

## 1. Get informed

# A framework for change

Mike Cook and Will Arnold outline the Institution's approach to providing guidance on the climate emergency, discussing six key areas this guidance will fall into.

### THE INSTITUTION'S CLIMATE EMERGENCY TASK GROUP

(CETG – **Box 1**) is coordinating the publication of guidance to drive change in the industry in response to 2019's climate emergency declarations. The guidance will take the form of articles, design guides, blog posts and lectures – where possible made available through the Institution's dedicated climate emergency webpage ([www.istructe.org/climate-emergency](http://www.istructe.org/climate-emergency)).

Guidance is grouped under six themes, as considering these alongside each other helps us to find the most effective solutions to a complex problem (**Box 2**). These were first outlined in a blog post on the Institution's website in March 2020 entitled *Six climate emergency actions for structural engineers* and will be referenced at the top of each 'Climate emergency' article in *The Structural Engineer* going forward.

Although the themes are numbered, they are not sequential and need tackling simultaneously. Reconciling these different approaches won't always be straightforward (e.g. designing both lean and loose-fit), but balancing demands has always been part of our job, and we will need to find the best approach on a project-by-project basis.

### Six themes

The list is bookended by understanding the problem (1. *Get informed*) and sharing our progress and knowledge with others (6. *Get involved*).

Between these are four areas that will require many of us to learn new technical and non-technical skills, as we get better at understanding emissions (2. *Low carbon*), minimising resource use (3. *Lean design*), maximising the benefits of modern methods of construction (MMC) and the circular economy (4. *Zero waste*), and helping our clients to develop sustainable briefs (5. *Influence the brief*).

This article explains what these themes mean to a practising engineer, and gives examples of what the Institution and CETG are doing to help. References to existing guidance are also given – these links are repeated on the Institution's dedicated climate emergency webpage (**Figure 1**).

### 1. Get informed

Structural engineers need to understand the science and system interactions behind the climate emergency, and recognise the professional responsibility and liability that comes with our job title. Keeping up to date with industry developments is key, as is declaring a climate emergency and acting on it ([www.structuralengineersdeclare.com](http://www.structuralengineersdeclare.com)).

#### Read now

**IPCC Special Report on Global Warming of 1.5°C, 2019**  
[www.ipcc.ch/sr15/](http://www.ipcc.ch/sr15/)

An overview from the Intergovernmental Panel on Climate Change (IPCC) of current scientific understanding around climate change, predictions for the future, and implications for our planet.

**GABC Global Status Report for Buildings and Construction, 2019**

<https://carbon.tips/gsr2019>

An overview of emissions in the built environment published by the Global Alliance for Buildings and Construction (GABC). Most famous for: *'Building construction and operations accounted for the largest share of energy-related CO<sub>2</sub> emissions (39%)'*.

**FIGURE 1:** Institution website now has dedicated 'Climate emergency' page

### 2. Low carbon

Structural engineers need to understand how to measure embodied carbon and how to use this measurement to minimise a carbon footprint, allowing carbon control to be prioritised alongside cost and safety. Material specification should maximise use of recycled materials.

The Institution is planning to publish guidance on calculating embodied carbon based on the current Royal Institution of Chartered Surveyors (RICS) methodology.

#### Read now

**RICS Whole life carbon assessment for the built environment, 2017**

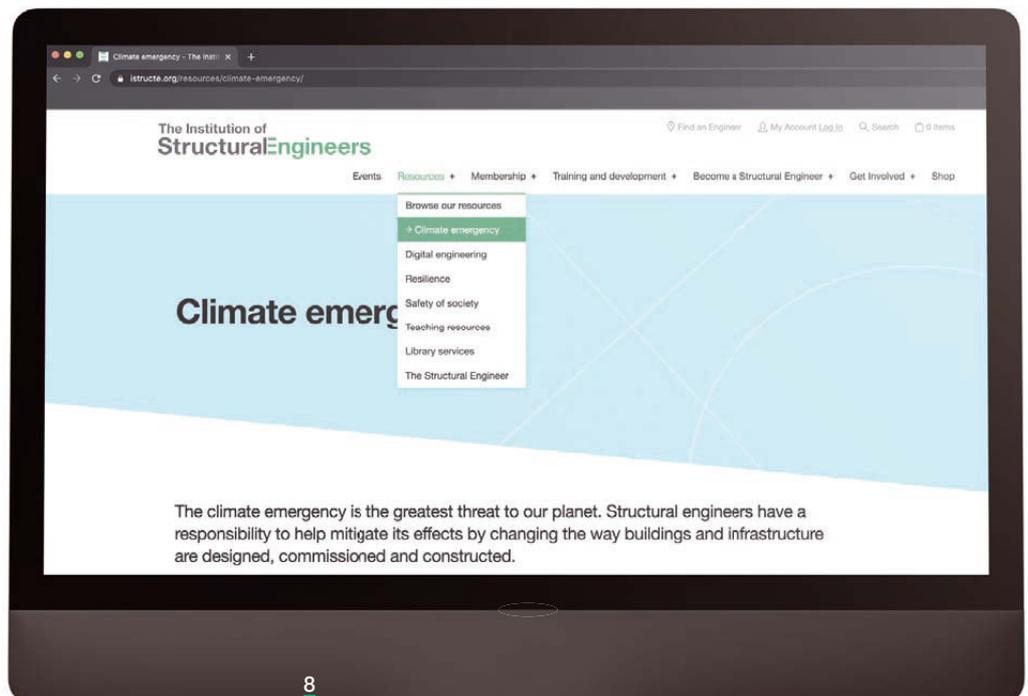
<https://carbon.tips/rics>

Best-practice guidance from the RICS for undertaking carbon calculations.

**LETI Embodied Carbon Primer, 2020**

[www.leti.london/ecp](http://www.leti.london/ecp)

Introductory document by the London Energy Transformation Initiative (LETI) giving an overview of carbon impacts in buildings, and targets and reduction ideas that can help with design decisions.



### 3. Lean design

Structural engineers need to advocate for sensible spans and efficient layouts that minimise the demand for new material. Appraising the loading applied to our designs and targeting 100% component utilisation (with stress governing) is best practice, with unknown future use scenarios discounted. Structures should meet serviceability requirements, rather than overperforming.

The Institution aims to publish guidance and case studies around best-practice lean design.

Read now

#### Embodied carbon: structural sensitivity study, 2020

[www.istructe.org/resources/case-study/embodied-carbon-structural-sensitivity-study/](http://www.istructe.org/resources/case-study/embodied-carbon-structural-sensitivity-study/)

Visual summary by Buro Happold quantifying the magnitude of carbon footprint that can be engineered through lean design decisions such as span size and slab type.

#### MEICON Survey of Structural Engineering Practice Report, 2018

[www.meicon.net/survey2018](http://www.meicon.net/survey2018)

Report from the 2018 Minimising Energy in Construction (MEICON) survey, commenting on common reasons for overdesign of structures.

### 4. Zero waste

Structural engineers need to understand MMC so that these can be utilised when advantageous. Circular economy design principles should be applied whenever possible, including documenting for deconstruction and maximising future reuse potential (long-life, loose-fit, low-energy).

The Institution aims to publish further guidance on MMC and the circular economy for practising structural engineers.

Read now

#### UKGBC Circular economy guidance for construction clients, 2019

[www.ukgbc.org/wp-content/uploads/2019/04/Circular-Economy-Report.pdf](http://www.ukgbc.org/wp-content/uploads/2019/04/Circular-Economy-Report.pdf)

This report by the UK Green Building Council (UKGBC) outlines what the circular economy means in the construction industry. It is written with clients in mind, but is good at explaining the basics of the circular economy at different stages of design.

#### Manufacturing buildings for people and planet, 2020

[www.istructe.org/journal/volumes/volume-98-\(2020\)/issue-1/manufacturing-buildings-for-people-and-planet/](http://www.istructe.org/journal/volumes/volume-98-(2020)/issue-1/manufacturing-buildings-for-people-and-planet/)

## BOX 2. SIX THEMES FOR CLIMATE GUIDANCE



1. Get informed



2. Low carbon



3. Lean design



4. Zero waste



5. Influence the brief



6. Get involved

An article in *The Structural Engineer* by changebuilding, Arup, and Waugh Thistleton Architects discussing the adoption of off-site manufacture in the construction industry.

### 5. Influence the brief

Structural engineers acknowledge that there's little point of lean, low-carbon design if the structure isn't needed in the first place. Proposals to reduce the amount of new construction in favour of retention and adaptation will be key, requiring persuasive powers and experience of designing and analysing existing buildings.

The Institution is looking at how best to help its members communicate the business case for minimal intervention, and influence and facilitate change. The Structural Awards now have a stronger emphasis on celebrating low-impact designs, with the introduction of new Awards for Minimal Intervention and Zero Carbon.

Read now

#### Realising the value of the circular economy in real estate, 2020

[www.arup.com/perspectives/publications/research/section/realising-the-value-of-circular-economy-in-real-estate](http://www.arup.com/perspectives/publications/research/section/realising-the-value-of-circular-economy-in-real-estate)

Report by Arup and the Ellen MacArthur Foundation that quantifies the business case to clients for adopting circular economy principles through a series of case studies.

#### Minimal intervention: less is more

[www.istructe.org/resources/training/minimal-intervention-less-is-more/](http://www.istructe.org/resources/training/minimal-intervention-less-is-more/)

Free webinar by Tony Parasram, the engineer behind the award-winning Newquay Harper Footbridge project, and an expert in the mindset of only doing what is necessary.

### 6. Get involved

The structural engineering community needs to discuss what is happening and help each other improve. This means engaging with the Institution and other professional bodies, declaring a climate emergency, sharing knowledge, and even lobbying local MPs for change. It means speaking up if guidance is needed to help tackle the climate emergency.

The Institution is working with other built environment bodies to combat the climate emergency and supports member activities that increase collaboration regionally, internationally and across the industry.

### What can you do now?

- 1) Visit the Institution's **Climate emergency** webpage ([www.istructe.org/climate-emergency/](http://www.istructe.org/climate-emergency/)), which includes links to existing articles and guidance published by the Institution.
- 2) Visit the Institution's **Get involved** webpage ([www.istructe.org/get-involved/](http://www.istructe.org/get-involved/)), which provides information on how to join the Institution's regional groups, committees, panels, etc.

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## BOX 1. WHAT IS THE CETG?

The Climate Emergency Task Group (CETG) was set up by the Institution in October 2019, recognising the need to respond proactively to the climate emergency. It comprises a small, but growing, group of members working with the committees and panels of the Institution, and other groups of active members, to ensure a coordinated response to the climate emergency and guiding changes needed in the profession. The CETG reports to the Institution's executive via the Engineering Leadership Group.

The group is working across four key areas:

- | **Cross-industry collaboration:** working with the steering groups of other built environment institutions to ensure coordination of effort and purpose (most notably the CIC, RIBA, ICE, CIBSE and RAEng).
- | **Professional support:** working to support collaboration between the Institution and members' practices, to strengthen collective professional capability, the ability to learn

from each other, and to share information and data.

- | **Membership guidance:** coordinating the development of clear guides on materials use, lean design and decision-making, and helping engineers articulate the need for climate-positive briefs and project outcomes.
- | **Setting standards:** working across the Institution's committees and panels to bring climate emergency response into all aspects of professional standard-setting.