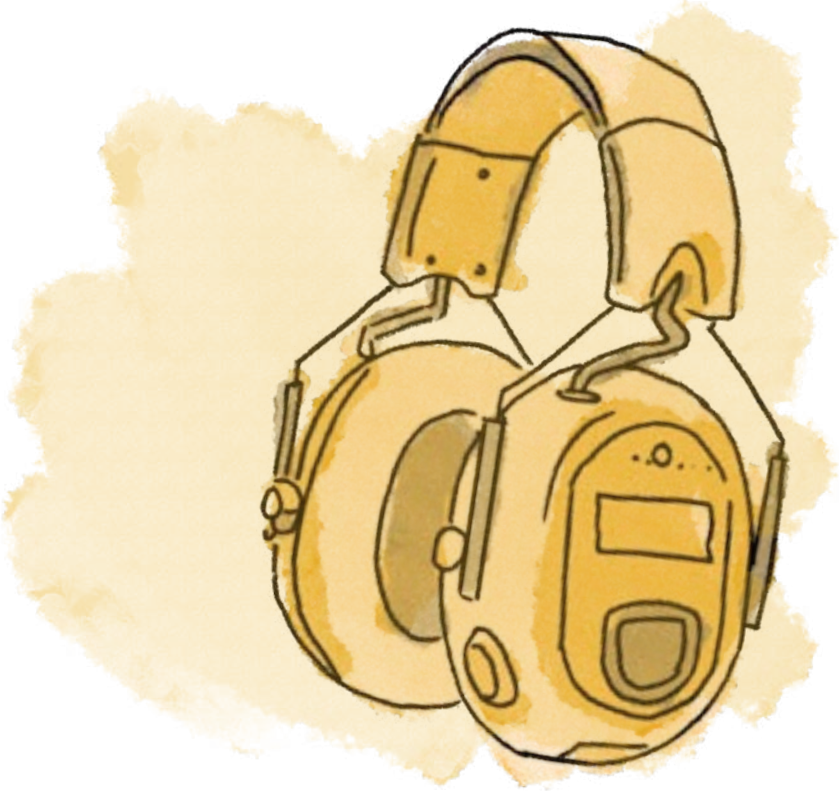




Drones

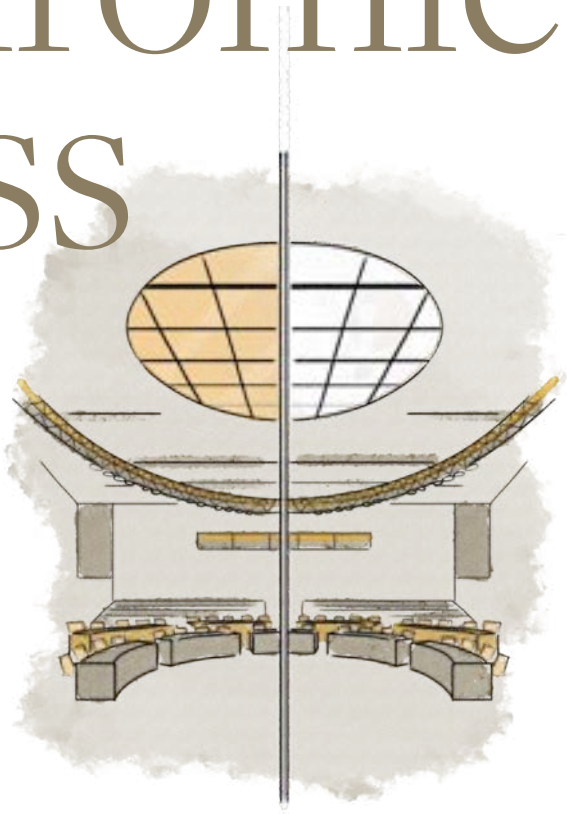
Used to carry out site surveys and inspections of hard-to-reach areas. Some can even carry out repairs, 3D printing components during flight.

Eave

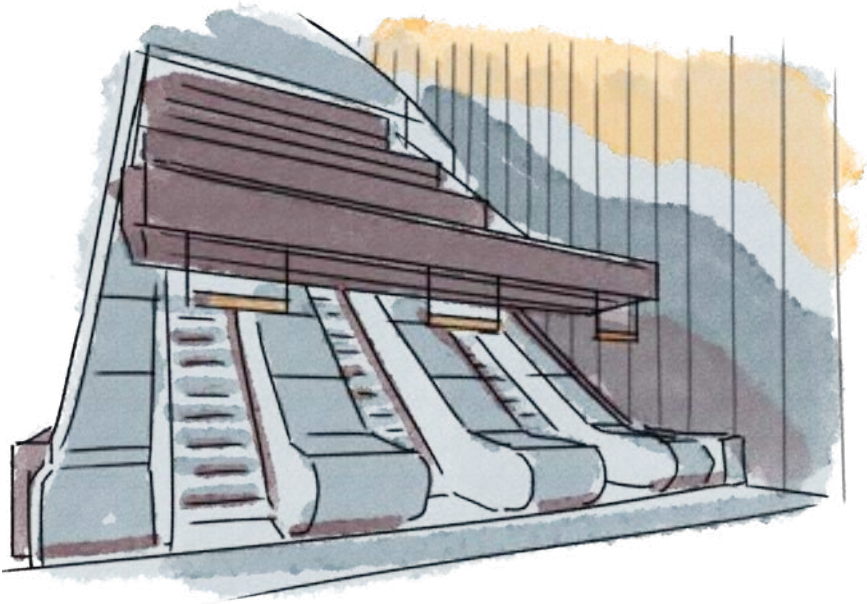


Smart ear defenders that automatically adjust to environmental noise, allow workers to communicate directly and identify high noise exposure spots on the site.

Electro-chromic glass



A type of glass that can change its transparency or color in response to an electrical charge. It has potential applications in various areas such as architecture, automotive, and aerospace, and can improve energy efficiency and comfort.



Enerdrape System

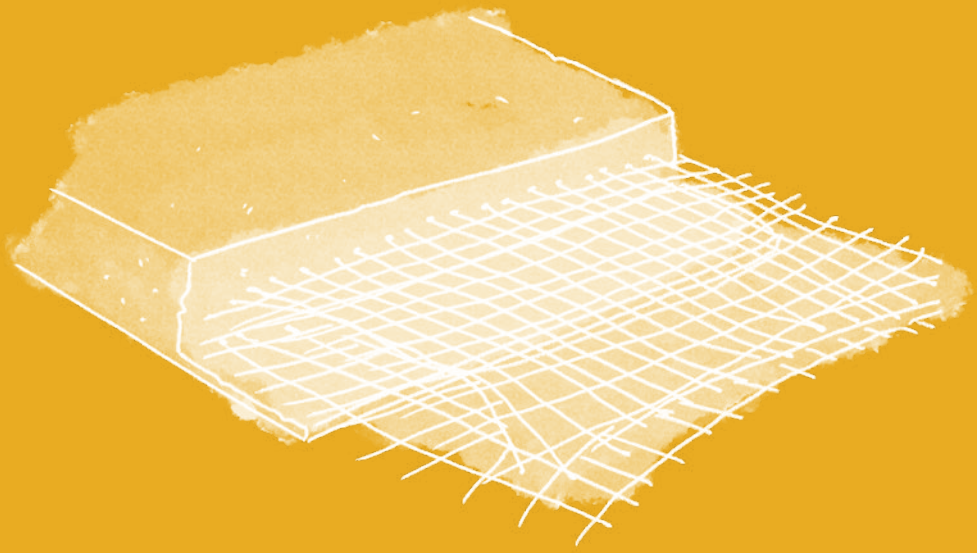
A system of modular, metal panels that absorb heat from the ground and capture ambient air and heat from underground infrastructure to provide heating for the buildings above.

Exo-skeletons

Wearable devices that are designed to augment or assist human physical abilities. They have potential applications in areas such as rehabilitation, military, and industrial settings, and can improve strength, endurance, and mobility.

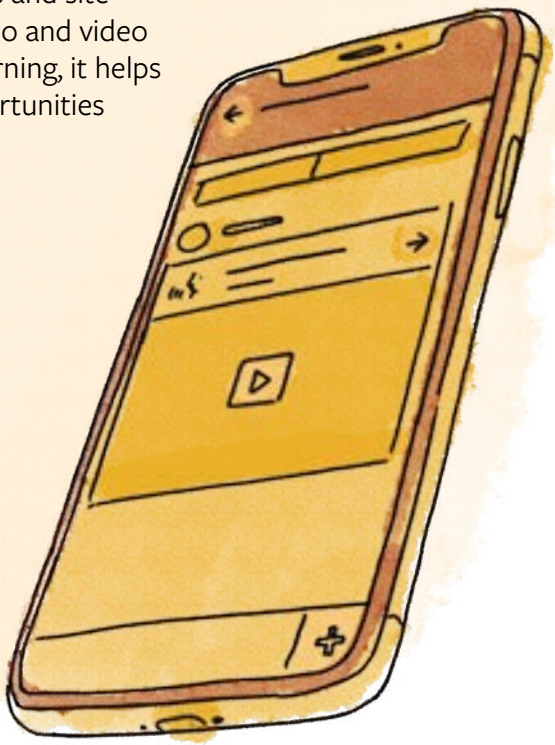
Fibre reinforced concrete

Often used in bridges and other structures due to its strength-to-weight ratio, durability under stress and fatigue loading conditions, ease of installation on site and thermal insulation properties.

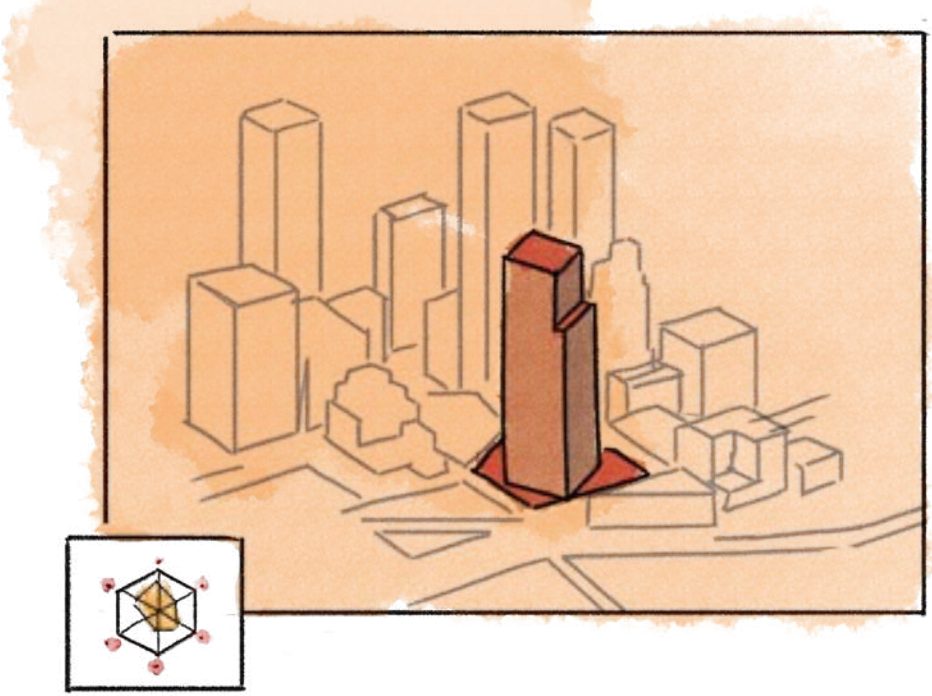


Fyld

AI-powered software that generates workflows, risk assessments and site analytics by converting audio and video footage. Using machine-learning, it helps companies to identify opportunities for predictive maintenance.



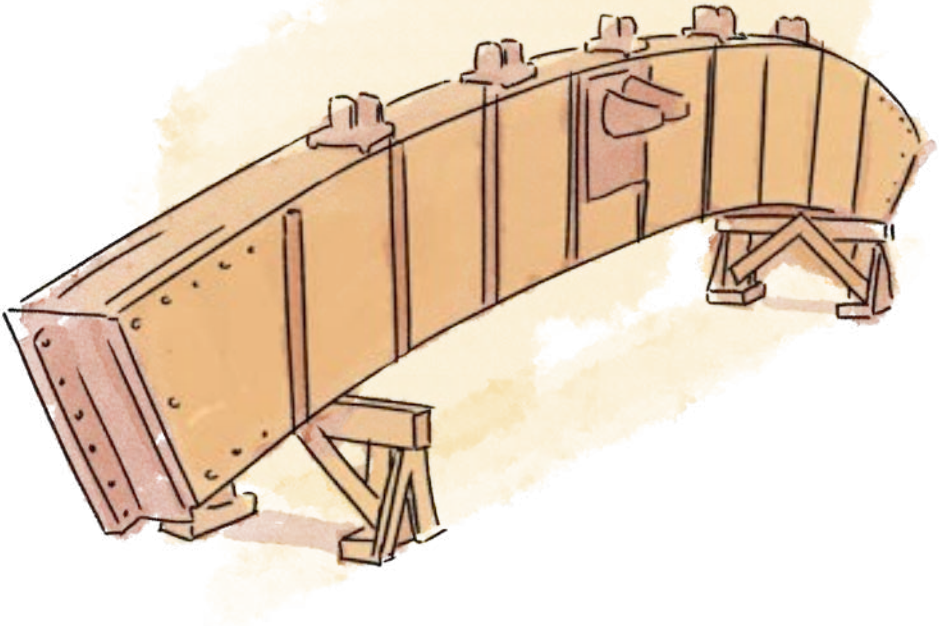
Generative design



A way of using AI to create an integrated workflow between humans and computers, exploring multiple design options and solving defined architectural or engineering problems.

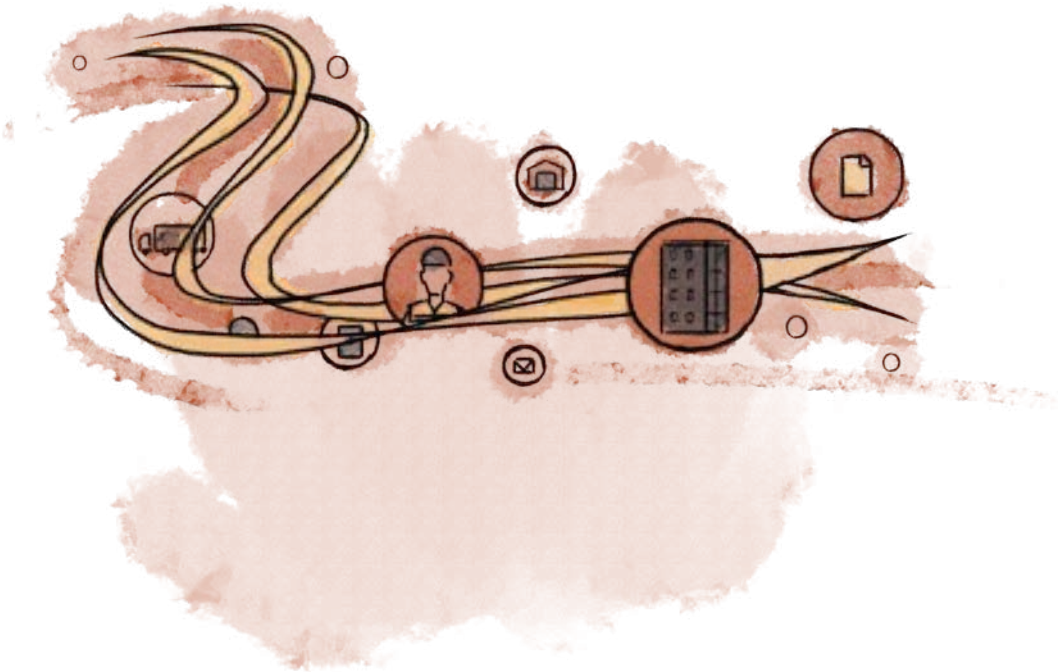
Glulam

An engineered wood product made by gluing together layers of timber with high-strength adhesive. It is a versatile and cost-effective building material that is popular in commercial and residential construction for its strength, beauty, and sustainability.

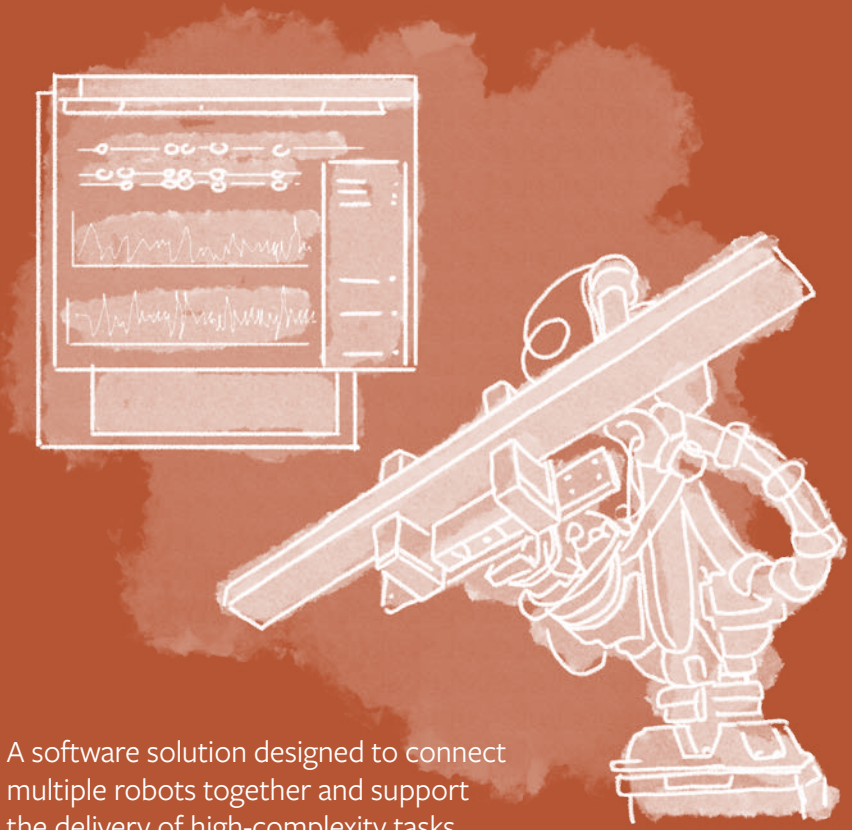


Golden Thread

A clear and accurate digital record of all information related to the design, build and operation of a building. Designed to improve accountability, it will also support the maintenance, retrofit and adaptation of buildings.



HAL Robotics



A software solution designed to connect multiple robots together and support the delivery of high-complexity tasks.

050

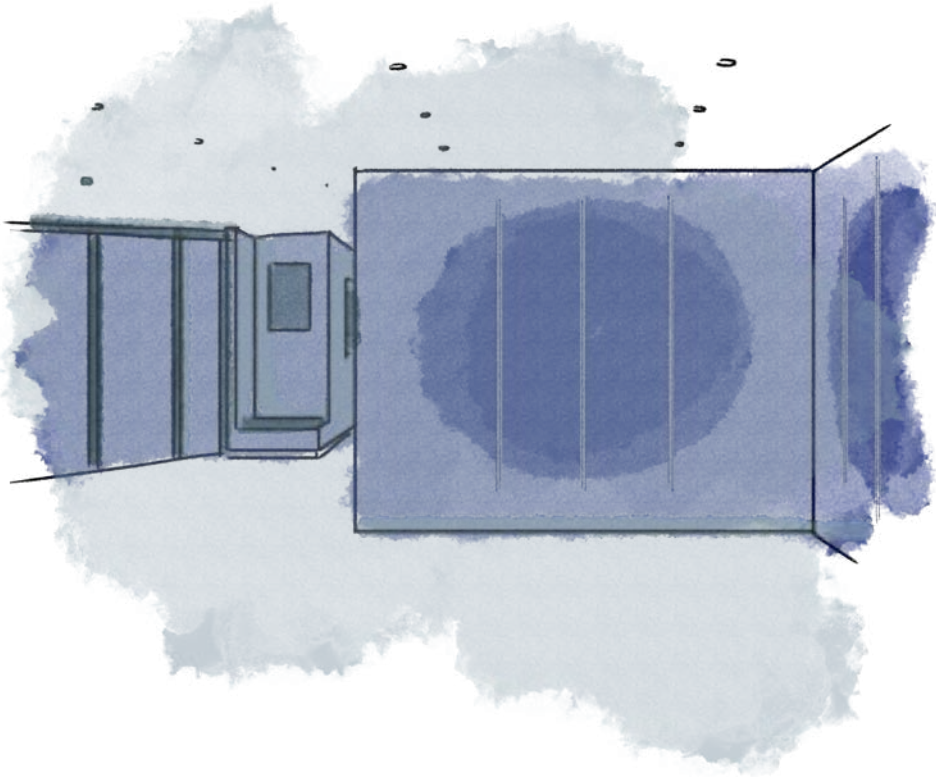
A mobile app from Build Test Solutions that allows users to precisely measure heat flow and U-values of building elements using a low-cost, quick and non-invasive method. It can detect heat flow rates, thermal bridging and poorly performing structures.

Heat 3D

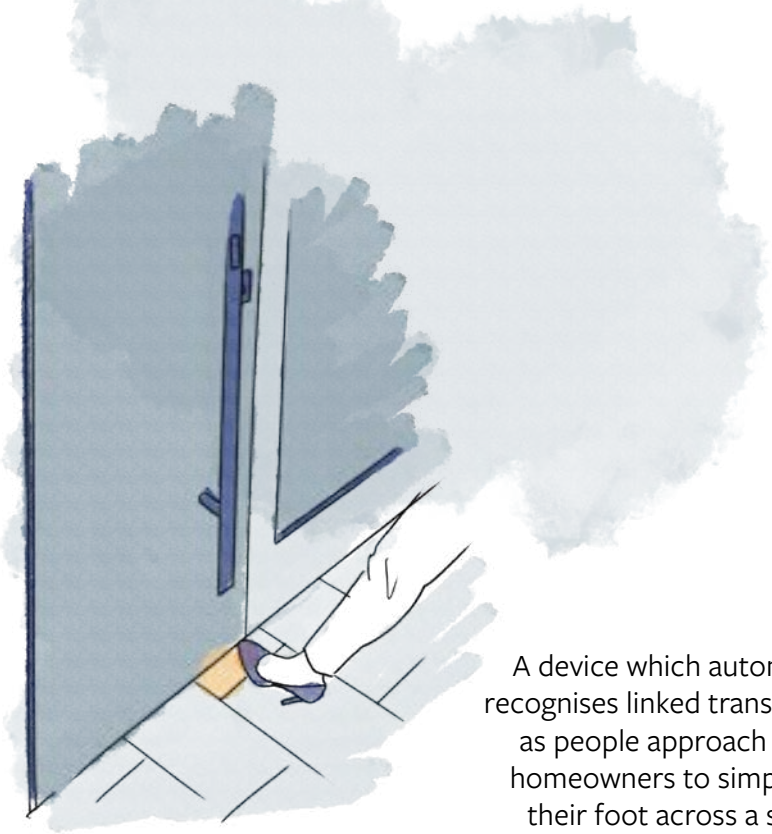
051

Heat-emitting wallpaper

A thin film of graphene for application on floors, walls and ceilings, which uses infrared rays and convection to project heat.

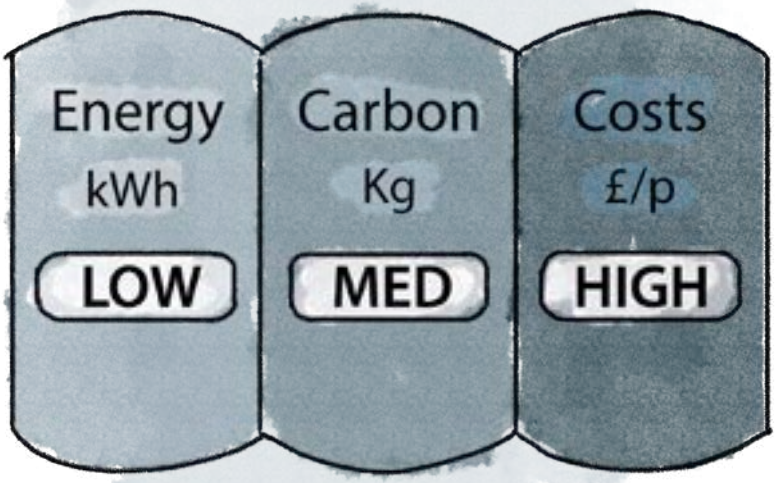


HOPPE eHandle



A device which automatically recognises linked transponders as people approach allowing homeowners to simply swipe their foot across a spotlight to unlock the door.

Improved



EPCs

A new design for Energy Performance Certificates being promoted by Elmhurst Energy, showing the 'three Cs' – energy cost, energy consumption, and carbon emissions.

Industrial Safetytech

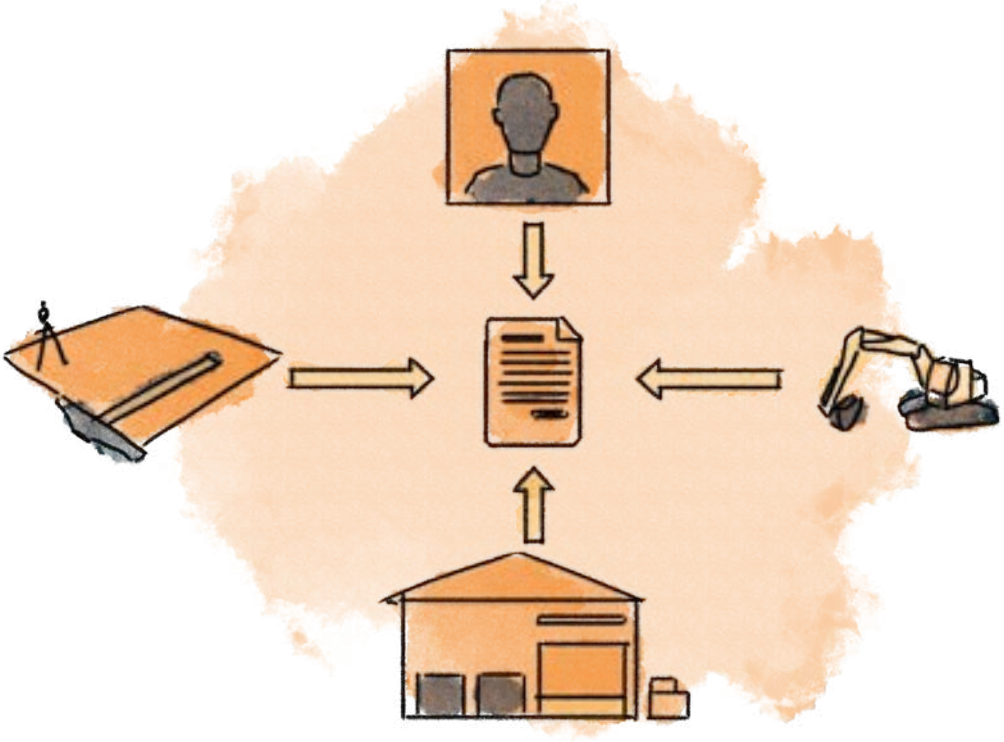
An HSE initiative to bring technology companies and construction partners together to test new solutions that address risk and safety problems in construction. Six companies are in phase one, with the ambition of bringing market-ready solutions to the forefront.

Regulatory Sandbox

Infrared heating

Uses infrared energy to heat objects instead of using convection that warms the air. When this infrared energy comes into contact with a person or furniture, it causes the molecules and atoms of that object to vibrate and generate heat.

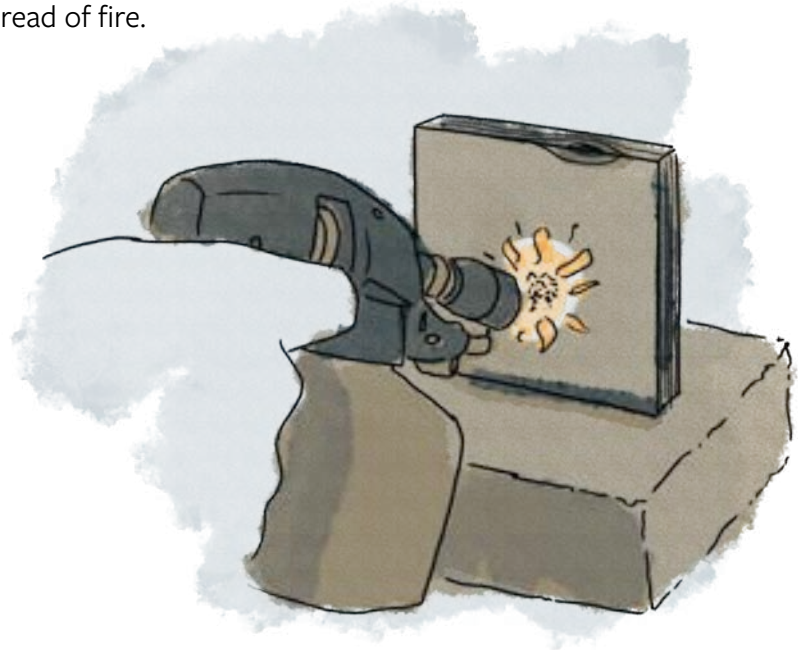
Integrated Project Delivery

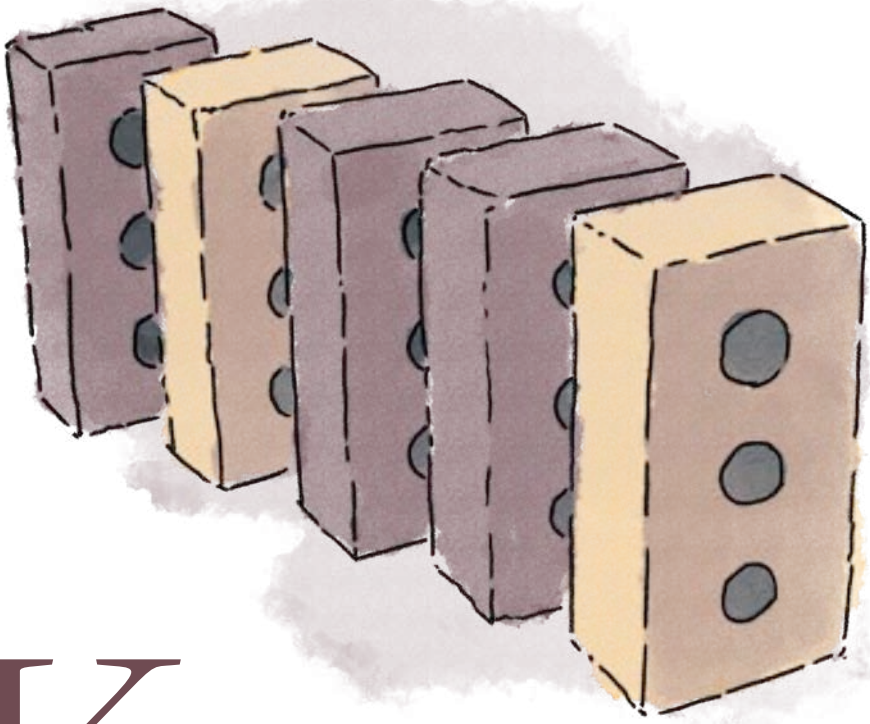


A highly efficient and collaborative approach to the delivery of construction projects, where the main parties involved in the design, manufacturing and construction work under a single agreement to share risks and rewards.

Invisible fireproof coating for wood

Being developed in Singapore, this is an extremely thin and completely transparent film which, when exposed to heat, creates an artificial char layer that protects wood and prevents the spread of fire.



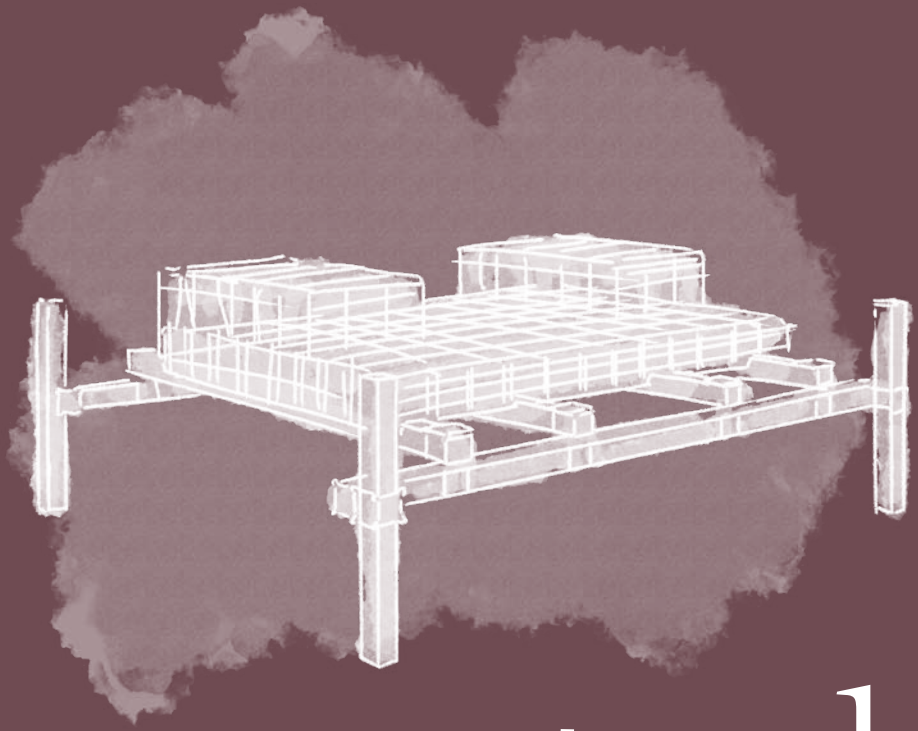


K Briq

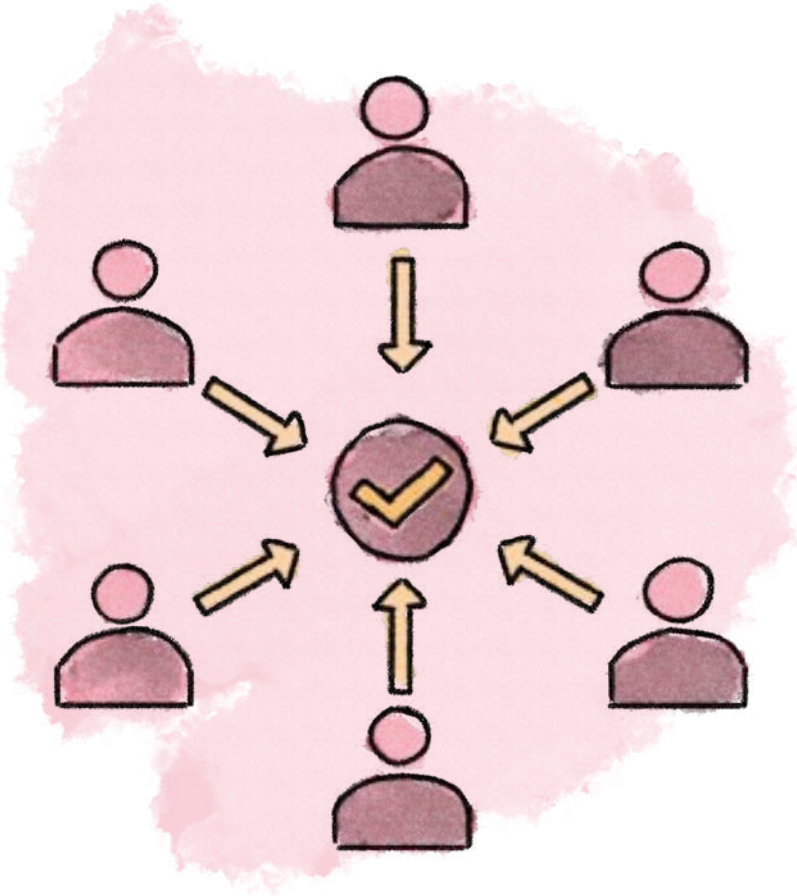
A new type of brick made from construction waste developed by Scottish start-up Kenoteq. The manufacturing process of K-Briq requires less energy and emits less carbon dioxide than traditional clay brick manufacturing, making it a more sustainable alternative.

Laser-cut steel

Using powerful lasers to cut rebar to the exact required size so that it can be brought to site, dropped in and the concrete pour can begin immediately.

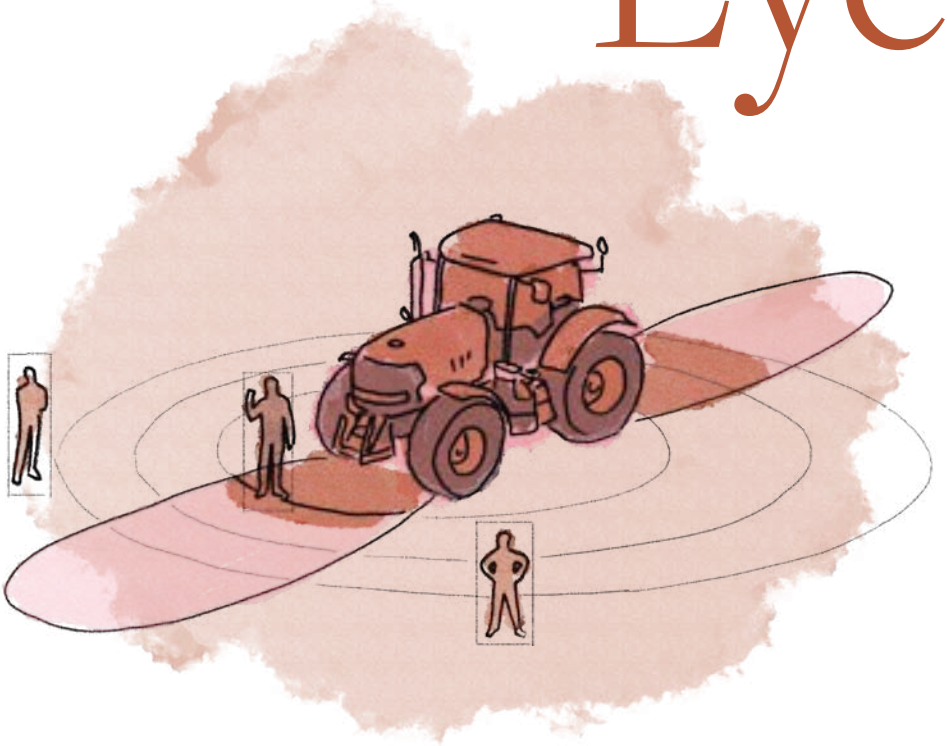


An initiative to get consensus around the creation and management of construction product data by standardising the production, use, and management of product data.



LEXiCON

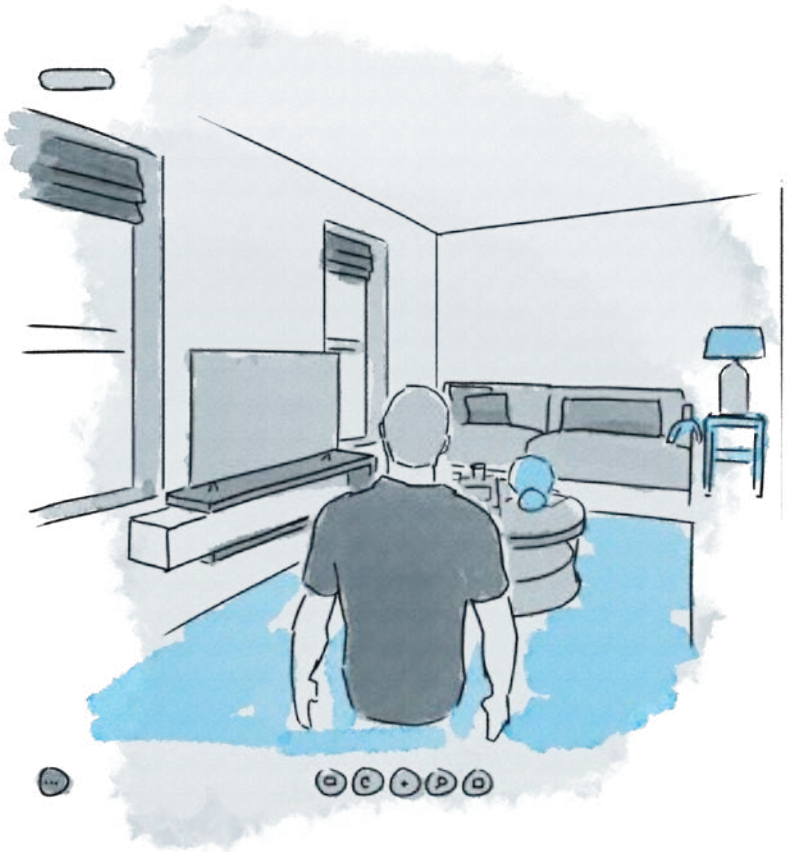
Machine Eye



Monitors the activities of heavy plant machinery and identifies potential risks to site teams, based on real-time activity.

Memory steel

Memory steel, also known as shape memory alloy, is a unique material that can 'remember' its original shape and return to it when heated. This makes it more resistant to large amounts of strain, making it perfect for reinforcing structures.



Metaverse showhome

A virtual reality platform that allows users to experience 3D models of buildings before they are constructed. It enables architects, builders, and homeowners to visualise designs and make changes in real time, improving the design process and reducing the risk of costly mistakes.

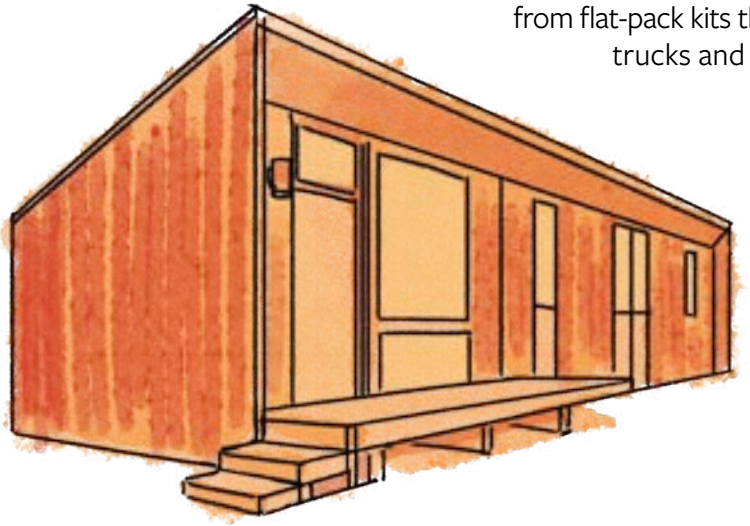
National Land Data Programme

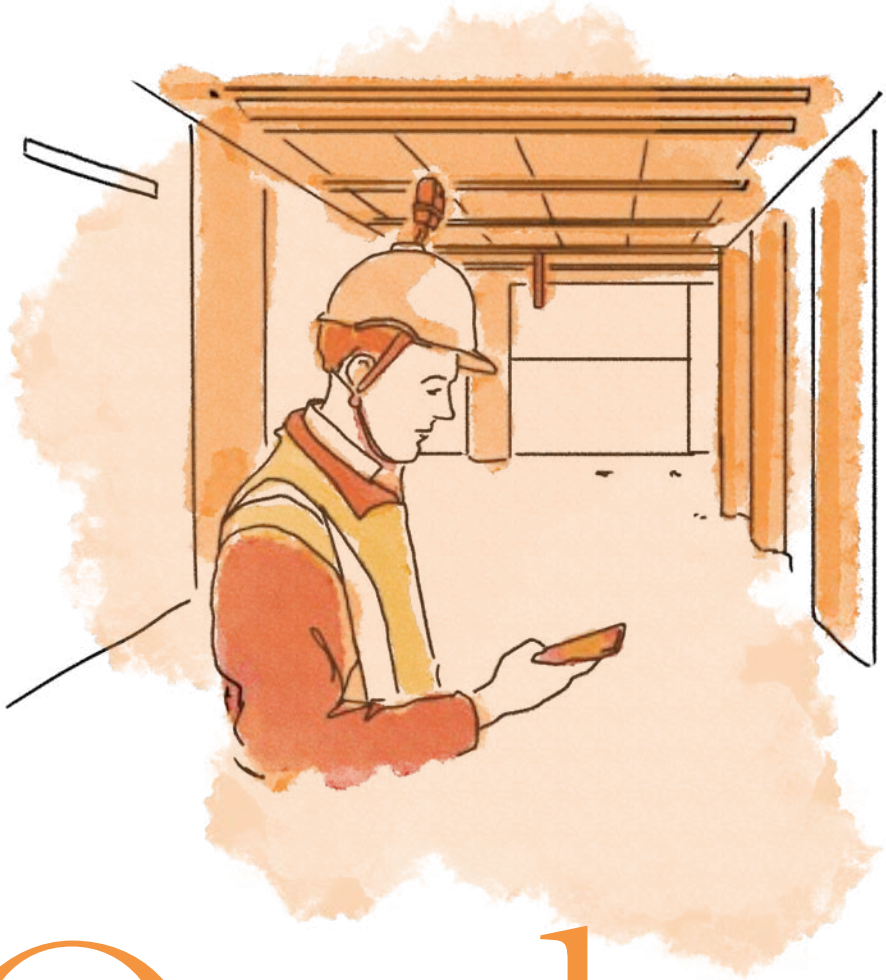
Innovative data analysis to support better decisions about land use change.

065

NODE flat-pack home

A US-based trial to supply flexible, modular, low energy homes made from flat-pack kits that fit onto normal trucks and can be assembled by the customer.



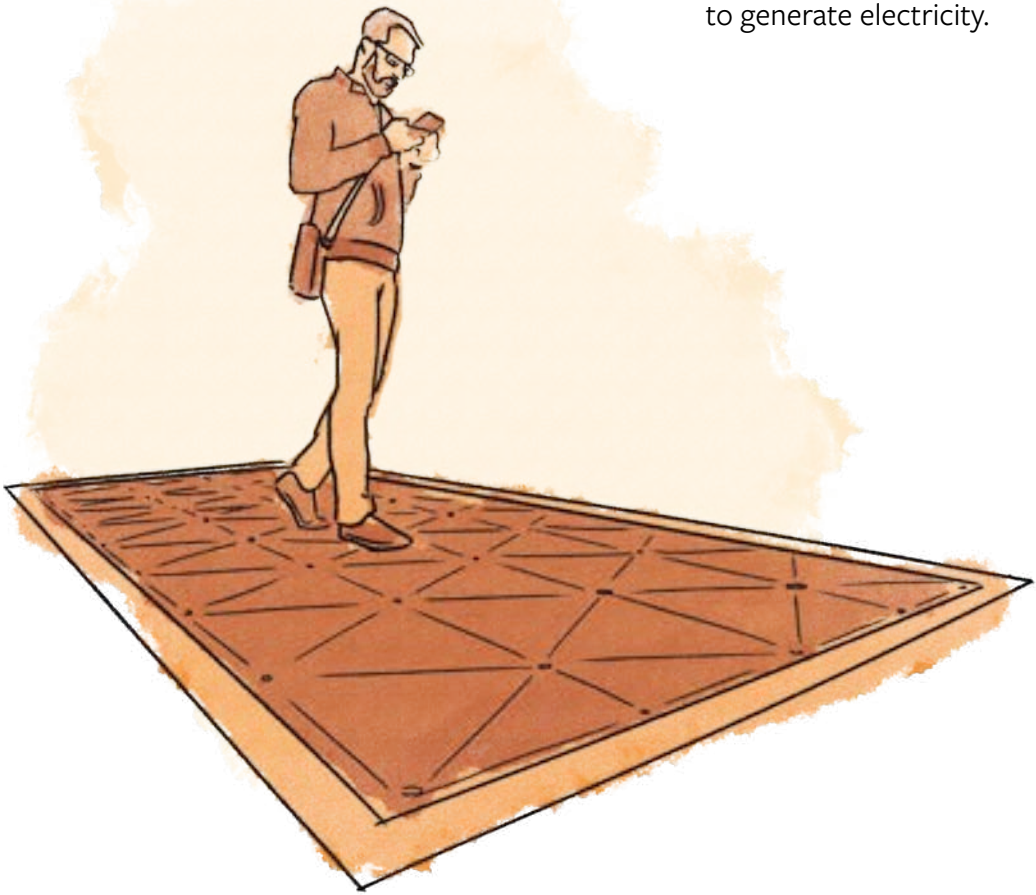


Oculo

Using a mobile phone's camera and location settings, Oculo maps existing assets and creates an accurate 3D model.

Pavegen

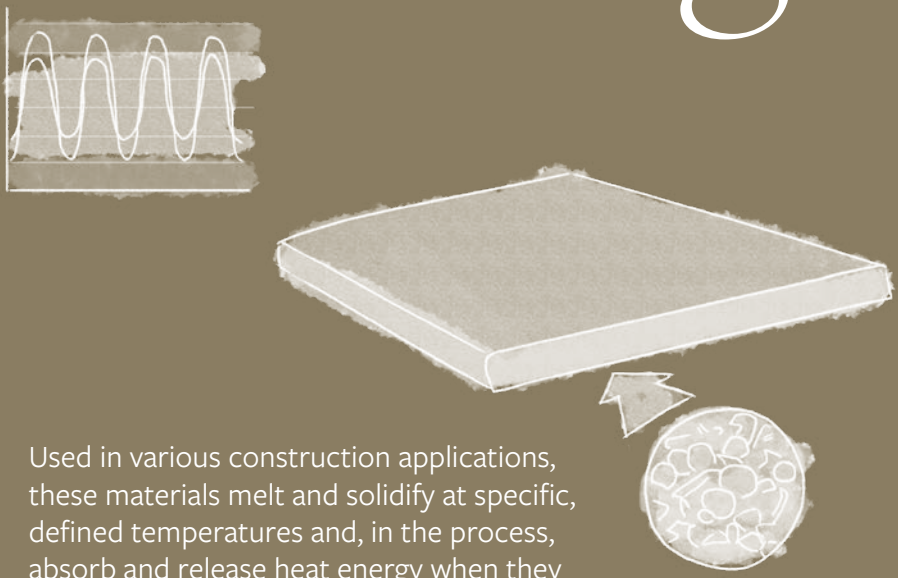
Transforms footsteps into electrical energy,
harnessing the power of footfall
to generate electricity.



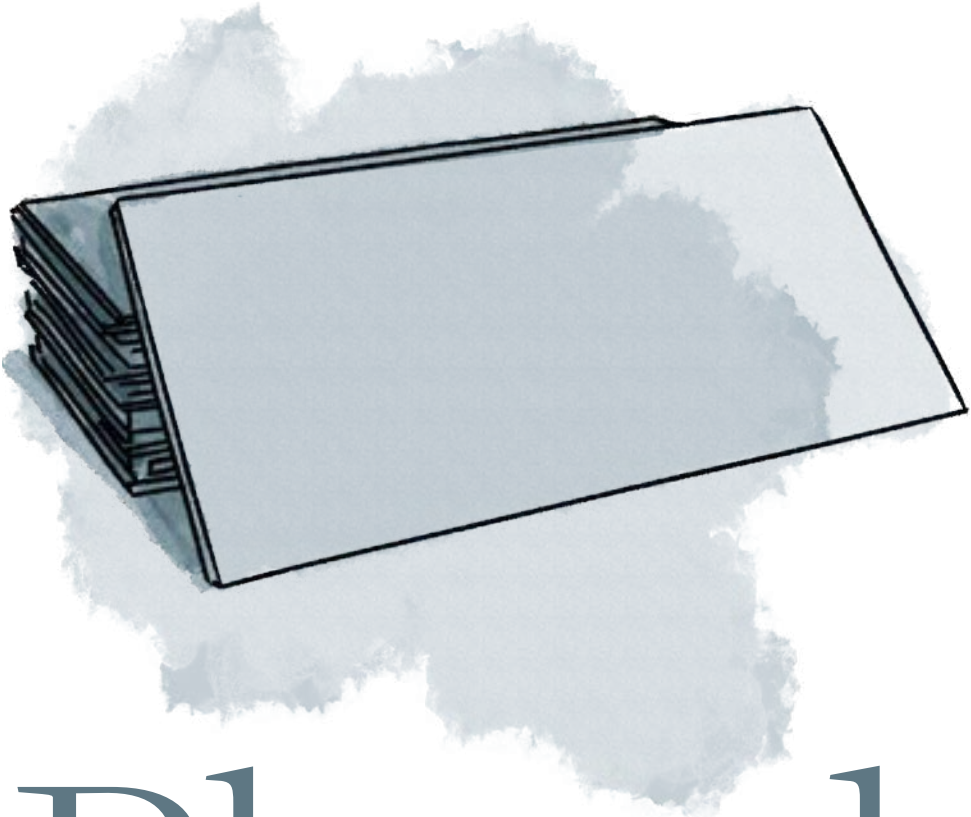
Perovskite Solar Cells

A cheaper, lighter, flexible alternative to silicon-based solar panels, PSC technology is currently being tested as a way to 'print' solar power cells onto coated steel for use in buildings.

Phase-change materials



Used in various construction applications, these materials melt and solidify at specific, defined temperatures and, in the process, absorb and release heat energy when they change phase (known as latent heat).



Plantd

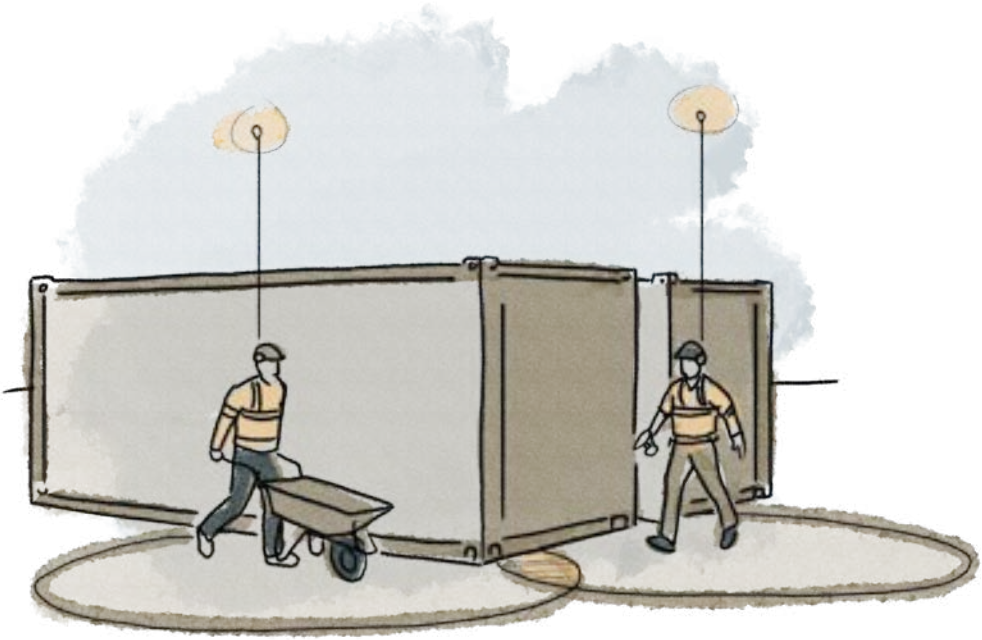
Using fast-growing giant reed grass to create grass-based construction panels in place of timber - lighter, stronger, and more moisture-resistant than traditional wood boards.

Plasmonic paint

Inspired by butterflies, the University of Central Florida is developing the first environmentally friendly, large-scale, multicolour alternative to pigment-based colourants which enables paint to keep buildings cool.

Plinx

Uses sensors and wireless monitoring to manage exclusion zones on construction sites, based on worker access rights, competence and potential risks and hazards.

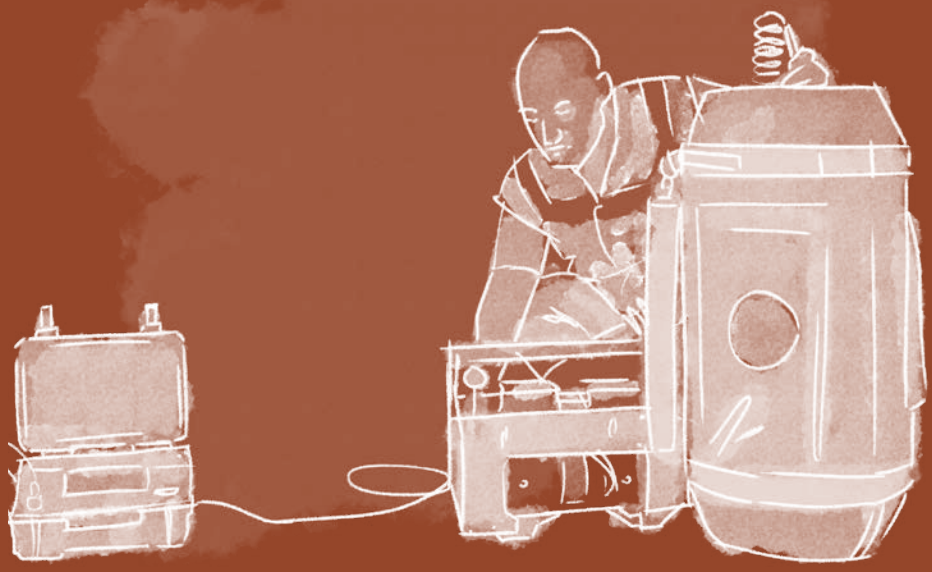


Surveys that use laser scans to quickly collect extremely accurate measurements and 3D data about buildings and conditions on-site.

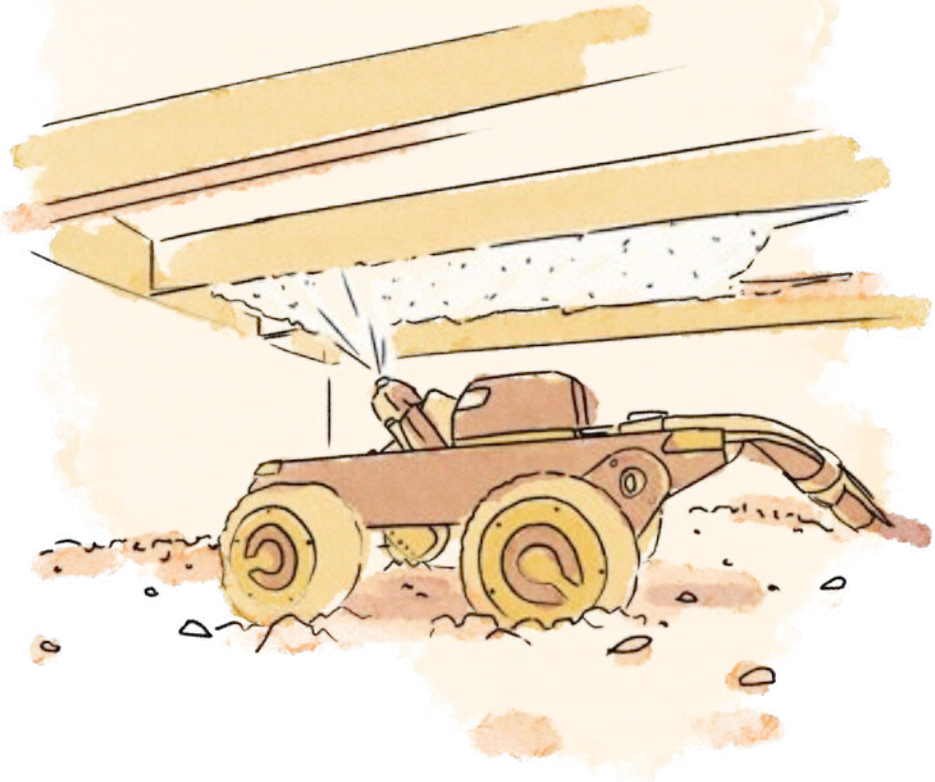
Point cloud surveys

Pulse

A portable compressed air-based system developed by Build Test Solutions that is used to measure the air leakage of a building. It is now a recognised air pressure testing methodology under both Part L1A building regulations and PAS 2035 retrofit.



QBOT

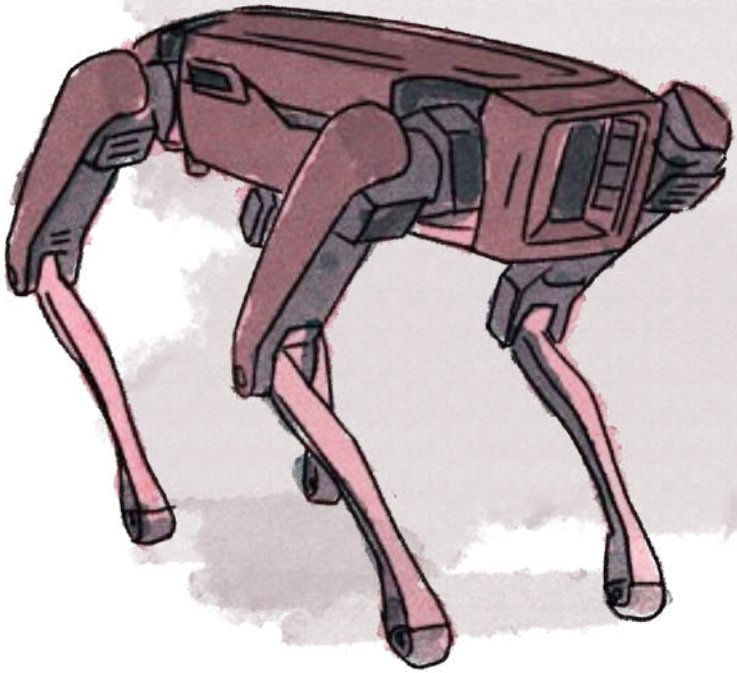


A robot that can crawl through tight spaces under floors and install insulation in older homes without requiring major renovations, helping to improve energy efficiency and reduce carbon emissions.

Recycled glass cladding

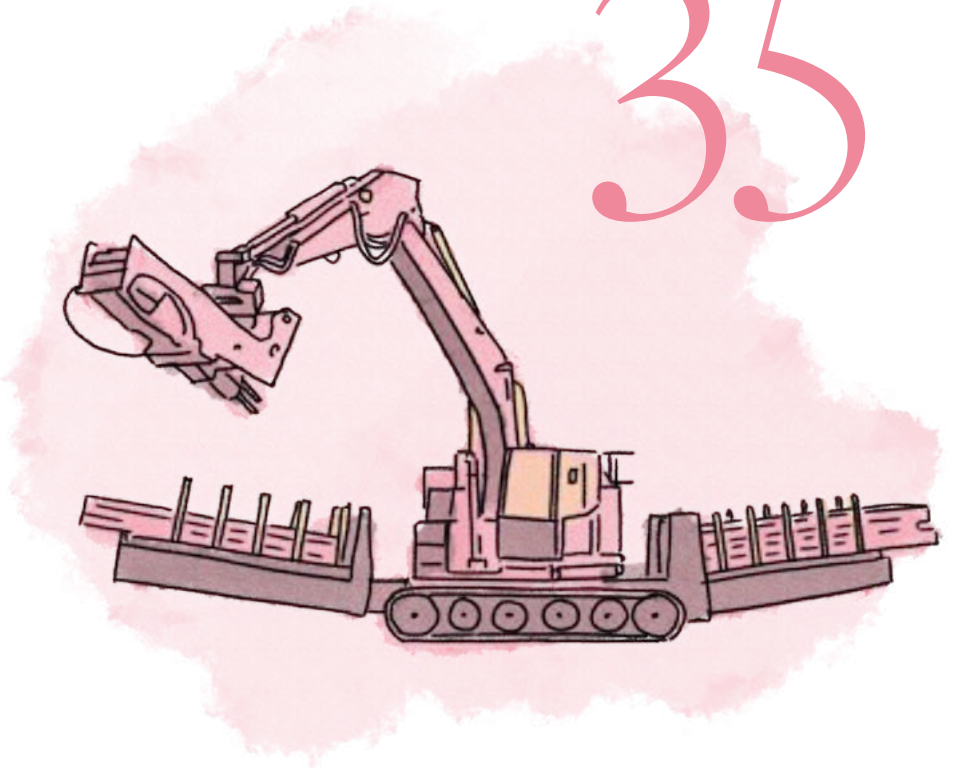
A new fire-safe building cladding made from 83% recycled glass, relatively low amounts of plastic binders and fire-retardant additives.

Robo-dog



Created by scanning specialist Trimble and robotics firm Boston Dynamics, The Robodog is used for surveying on construction sites. The Robodog can scan and analyse buildings that are under construction.

RPD 35



A huge autonomous construction robot invented in the USA to install solar piles, the heavy steel beams driven eight feet into the ground to support solar PV panels.

Sandpit projects

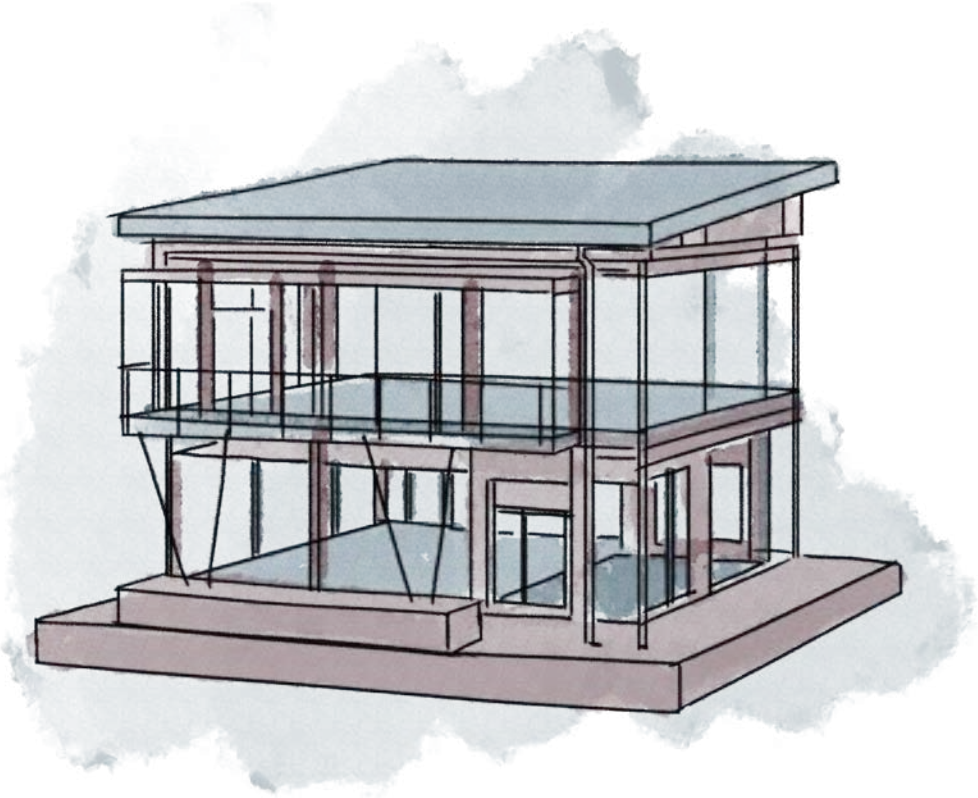
A way of creating testbeds for previously untried building methods.

Scope3 Made Easy

An initiative by Causeway Technologies, Aggregate Industries, Balfour Beatty, Galliford Try and Morgan Sindall to give the construction industry a credible, verifiable, efficient and scalable way to measure Scope 3 emissions in real-time, using invoice data automatically extracted from Causeway Tradex, the largest connected construction supply chain community in the UK.

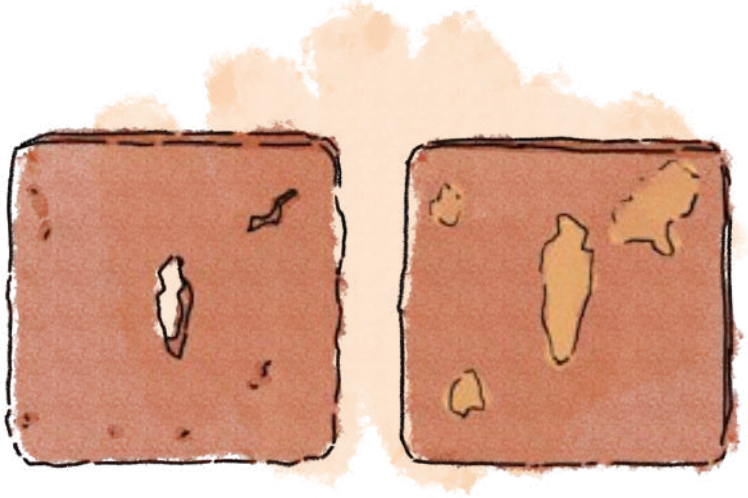
Seismic

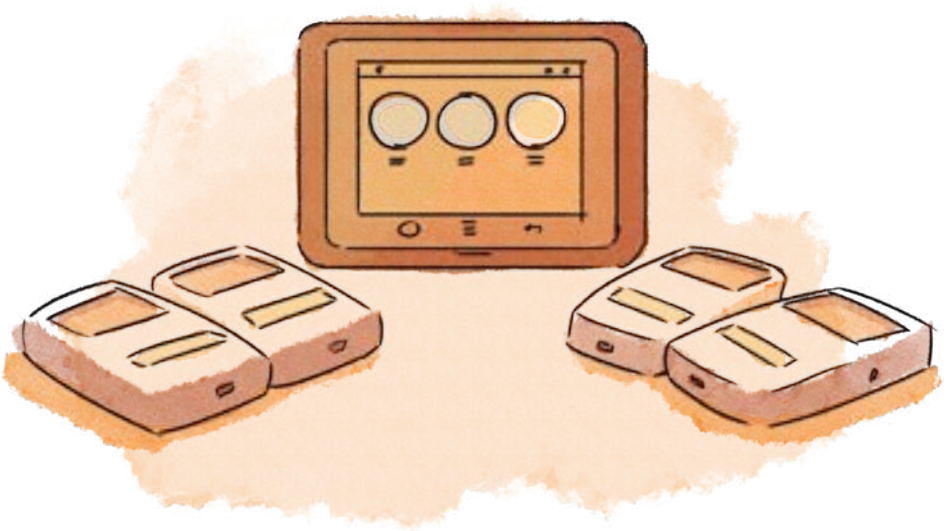
Seismic offers a platform-based approach to construction. It comprises a standardised steel frame joined by an innovative connector block that supports the installation of pre-assembled wall, floor, ceiling, and roof cassettes.



Self-healing concrete

Concrete that repairs its own cracks, using a range of techniques and additives including bacterial healing agents, and crack-closing memory polymers.



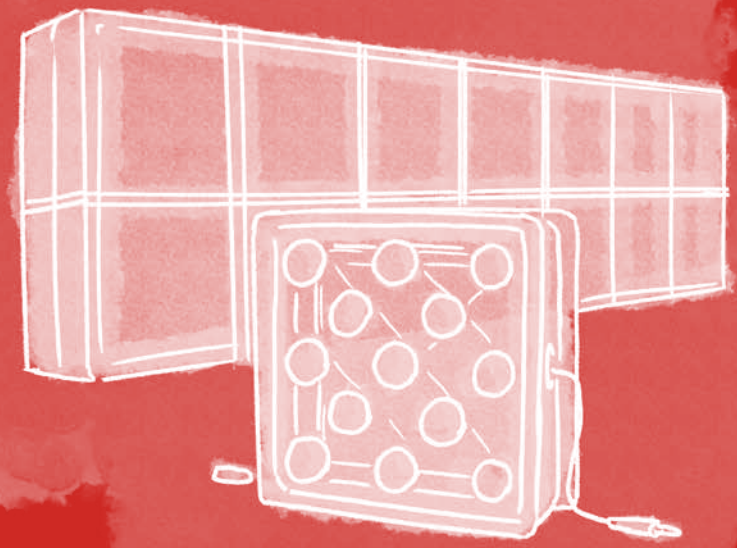


Smart HTC

A unique algorithm that can calculate an accurate and reliable measurement of whole building fabric heat loss (also known as a Heat Transfer Coefficient or HTC). Whereas SAP and EPC assessments make assumptions about the building, SmartHTC uses actual temperature and energy data from the property to derive an energy performance rating.

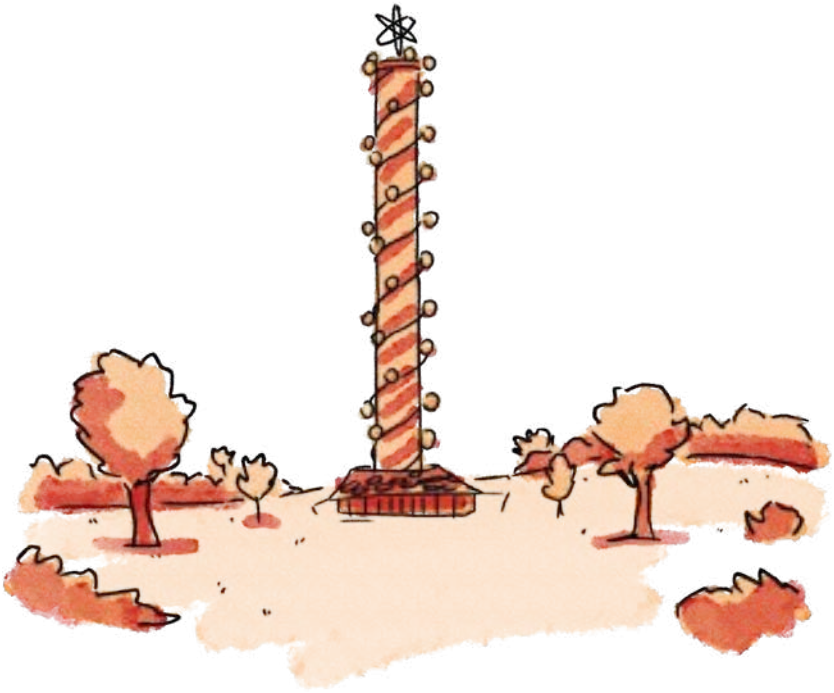
Solar

Glass bricks that collect solar energy, integrating renewable energy into construction materials.



Squared

Spiral Tower



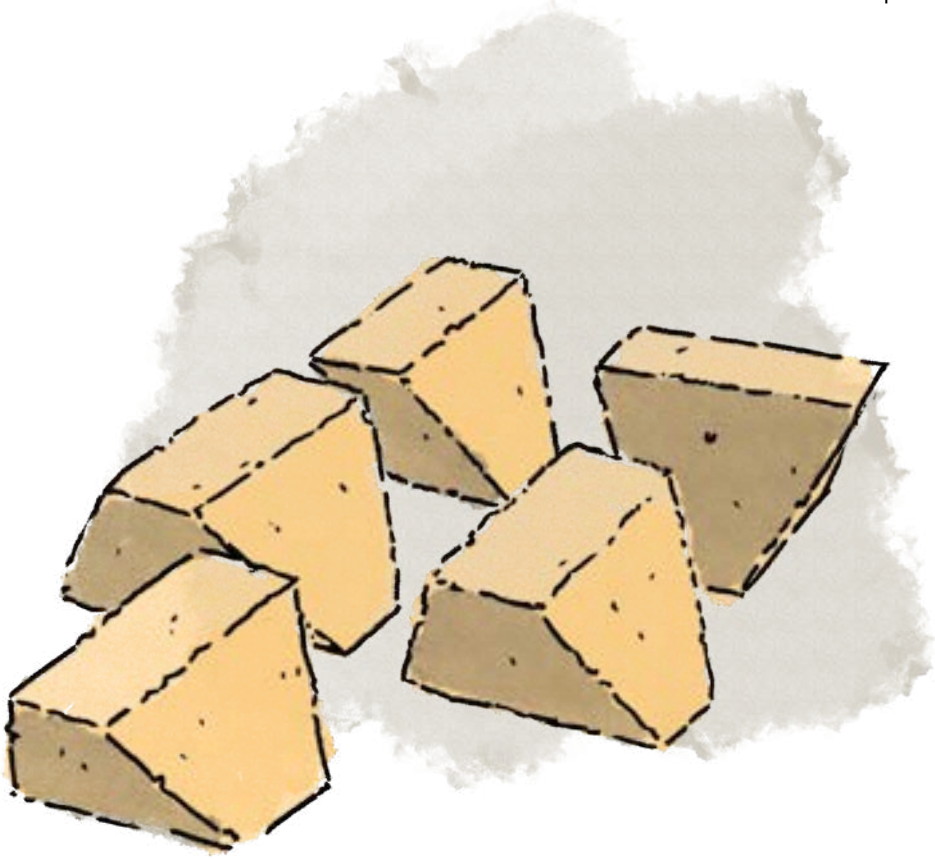
Promoted as “the first energy-neutral high-rise attraction in the world”, being planned by four Dutch companies and maybe coming to a city or expo near you.

Stone veneers

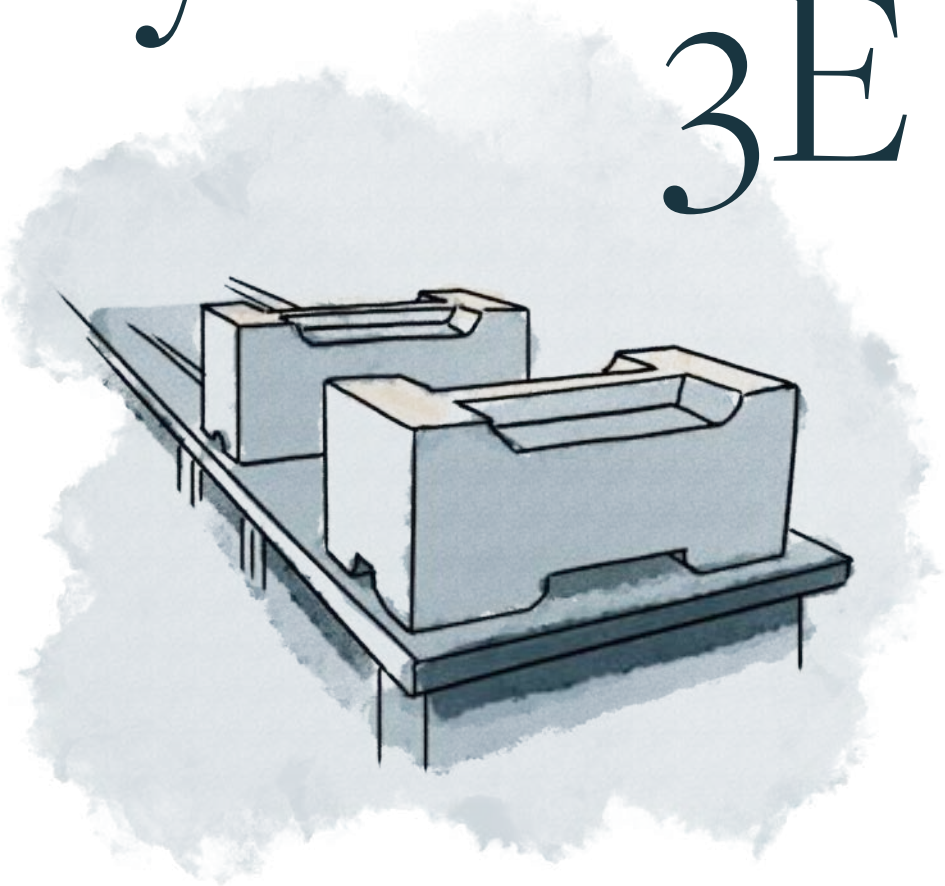
Cut from the surface of natural stone and re-engineered with a flexible backing so that the ultra-thin product can be applied to curved surfaces.

Sugarcrete

Construction blocks made from sugarcane bagasse waste are four times lighter than traditional bricks with only 15 per cent of the carbon footprint.



System 3E



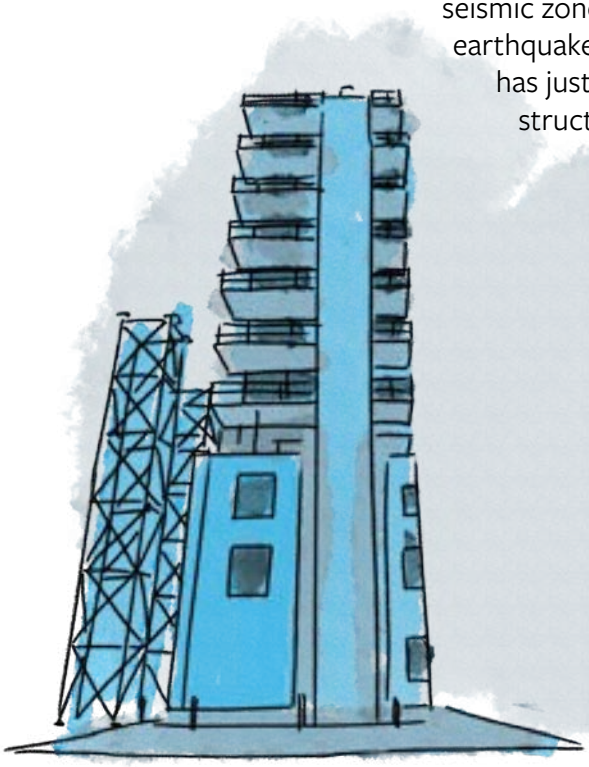
LEGO®-like building blocks that fit together tightly without mortar, and contain expanded perlite, a naturally occurring volcanic glass that is highly insulating.

Talentview Construction

A government-backed scheme that helps match construction employers with people looking to find their first jobs, apprenticeships and work experience in construction.

Tallwood project

An initiative to test the suitability of mass timber buildings for seismic zones. The largest outdoor earthquake simulator in the world has just tested a 10-storey CLT structure with great success.



The Atom

A construction safety headset which integrates AR and inbuilt computing power. Made by XYZ Solutions, The Atom helps construction teams view and position holograms of 3D design models to millimetre accuracy onsite.

Thermo Print

A revolutionary new way to automatically scan and apply road markings such as letters, numbers, arrows, and other symbols, keeping workers safer on live carriageways.

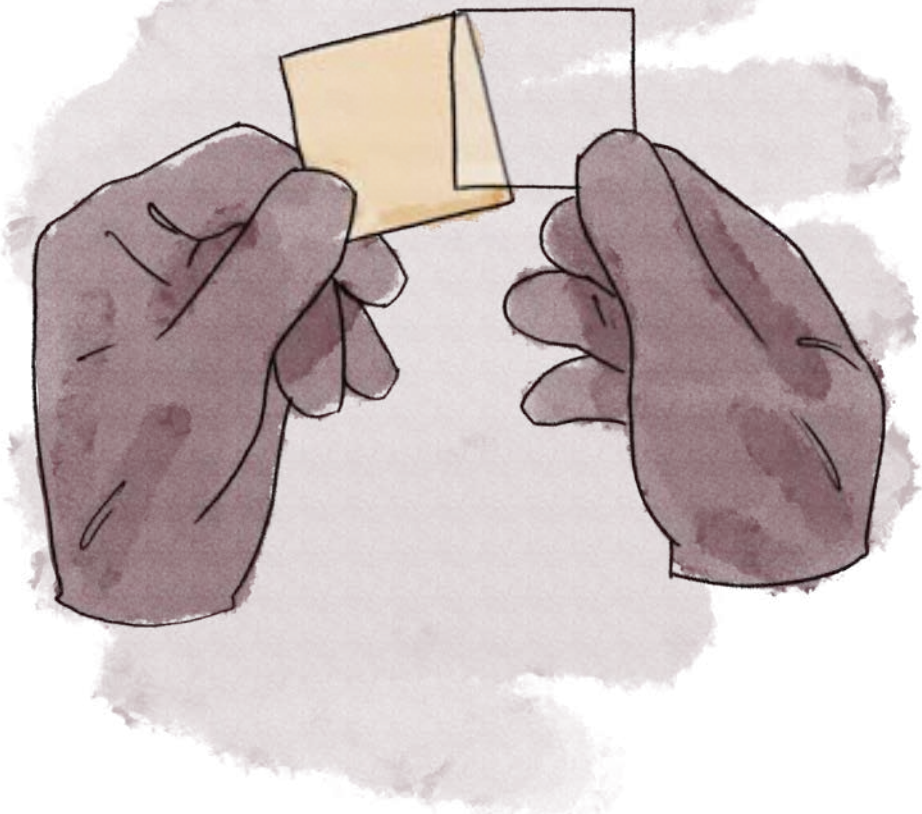
Tomorrow's Architects

Ideas for the reform of the education and training of architects in the UK. Proposals published by the regulator, the Architects Registration Board.

Translucent concrete

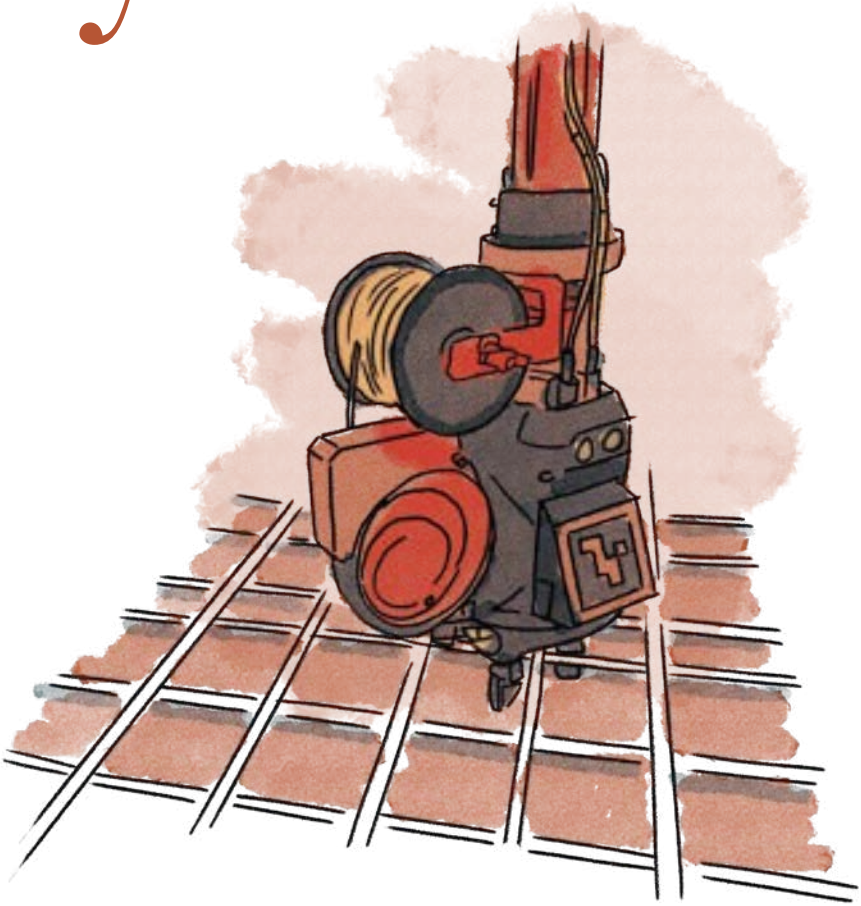
A modern building material that allows light to pass through it. It is made by embedding optical fibres or other transparent materials into traditional concrete, creating a unique and aesthetically pleasing effect for architectural and decorative applications.

Transparent wood



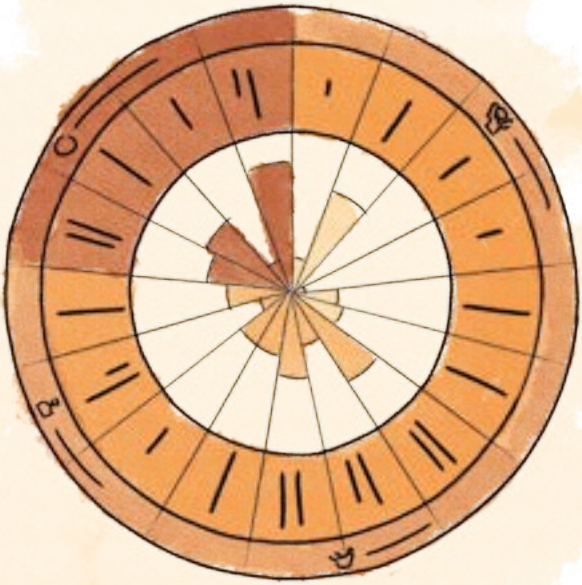
Durable and lightweight, transparent wood is made by selectively replacing lignin from the wood's structure with resins that allow light to pass through them.

TyBOT



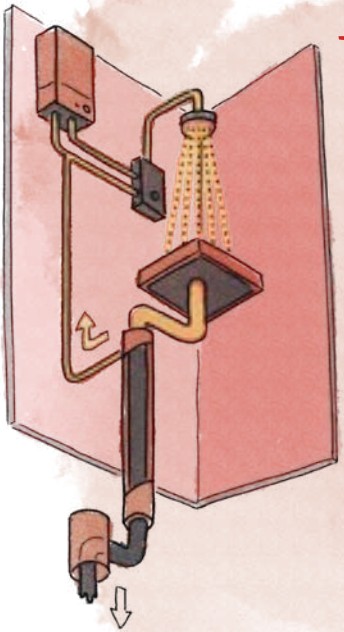
A robot developed in the USA that is capable of performing repetitive construction tasks such as tying rebar, improving site safety.

Value Toolkit



The Value Toolkit enables value-based decision making focused on driving better social, environmental and economic outcomes, improving industry's impact on current and future generations.

Waste water heat recovery



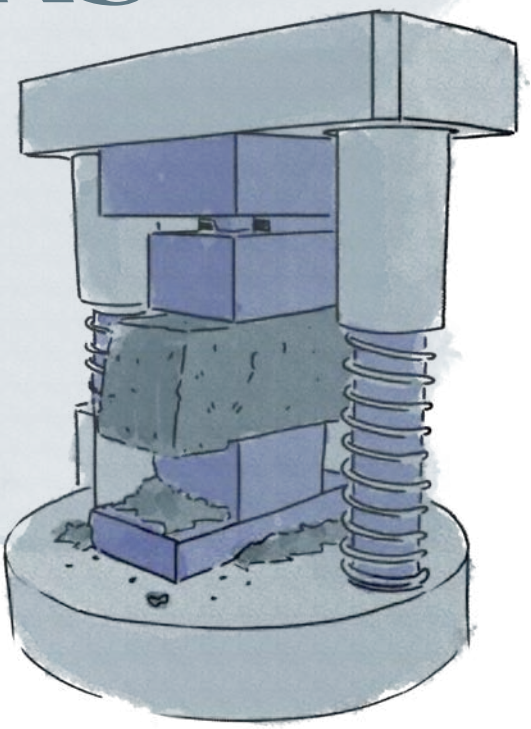
A process that recovers heat from hot water that would normally go down the drain and uses it to preheat cold water. It is a sustainable and cost-effective way to reduce energy consumption and carbon emissions in buildings.

Wendy

A multi-lingual AI assistant for the built environment

100

Wool reinforced bricks



New technology involves incorporating wool fibres into building bricks, which can absorb and store carbon dioxide emissions from the atmosphere, reducing the environmental impact of construction projects.

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