

Sustainability notes for authors and presenters



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The construction of structures is responsible for 10% of all global carbon emissions. As such, in 2019 the Institution's Trustee Board made a fundamental decision to place sustainability on a par with its ongoing commitment to structural safety.

This note has been prepared in response to that decision, to aid the embedding of sustainability and climate change within the Learning & Development (L&D) activities of the Institution. In this note, L&D is used to refer to both written forms of guidance (eg authoring guides, articles or papers) as well as spoken guidance (eg courses, webinars, seminars, conferences).

We ask that all those who contribute to L&D, whether paid or free, to consider whether or not there are aspects of sustainability that need incorporating within their topic. Where there are, the contributor is asked to think about how their own content might align with the sustainability thinking shared recently by the Institution (available at www.istructe.org/climate-emergency). There are some questions on the next page of this briefing note that can be used to prompt thinking around the topic.

Note that we are not insisting that climate/sustainability be mentioned in every L&D topic. For many things, sustainability is not of direct relevance and doesn't need referencing explicitly (eg guidance on the torsional design of beams, even though there are implicit carbon savings through efficient design). Our drive is to ensure that where sustainability should be considered, it is, and that it is done so in a manner consistent with best practice sustainability advice.

Similarly, we ask that contributors follow the Institution's lead in considering how best to provide a balanced view on approaches towards reducing emissions, to avoid just presenting 'one side of the argument' where possible. There are positive and negative sustainability aspects for most topics, materials, design and construction methods, and **we wish to enable our members to make informed sustainability decisions.** Note that we don't expect 'balance' on scientifically established facts (eg whether the climate crisis is real).

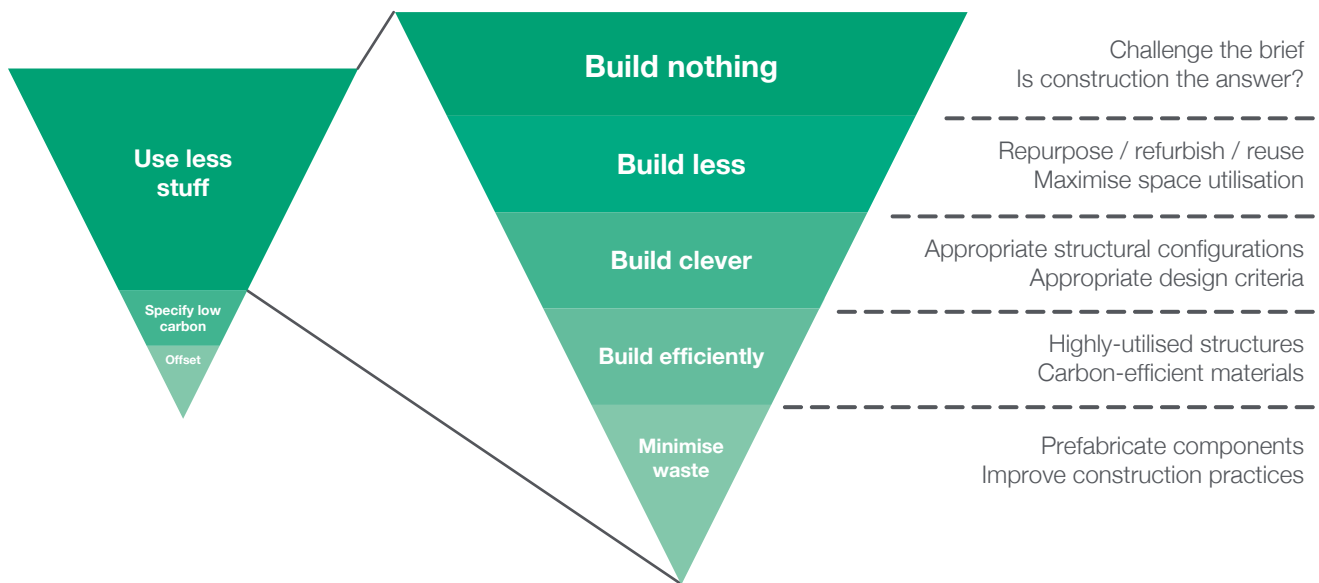


Low carbon design hierarchy

The Institution advocates that engineers follow the hierarchy shown in the figure below in order to maximise their impact when it comes to reducing the carbon emissions associated with a design.

This prioritises solutions which reuse what is already available, and only build new where there is a real need.

Appropriate structural configurations, design criteria, and utilisation limits follow, along with a quest of how best to utilise materials in a way that is efficient (and carbon efficient). Note that the specification of materials themselves follows later still.



Next Steps

- Try answering the questions below to help identify knowledge gaps
- Read our content online at www.istructe.org/climate-emergency
- Think about how best to incorporate this knowledge into your L&D activity
- If you want more advice, get in touch - we're here to support you

Questions the contributor might want to be able to answer

General

- Which aspects of the hierarchies of carbon reduction (previous page) are most applicable to my topic? How can I encourage readers/attendees to make decisions further up the hierarchy?
- What questions might a client ask their engineer on this topic? Can I help the engineer prepare for this?
- Are there any broader sustainability aspects (biodiversity, societal benefits etc) worth exploring within this topic?
- Are there safety/sustainability overlaps within this topic that we should be aware of?
- Are my examples appropriate in this context (eg presenting a glassy steel high-rise at a conference in a developing country with a very hot and dry climate) or should I find better examples?
- Are there opportunities to discuss holistic carbon reduction, and the impact the structure may have on the emissions of other disciplines?

Build Nothing and Build Less

- Is it possible to enable the client's desired outcomes without designing this amount of structure? (note that 'building nothing' should not equate to doing nothing, eg it could result in providing engineering advice on load capacities, reusability, and re-configuration of existing spaces)
- Does re-use, adaptability, life-extension or circular economy have any bearing on what I'm teaching/writing about?
- What assumptions are typically made about the end-of-life processes for the structures/materials being discussed? Might this change in the future?

Materials (steel, concrete, etc)

- Am I up-to-date with industry guidance on the impacts (carbon, biodiversity, land use etc) of these materials?
- What impact on nature/biodiversity does the extraction/manufacturing of this material have?
- What are the carbon benefits of these materials? What are the downsides?
- Where are the areas of uncertainty around this knowledge?
- Is it relevant to talk about the material's durability in this context?

Discussion

- Am I and prepared to answer sustainability questions related to my topic?
- How can I encourage the L&D attendees/readers to question the sustainability issues that I'm raising?
- Is there space in my agenda to prompt discussion around these topics?
- Will it help the attendees/readers if I discuss part of the decision-making process that happened on a project in terms of sustainability criteria (even if the less-sustainable decision was taken)?

Some examples of L&D providers putting this into action

- The Contributor Group of the IStructE's forthcoming *Car park design* guidance were reviewing the existing *Design recommendations for multi-storey and underground car parks* (Fourth edition). They have decided to add a general section on sustainable car park design into the new guidance; looking at both efficient use of materials, and future circular economy principles.
- The Contributor Group for the IStructE's forthcoming *Conceptual design of structures for extreme loads* realised that they could bring in far more content on the life extension of certain existing assets, such as harbour structures. This was done both in the context of reducing material use today, but also in the context of squeezing another few decades out of a structure until lower-carbon replacement materials exist.
- The author of the Hams Way Footbridge project focus article ([link](#)), critiqued their design against the IStructE's hierarchy for embodied carbon reduction, and included a carbon footprint analysis as part of the write-up.
- The chairs of the 2022 Timber Conference were keen that the conference remained focussed on designing with timber, and didn't become all about sustainability. However, they realised that in order to do this, they needed clarity as to how timber's carbon emissions are interpreted, and approached institution staff for more guidance on this.



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