

Putting the net-zero hierarchy into practice

Build nothing

Emily Halliwell introduces a new series of notes that will signpost key climate resources for IStructE members around each level in the hierarchy of net-zero design.

Introduction

In recent years, the Institution of Structural Engineers has produced a wealth of guidance to assist engineers in tackling the climate emergency. This new mini-series aims to help engineers put the hierarchy of net-zero design¹ (Figure 1) into practice by signposting key resources, such as existing articles in *The Structural Engineer*, for each level of the hierarchy.

The hierarchy sets out the steps that may be taken to minimise the environmental impact of a building or structure, with the area of each level representing the scale of the opportunity at each step – i.e. the higher up the hierarchy, the greater the potential to reduce the impact. The hierarchy is also semi-chronological, with the topics in the higher levels typically being open for discussion near the start of a project.

This series should be read alongside the IStructE *Design for zero*² guide, which considers each level in the hierarchy in more detail and provides case studies to demonstrate how the hierarchy can be implemented.

Build nothing

At the top of the hierarchy is ‘build nothing’, which requires us to ask whether the aims of

a project can be achieved without building anything. To do this requires a significant change in the approach of structural engineers³ and Tim Ibell, James Norman and Oliver Broadbent have called for the structural engineering profession to demonstrate the value of ‘doing nothing’⁴.

A key part of this is persuading and influencing the client and design team: William Algaard sets out ways in which engineers can approach this⁵, in particular using engineering knowledge to quantify the potential savings that can be made by altering the brief or solution.

Will Arnold presents an approach to challenging the brief which focuses on outcomes⁶, allowing us to reframe what we’re being asked for – e.g. we

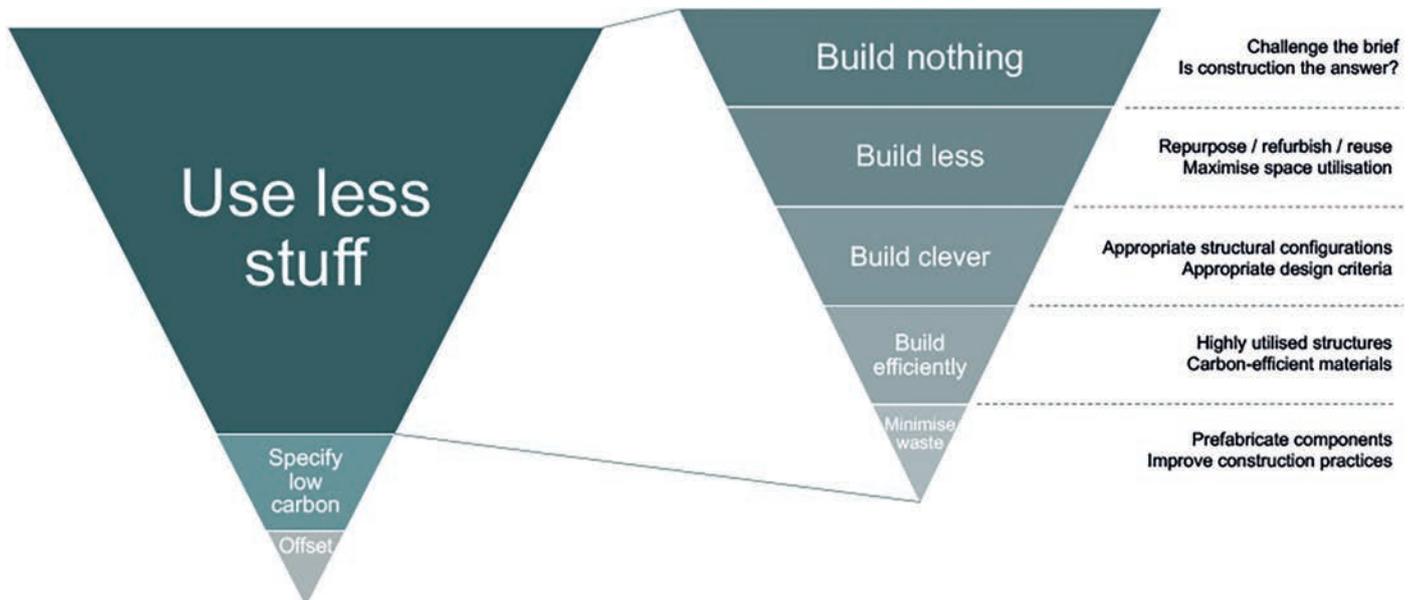
might be asked for a ‘cycle bridge over a road’ and this could be reframed as ‘a safe way for cyclists to cross the road’.

This way of thinking is exemplified in a write-up by Buro Happold of its Elizabeth line gantry assessments⁷ in 2018, where a brief to replace 700 overhead gantries changed into a challenge to prove that as many as possible could be reused without intervention.

The importance of outcomes is also discussed in Tim Chapman and Ian Firth’s article on low-carbon outcomes for infrastructure projects⁸. This includes consideration of whether a design will encourage and enable low-carbon activities and recommends we consider ‘user carbon’ in addition to ‘capital (or embodied) carbon’ and ‘operational carbon’ – something we may want to encourage clients to include in their briefs.

Clear and effective communication is key to influencing the client and project team to make more sustainable decisions. To enable this, the IStructE has developed a Structural Plan of Work (SPoW) Sustainability checklist⁹ and associated report template¹⁰ – these complement the net-zero hierarchy and give a clear framework of practical actions that can be taken through the design process to

“**THIS MINI-SERIES AIMS TO HELP ENGINEERS PUT THE HIERARCHY OF NET-ZERO DESIGN INTO PRACTICE**”



↑FIGURE 1: Hierarchy for net-zero structural design (inspired by PAS 2080)

reduce the carbon emissions associated with the structural design and communicate this clearly with the client, design and construction teams. The first step in the SPoW is to inform the client, and the LETI *Client Guide*¹¹ offers guidance aimed at clients which highlights the importance of the client's role in delivering net-zero-carbon projects.

As part of the IStructE Climate Emergency Conference 2020, Victoria Martin discussed how the brief can be challenged throughout the design process¹² – showing that while the biggest impact can typically be made at early design stages, there is scope to have a positive influence throughout the project. Further articles in this series will assist designers with identifying opportunities at each stage.

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