THE CONISBEE CARBON CIRCULAR

Edition 3 April 2025

The *Conisbee Carbon Circular* is bought to you by the Sustainability Group. Here we cover Conisbee's sustainability journey as well as global stories on carbon in construction. Stay informed, inspired, and empowered as we navigate the path to a greener future together.

Find out what we as a company have been up to in the section ECO-ENDEAVOURS p. 4

The Sustainability Scoop... ...brings you notable stories about carbon in the construction industry across the world – keeping you up to date with the latest technology, most recent updates to legislation / guidance and other interesting news. p. 7

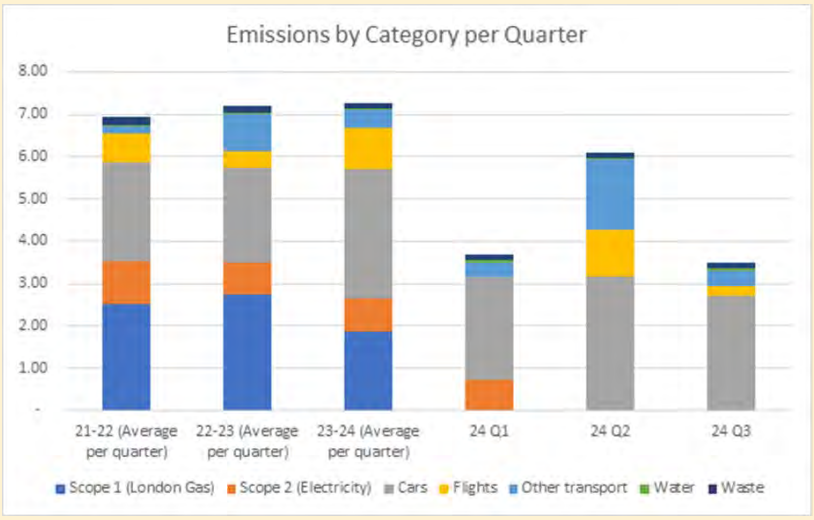
SPOTLIGHT STORY ON.... What to consider when using reclaimed steel p. 6

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CONISBEE'S OPERATIONS EMISSIONS

See below for the latest Scope 1-3 greenhouse gas emissions associated with our operations for the first three quarters of 2024-25, as well as a comparison with historic data from the previous three years. (Scope 3 emissions associated with employees' commutes have been excluded from the data below.)

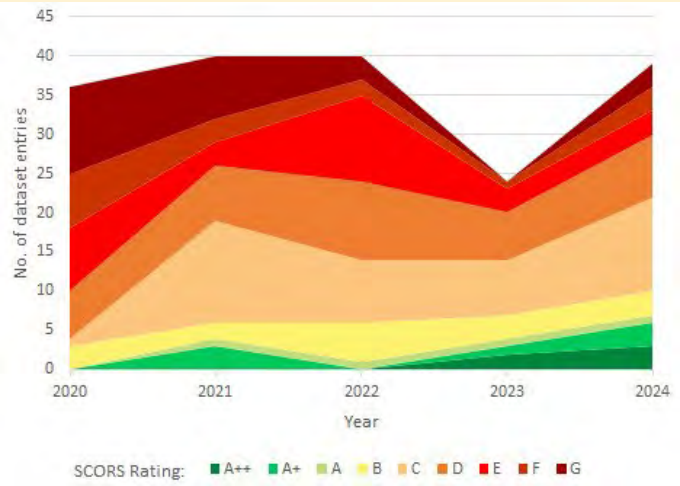
- Conisbee have now achieved net zero Scope 1 and 2 emissions by switching to energy suppliers that are all net zero certified by The Carbon Trust.
- Transport accounts for over 90% of our emissions in 24-25 Q1-3, with car travel and flights disproportionately impacting emissions compared to public transport.
- The overall trend continues to be downward with emissions in all three of the first quarters of 2024-25 coming in less than the average for 2021-22, 2022-23 and 2023-24.



EMBODIED CARBON DATASET TRENDS

- Dataset entries in 2024 showed an average company output of 246 $kgCO_2e/m^2$, meeting our company target for the year of 250 $kgCO_2e/m^2$.
- Of the 39 dataset entries in 2024, 56% of them achieved our target.
- The two figures below show our dataset trends over time. One highlight of 2024 has been a record 7 entries rated A or better. This can in part be attributed to 2 new build entries reaching this status for the first time.





IDEAS IN DEVELOPMENT

Specification Notes for Sustainability

We want to add some sustainability options to our standard specification templates. If you've got any examples from past projects, these would be gratefully received. These notes could relate to areas such as material sourcing, strength/grade, reuse, recyclability, materials passports, design life, designing for deconstruction, pre-demolition audits, or biodiversity. We're also reviewing the concrete mix specification to ensure new mixes introduced by the latest BS 8500 can easily be specified.

Embodied Carbon Guidance & Calculator Updates

Our internal guidance for extracting material quantities from Revit to carry out embodied carbon calculations has been updated, with some useful tips & pitfalls to watch out for added. The recently published third edition of the IStructE Structural Carbon Tool will also be added to Conisbee's tools shortly. If there's any additions to the calculator or guidance that you'd like to see to make carbon calculations easier for you, please let the sustainability team know.

Circular Economy Crib Sheet

A crib sheet for circular economy design is currently being developed by our sustainability team. This will highlight key considerations for circular economy design and point readers towards guidance and examples for different materials. If you have any experience of circular economy design and would like to contribute, please let us know.

Have you got any ideas for how we can improve our sustainability endeavours? If so let us know by dropping the Sustainability Group a message.

SCORS SPECTRUM

Winner of the Swampy Award for Best Refurbishment

15kgCO_2e/m^2

This project sees two existing historic school buildings in London refurbished to provide spaces for community use, including a Mosque and a library. The main school building is 3 storeys tall with a single storey basement constructed c.1930, the single storey gym annex was constructed c.1970. The main school building is constructed in solid loadbearing masonry walls with steel framing supporting filler joist floors, the gym building comprises of steel portal frames with metal deck roofs over the main gym and loadbearing masonry with timber joisted roofs in the other areas. The existing building was generally in reasonable condition aside from some water ingress issues at roof level, and no significant repairs were required other than re-waterproofing of the roof.

Structural works include removal of existing loadbearing masonry walls, builderswork / new riser provision, a new steel plant deck above the main school building roof, provision of roof amenity space over the main school building, a new external lift, new feature canopy, and new drainage provision. The structural/ civils works are modest compared to the large footprint of the school buildings making this a very carbon friendly project from a SCORS point of view.



Winner of the Thunberg Award for Best New Build

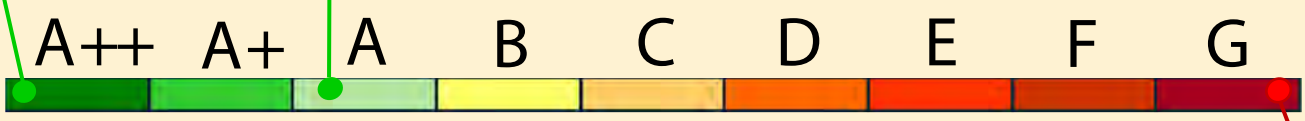
119kgCO_2e/m

This new development is to be used as office space. The new construction is a steel frame and posi joist superstructure, with an RC ground floor slab and piled foundations. While most of the columns are steel, there are also some glulam columns along one side of the building to match the aesthetic of the neighbouring buildings.

Typical floor spans for the steel are around 6.1m with shorter spans for the posi-joists. The building is four storey with a small section of double height space. The substantial posi-joists usage and the moderate spans are key drivers in the project's low embodied carbon score.







Dishonourable Mention for High Embodied Carbon

550kgCO_2e/m^2
Podium slab and basement only

The proposed development includes three new residential blocks (RC frame, piles) and an office/commercial block (comflor/steel frame, piles). The basement area beneath two of the residential blocks largely comprises of carparking. There is an existing basement carpark on the site, over which an RC podium slab supports a four storey RC framed office block. Reuse of the podium slab was considered; however, to be feasible columns would need to align at basement and podium level, pushing any transfer structures to first floor level. Existing columns would also need to be reused. Current layouts in the basement do not align with the proposed carparking bays and continuity of columns through the lower two stories is difficult to achieve due to the change in use between floors.

The carparking bay and access aisle requirements result in the podium slab above spanning up to 8.5m. A 500mm thick slab is required to achieve the span and support the heavy finishes (blue roofs are proposed). This increases to 750mm where the slab is acting as a transfer to six stories of RC frame above. It's worth noting that the overall embodied carbon across all blocks comes out at 295kgCO_2e/m^2 and we'll also be conducting further investigations into the potential reuse of existing pad foundations!



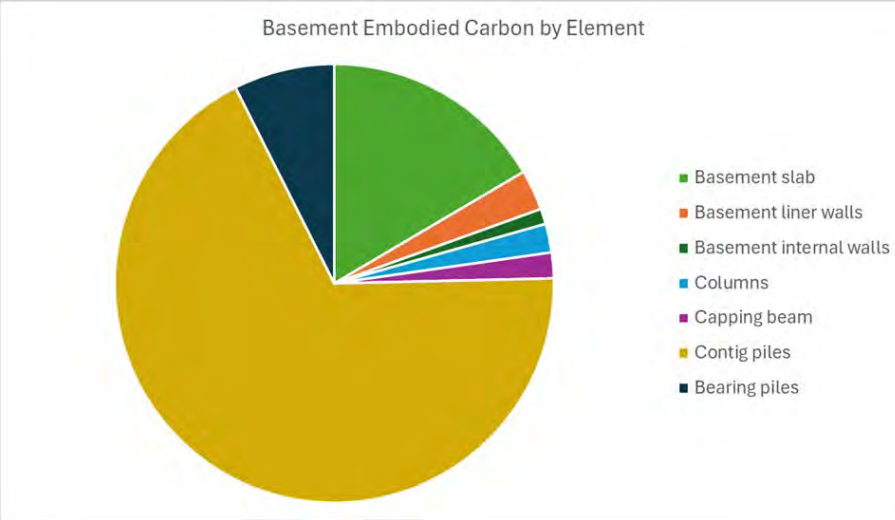
For more on SCORS ratings, take a look at this IStructE article in which the original proposers of the SCORS system reflect on carbon target progress since 2020.

ECO-ENDEAVOURS

What have we busy 'conis'-BEES been up to?

Highlighting Potential Carbon Savings from Basement Removal

Conisbee picked up a project at stage 3 when the client was going through a value engineering exercise. Ian Prentice ran a carbon calculation for the basement to demonstrate to the client that there would be a large embodied carbon saving by removing the basement from the scheme, as well as the financial benefit they were looking for. The pie chart shows the embodied carbon breakdown of the basement by element, with the contiguous piled walls the most carbon intensive element.



The Engineers Reuse Collective

Conisbee have joined The Engineers Reuse Collective (tERC). This is a group of structural engineering companies aiming to promote and implement reuse in the built environment. The collective champions working together to change mindsets, share & demonstrate knowledge, and advocate for change as a collective voice. Gavin attended their January meeting and reported the following, "The key points going forward were that there will be 'working groups' set up this year with 4-6 people from different companies who will be tasked with researching a particular topic. We can get involved in this. There's also going to be additional 'steering group' members set up in 2026. There will be various meeting across the year, roughly every 6 weeks." To stay up to date with the latest events, you can subscribe to the mailing list.

Retrofit Social Housing Exhibition

Back in 2020, Conisbee were approached by old friend and client Alice Brown at AAB Architects, to advise on the structural elements of retrofit plans for the West Kentish Town estate. Although the plans didn't go ahead, the scheme was used as a case study to highlight the cost and environmental benefits of adaptive reuse and refurbishment of exiting housing stock. Following this, we collaborated with AAB Architects and ECD Architects to turn these case studies into an exhibition at the Building Centre Retrofitting Social Housing: Alternatives to Demolition. Our contribution consisted of 2 large exhibition boards that outlined some of the key structural considerations for re-use of existing residential buildings, potential methods for extending existing buildings and the sustainability benefits of re-use. There was also an accompanying panel discussion on the benefits and barriers to more widespread retrofitting, with Allan sitting on the panel to provide structural expertise. The RIBA Journal's review of the event can be found here, or you can watch the full video recording here.







ECO-ENDEAVOURS

What have we busy 'conis'-BEES been up to?

Brompton Bike Initiative

As part of our ongoing commitment to sustainability and active travel, we now have 2 Conisbee Brompton bikes in the office for use going to external meetings or going to site. We have leased them for a year initially, if they are a successful addition to the office, we will extend this.



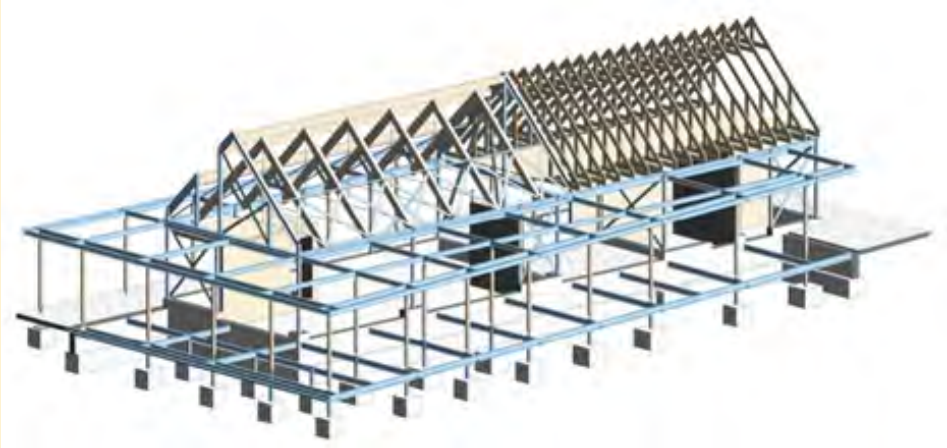
Islington Sustainability Network

Conisbee continue to sit on the steering committee of the Islington Sustainability Network (ISN), a non-profit network of over 140 local organisations working to reduce energy use, cut carbon emissions and manage environmental impacts. This year, look forward to several ISN events and initiatives, which Conisbee will be involved with including: tours of retrofit projects, networking events and the reinvigoration of the existing mentorship scheme.

ISLINGTON SUSTAINABILITY NETWORK

Low Carbon Notes on Drawing

In the drawing notes for a project going out to tender, our Norwich team have included 'Low Carbon Notes'. These state that the tendering contractors are to provide proposals for sourcing reused steel sections and low carbon concrete. For the steel sections, substitution of alternative sections is permitted for non-visual sections and where this wouldn't increase weights by more than 20%. For the low carbon concrete, use of calcined clay is suggested, and any GGBS or PFA replacement proposed must be sourced from existing stockpiles within Europe. As well as the notes on the drawings (and similar in the specification), the project team were also sent an email highlighting the notes and explaining the rationale behind them. It will be interesting to see the responses from the tendering contractors – watch this space!



Contractor Asks for Sustainability

It's great to see our industry partners' low carbon ambitions. During the tender process, a contractor has recently asked us to sign up to a Low Carbon Structures Plan for a project - we're always happy to work with clients to achieve sustainability goals.



We don't just think about sustainability on our projects, we've also been working to bring down the company's operations emissions – see Conisbee's Operations Emissions section for more.

Spread the Word – please help to spread the word on all things sustainability by sharing this newsletter with other industry professionals.

SPOTLIGHT STORY

What to consider when using reclaimed steel

Because it offers the potential to deliver substantial embodied carbon savings, there's a growing interest across the built environment to develop and share good practice in steel reclamation and re-use. As engineers with the power to recommend and specify reclaimed materials there are four main interlinking aspects we need to consider when incorporating reclaimed structural beams, columns etc in a construction project: procurement, compliance, cost and embodied carbon.

Two basic routes are available for procuring reclaimed steel: i) buying tested reclaimed steel from the open market and ii) salvaging steel directly from an existing building. Buying reclaimed steel directly is simpler and quicker since it's already compliant but it's a relatively costly and carbon intensive approach compared to acquiring steel salvaged from an existing building during demolition. Unfortunately, the range of reclaimed steel suppliers in the UK is limited so salvaging steel directly from site can help unblock that bottleneck, but site salvage activities add complexity and risk to the project requiring careful planning, management and compliance checks. Reclaimed steel procured in this way also usually needs extra suitable space for storage until ready for delivery to site.



To comply with the Construction Product Regulation (CPR) all new and reclaimed structural steel must be Conformité Européene (CE) or UK Conformity Assessed (UKCA) marked, and all reclaimed steel must undergo testing to determine its key material properties for use in structural design.

Reclaimed steel suppliers typically carry out testing and CE/UKCA marking in conjunction with fabricators, together with dimensional assessments and checks for distortion, damage, loss of section and the presence of welds, holes and similar modifications which act to weaken the structural elements.

If we're working on projects where we're specifying reclaimed steel we also need to consider professional indemnity insurance considerations, and we should consider whether we need to disclose relevant information to our insurer. There's no clear industry guidance on this but best practice requires us to liaise with our insurer to fully understand the level of detail required by them.

Reclaimed steel suppliers
The main supplier of reclaimed steel in the UK is:
Cleveland Steel and Tubes - Repurposed Steel

Further information & guidance
Detailed information and guidance on using reclaimed steel can be found in the following sources:

- Protocol for re-using structural steel Protocol for Reusing Structural Steel
- Assessment, Testing and Design Principles for Structural Re-use - Structural Steel Reuse
- Re-using structural steel - New ISturctE guide
- Holbein Gardens: Delivering a low-carbon structure with reclaimed steel - Holbein Gardens
- What engineers need to think about when using reclaimed structural steel - Interview: Roy Fishwick
- Delivering steel's circular economy potential - Steel's Circular Economy Potential

Overview of the key considerations when using recycled steel - Steel and Recycling

SUSTAINABILITY SCOOP

Structural Engineers Declare Summit

As usual, Conisbee attended the SED annual summit. The summit included some circular economy case studies, the impacts of raw material extraction, and information on the biodiversity emergency. There was an emphasis on thinking beyond the immediate site boundary and about sustainability more broadly than just embodied carbon. Suggested ways forward included:

- Stronger sustainability emphasis in The Institution's code of conduct / ethics
- Aiming to change the system rather just a single project, e.g. new design codes, creating new local supply chains
- Mobilising existing AI tools in a construction industry context to help analyse, predict and solve problems, such as biodiversity loss. (Although not without a note of warning over the energy use of AI.)
- Structural engineers leading in sustainability through new career pathways.

All the presentations from the summit are available to watch on the IStructE website.



Government Actions on Climate

The Climate Change Committee 'Progress in Reducing Emissions 2024 Report to Parliament' recommends that the UK must urgently cut emissions from buildings, transport and farms. Meanwhile, the Scottish Government have passed the Circular Economy Act, with the aims of reducing waste and developing circular economy strategy. More recently, at the Timber in Construction summit, the Environment Minister announced plans to increase the use of timber in construction and boost the domestic timber industry. The ambition is to create economic growth and meet housebuilding targets in a sustainable manner. Timber Development UK have reported on the announcement and the full Timber in Construction Roadmap 2025 policy paper is available to read.

UK Net Zero Building Standards Pilot Version

The pilot version of this standard was launched in September 2024. It aims to provide a clear set of requirements for a building to be classified as Net Zero Carbon Aligned, with both operational and embodied carbon included in the assessment. The standard aims to be ambitious but achievable, with technical principles based on climate science and real measured data. The standard is ready for the industry to start using, with pilot projects to test the standard being sought. You can read the full overview of the standard here.

UKGBC Materials Passport Guide

The UK Green Building Council have published guidance on material passports. The first guide gives an overview of what material passports are, key considerations when using them and who the key stakeholders are; while the second is a reference document for information that should be collected.



SCI Guide on Low Carbon Steel Design

SCI have released the guidance 'Best Practice for Designing Low Embodied Carbon Steel Buildings'. The guidance is structured around the IStructE Hierarchy of Net Zero Design and covers reuse, efficient & clever design principles, minimising waste and deconstruction, all while maintaining safe & reliable design. Design criteria checklists at the end of each chapter provide useful summaries. As well as steel frames, steel-concrete composite and steel-timber hybrid construction are also considered.



SUSTAINABILITY SCOOP

Minoro Carbon Management Tool

Minoro is a free access carbon management tool launched by Grimshaw which aims to help building owners, project managers and design teams create a plan for carbon management. It identifies key actions and responsibilities at each stage of a project and provides guidance on setting realistic science-backed targets.

Reuse of Structural Materials IStructE Conference



Conisbee attended the recent IStructE conference on the reuse of structures and structural materials. It was inspiring to see the pioneering projects that are addressing the challenges associated with reuse. The conference was an informative event from which Conisbee look forward to continuing the work we are doing finding new uses for existing structures, as well as looking for opportunities to apply some of the more novel solutions in reuse of steel and concrete.
Following the conference, Conisbee have joined The Engineers Reuse Collective and are looking forward to collaborating to further the reuse agenda – see the Eco-Endeavours section for more on this.

Embodied Carbon on Concrete Mix Design

Concrete mix designs received from some concrete suppliers for review during stage 5 are now showing embodied carbon values for each mix. This is great to see and will hopefully become more widespread. Perhaps it's something we should be asking for in our specifications?



Concrete Zero Publications

Concrete Zero have published the report 'Classification methodology for embodied carbon of concrete', which describes three tools for assessing the embodied carbon of concrete. They've also released a publication on closing the emissions gap in the UK concrete industry to achieve decarbonisation by the mid-2030s. A requirement for immediate action is highlighted. The report identifies reclaimed Portland cement and alternatives to Portland cement as important pathways to pursue, but concludes that to fully close the emissions gap, carbon capture technologies will be required.



UK Electric Arc Furnace

Tata Steel are planning to build an electric arc furnace at Port Talbot, to be operational by early 2028. The electric arc furnace will mostly melt scrap steel and will reduce carbon emissions by up to 90% compared to the recently closed blast furnaces. For the construction industry, this is likely to reduce UK supply of GGBS but produce 'greener' steel.

IStructE Carbon Calculator 3rd Edition

The third edition of the IStructE carbon calculator has now been released, along with updated guidance. The main changes made are: updates to align with version 2 of RICS Whole Life Carbon Assessments (July 2024), breaking down carbon in mixed development projects to distinguish between refurb and new build, adding carbon assessment for bridges, and expanding the materials database. Find out more about the updates in this article.

Specifying Concrete Sustainably

The Concrete Centre have published a series of new guides, each focusing on a different aspect of specifying sustainable concrete. Topics covered include aggregates, reinforcement, supplementary cementitious materials and 56 day concrete strengths. A key considerations guide is also included.

SUSTAINABILITY SCOOP

RIBA Mandatory Climate Reading

RIBA are making Climate Literacy a mandatory competency for its members. The Climate Literacy Knowledge Schedule includes climate fundamentals, sustainable outcomes, human factors, circular economy, energy & carbon, ecology & biodiversity, water, and connectivity & transport.

ICE Database v4

The Inventory of Carbon and Energy (commonly known as the ICE Database) have released an updated version. This fourth version includes updates to a wide range of material profiles – further detail is available in the launch webinar.

The Building Archives

The Building Archives is a digital platform which was launched in June 2024. It aims to aid building owners with finding archive information, such as structural drawings, to make adaption and reuse of existing building stock easier to do. The information held by the archive is not publicly available, they act as a referral service. The hope is that more practices will add information to the archive over time.



IStructE Five Year Report

IStructE's Climate Action End of Year Report 2024 looks back on the past five years of increased sustainability and climate action in the industry. The report also looks to the future, setting out the next three years of sustainability strategy.

Measuring Mass Timber



The Measuring Mass Timber report presents the findings of a two year research study into the environmental and quality of life benefits of mass timber construction. The research assessed five timber building case studies, reviewing whole-life carbon, biogenic storage and occupant satisfaction. Lessons learnt in conducting the building assessments are outlined in the report, with the intention that this research could serve as the starting basis for a larger timber dataset. One key conclusion of the study was that mass timber offers a decarbonisation solution that can be used today, with significantly lower emissions than 'business as usual'; however, it is a solution that shouldn't be considered in isolation but as part of a wider set of decarbonisation tools.

Regenerative Architecture Index

The Regenerative Architecture Index (RAI), launched by Architecture Today and UK Architects Declare, recognises that, as well as reducing negative impacts, the built environment should also have positive impacts, now and in the long term. The index aims to showcases examples of best practice, identify challenges to progress and ideas to overcome them, and to support a paradigm shift to regenerative practice across the industry. A special edition of Architecture Today contains the inaugural RAI. Three key criteria explored were: being a good ancestor, co-evolving with nature, and creating a just space for people.

Chartered Environmentalist

IStructE are now offering the qualification Chartered Environmentalist (CEnv) to existing Chartered Structural Engineers. Achieving CEnv status recognises a high level of knowledge, skill and experience working in sustainability, and an ability to act as a competent leader of sustainability. Details of the application process and the 11 competencies that applicants will be assessed against can be found in this guide.



The Engineers Reuse Collective has launched and Conisbee are a member - see the Eco-Endeavours section for more.

CASE STUDY

Rating the Embodied Carbon of Bridges

Embodied carbon in buildings is commonly rated using SCORS (Structural Carbon Rating Scheme). SCORBS is the equivalent rating scheme for bridges and asses the embodied carbon of bridges based on the carbon per square metre of functional area (FA), rather than gross internal area. The calculation includes ancillary elements, such as parapets and surfacing, and adapts the calculation for site activity emissions used for buildings to reflect the differing construction.

Conisbee have recently designed three bridges in Norfolk and Suffolk and the SCORBS rating scheme has been used to compare their A1-A5 embodied carbon. The CNG bridge has the lowest emissions per square metre of FA, at ~20% of the others. Its wider and shorter span, leading to a higher FA:span ratio, contribute to this, alongside its "kit" structure and shallow pad foundations, in contrast to the highly bespoke designs at the other two sites. Cabbage Creek's 18m concrete-filled steel driven piles are a result of the site's ground conditions and account for 29% of the bridge's embodied carbon.

Bridge Location	Span	Width	Foundations	Loading (kN/m^2	Bridge Area (m^2)		kgCO2e		kgCO2e / m^2 Floor		RATING
							Deck	Total	Deck Structure	Total	
Cabbage Creek	20m	1.5m	Concrete-filled Tubular piles	5	20*1.5 =	30	25109	35890	837	1196	B
Norwich Castle	10m	1.5m	Supported by existing	5	10*1.5 =	15	18355	18355	1224	1224	B
CNG	8m	2.4m	Mass Concrete	5	24*8 =	19.2	3525	4840	184	252	A++

When comparing just the deck structures, the Castle bridge is the most carbon-intensive; despite having the same overall SCORBS rating as Cabbage Creek, the Castle bridge has no new foundations. CNG continues to perform well due to the efficient design and shorter span.

SCORBS comparisons can be tricky due to the many different environments bridges can be found in. One of the bridges we have analysed spans a 20m creek on a saltmarsh, whilst another is fully enclosed in glass and spans to a Norman castle. Both bridges have restraints that will result in more carbon intensive processes, hence context is vital to understand the data. Span length is the primary driver in embodied carbon, but foundation type and loading (pedestrian, traffic, etc.) will also have a significant influence.

For the Cabbage Creek bridge, early design carbon assessments explored various spans, widths, and materials. Timber was found to be less carbon-intensive than recycled plastic. Adding intermediate supports and reducing spans had little effect, as any savings in beam sizes were offset by additional supports. If shorter spans led to underutilised primary members, this also increased embodied carbon.





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If you would like to contribute to the newsletter – whether you have a case study of interest, a project that's done well or really badly, have attended an interesting lecture, or have presented one yourself – then let someone on the sustainability group know.

Spread the Word – please help to spread the word on all things sustainability by sharing this newsletter with other industry professionals.