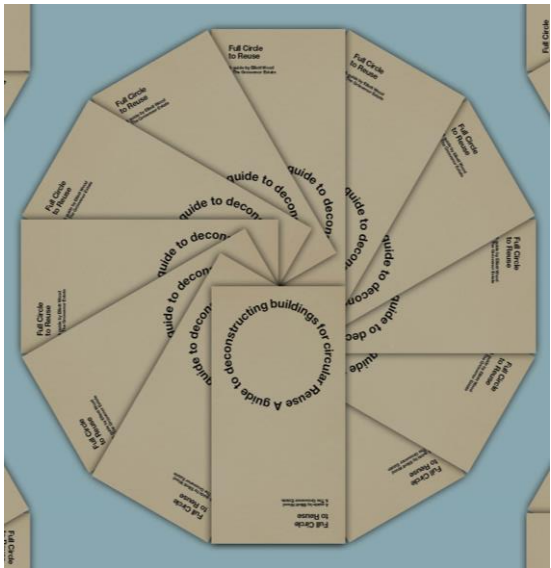
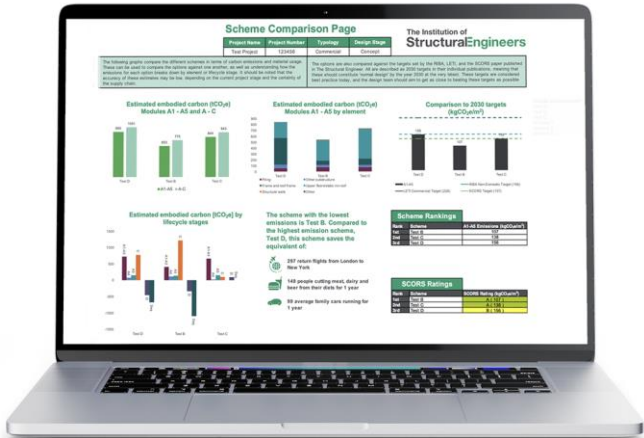


# IStructE Circular Economy & Reuse Design Guidance

# A bit about me





# Elliott Wood



## Our Values

### Be Brilliant

/bi:ˈbrɪlj(ə)nt/

#### Verb

1. to go above and beyond
2. to show outstanding ability no matter the task
3. to offer unrivalled service
4. to achieve your full potential

### Step Forward

/stɜːp fɔːwəd/

#### Verb

1. to inspire everyone for a better future
2. to embrace diversity and inclusion
3. to safeguard the wellbeing of yourself and others.
4. to choose well, leaving a positive footprint on our shared world

### Flip it

/flɪp ɪt/

#### Verb

1. to disrupt routine
2. to consider other perspectives
3. to cultivate curiosity
4. to realise unexpected benefits

## Engineering a better society

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### Education

How do we make education relevant for the 4th industrial revolution?

### Technology

Can we keep up with the pace of technology and are we using it correctly?

### Health

Can we prevent through lifestyle and well-being, rather than just a cure?



### Infrastructure

Are we investing in the right infrastructure to benefit today and the future?

### Culture

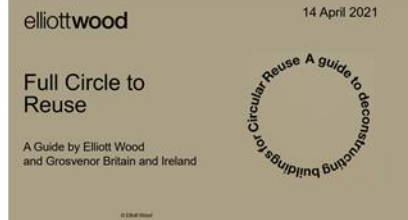
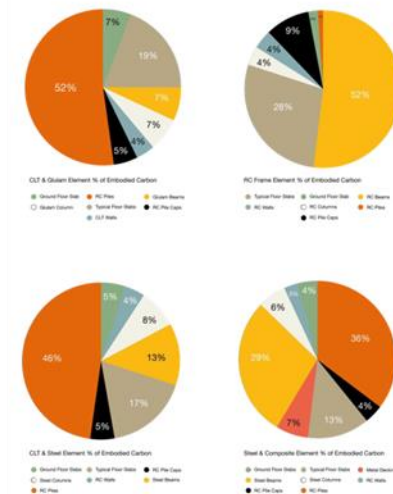
How can we overcome apathy and division in order to truly engage with each other?

### Sustainability

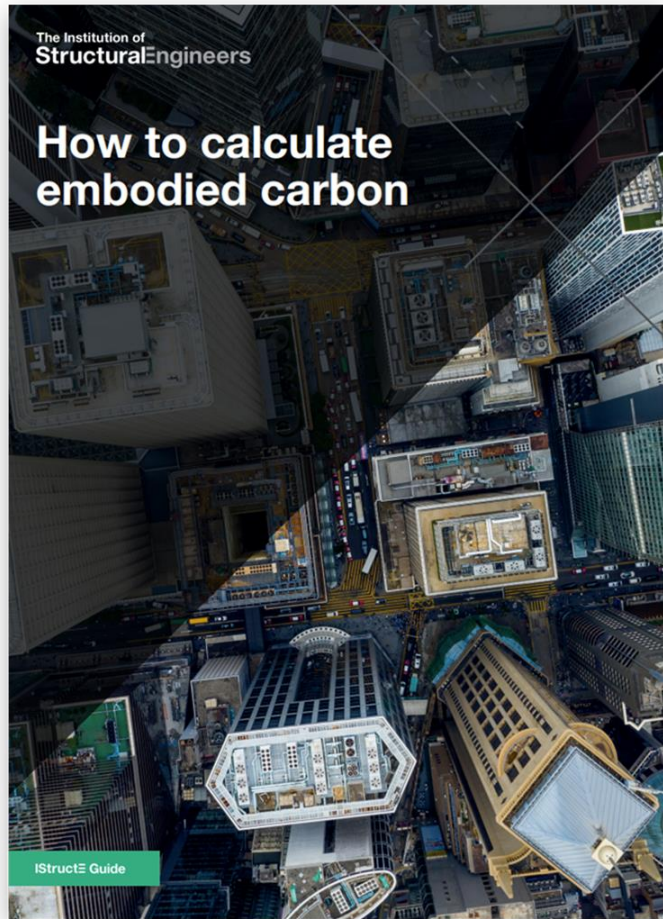
Will it be sustainable enough?



## Carbon Tools Output



# IStructE publications



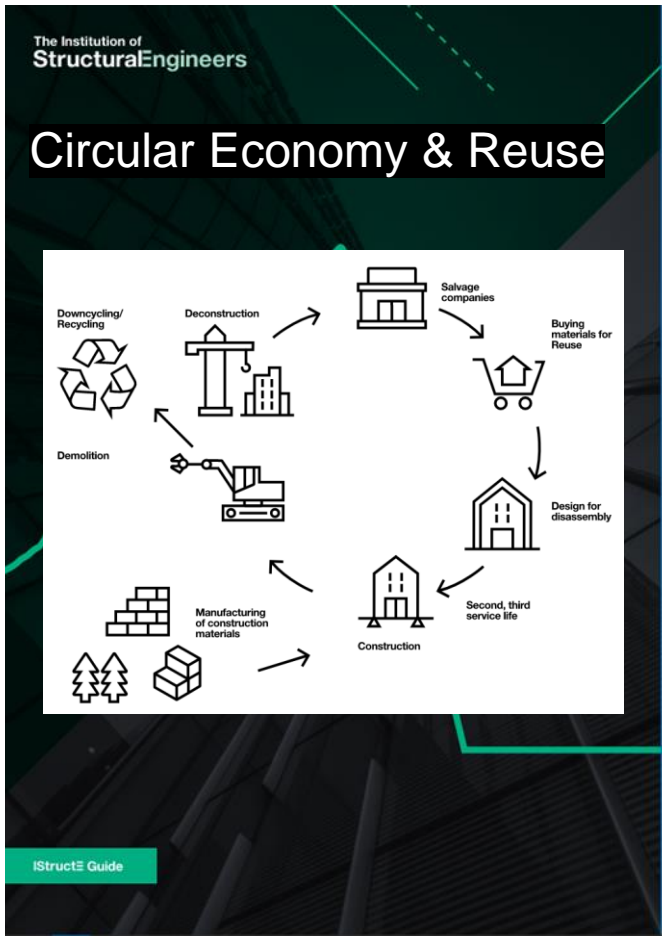
2020



2021



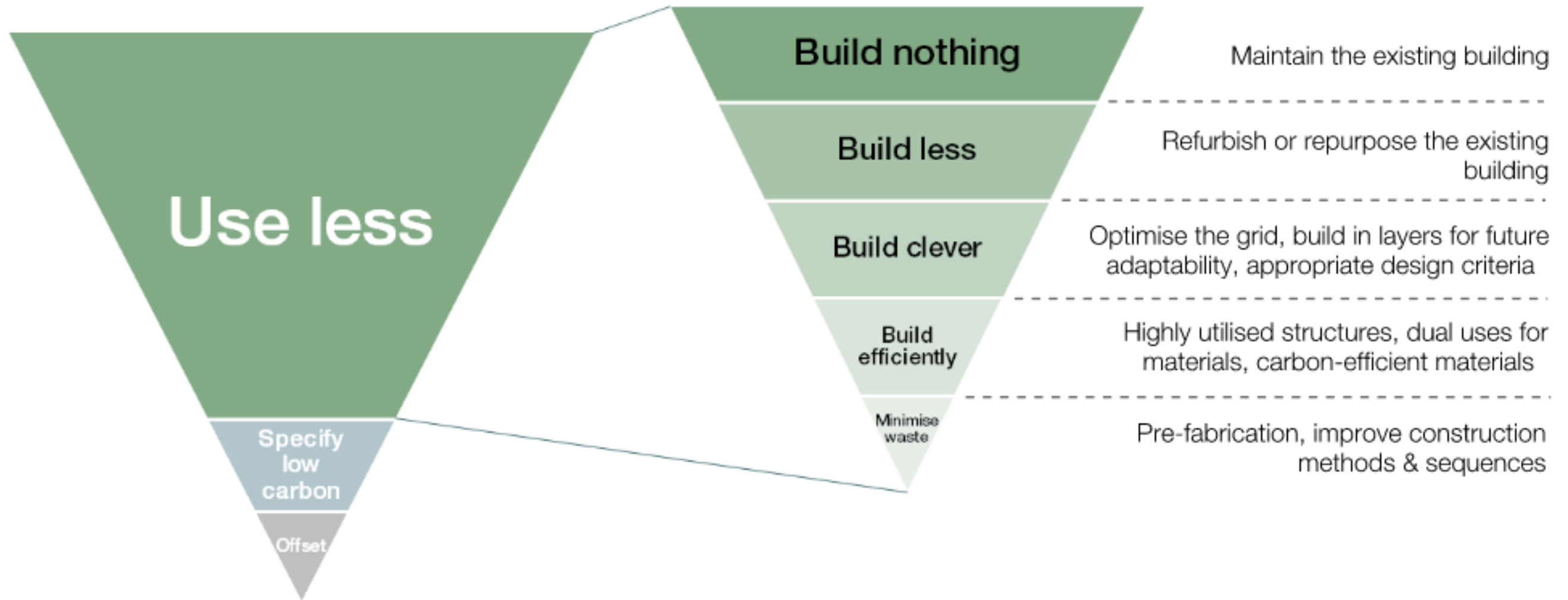
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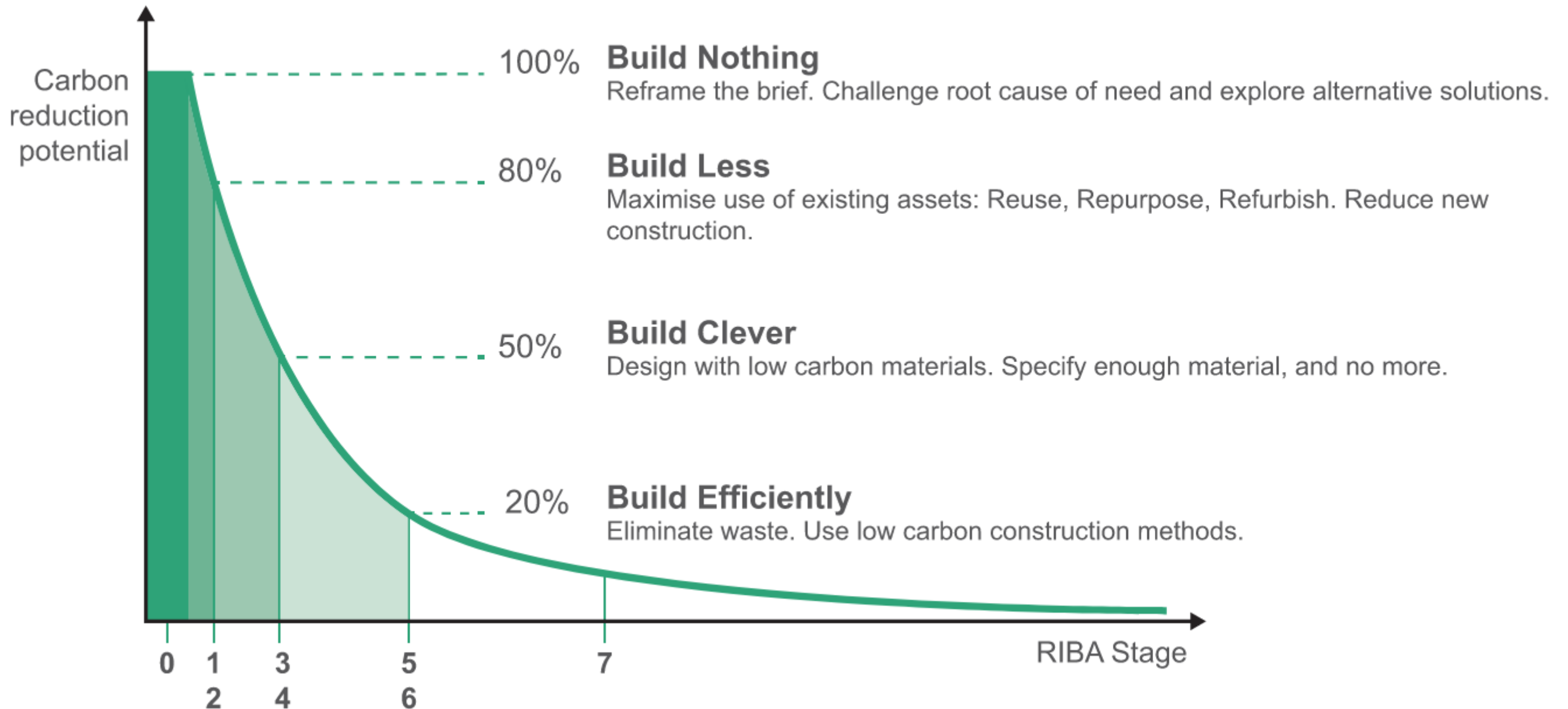
2022

# Design for zero

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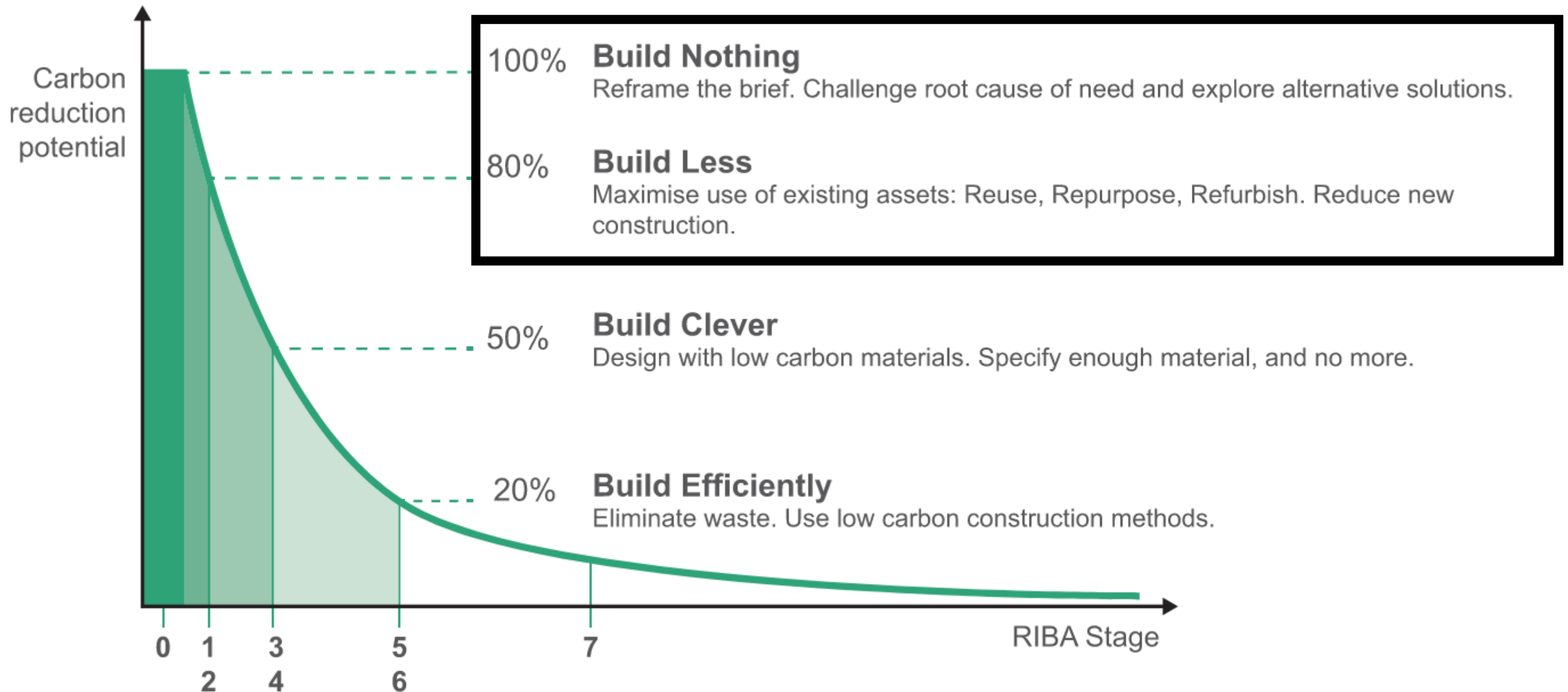


# Design for zero = the 'what'



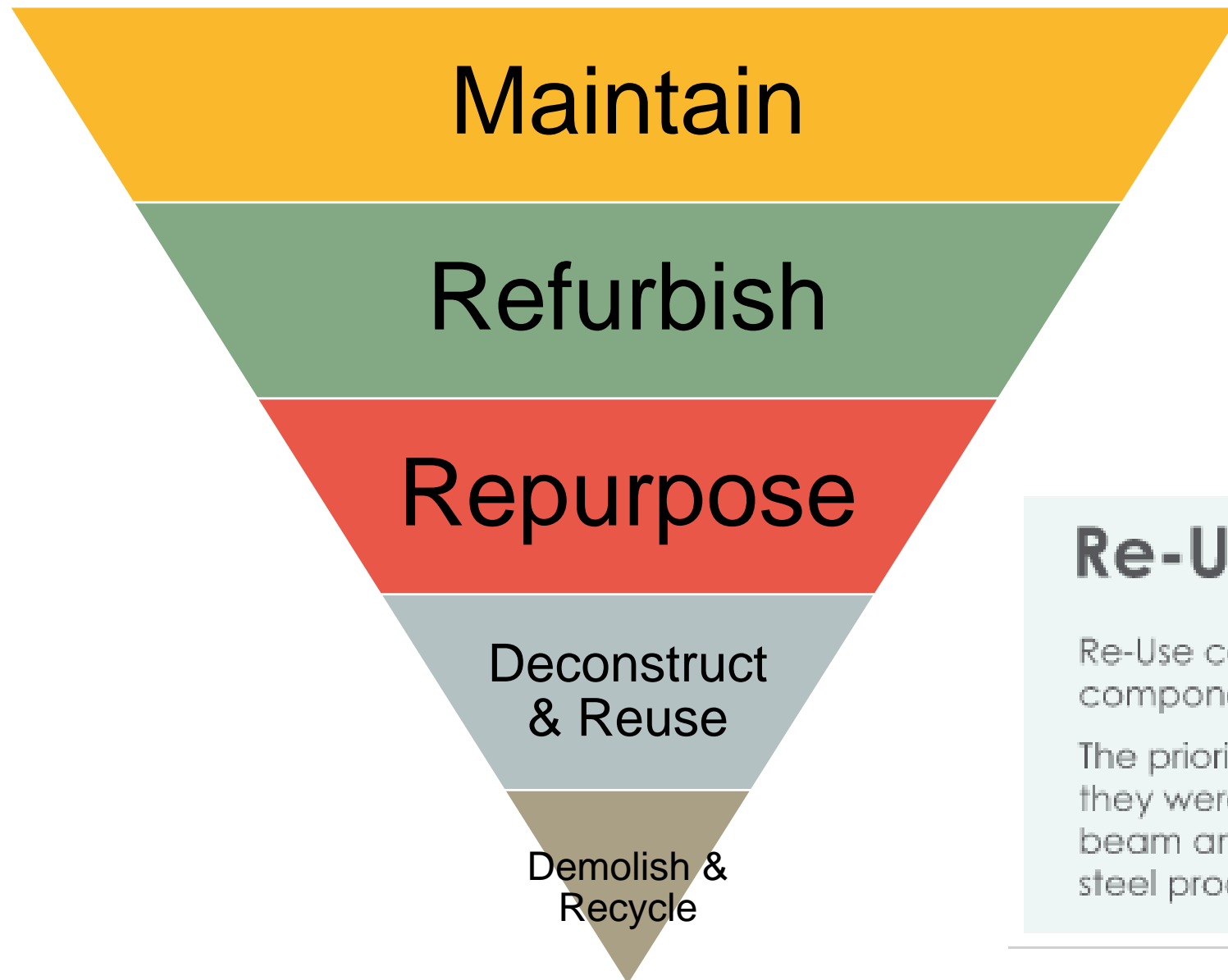


# Circular Economy & Reuse design guidance = the 'how'



# Reuse vs recycling

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## Re-Use

Re-Use can take place at different levels. Buildings, systems, components or materials can all be reused.

The priority is that they are reused for the same purpose for which they were originally conceived e.g. a steel beam is reused as a steel beam and energy is not expended downgrading to lower value steel products.



# Contents of the new guide

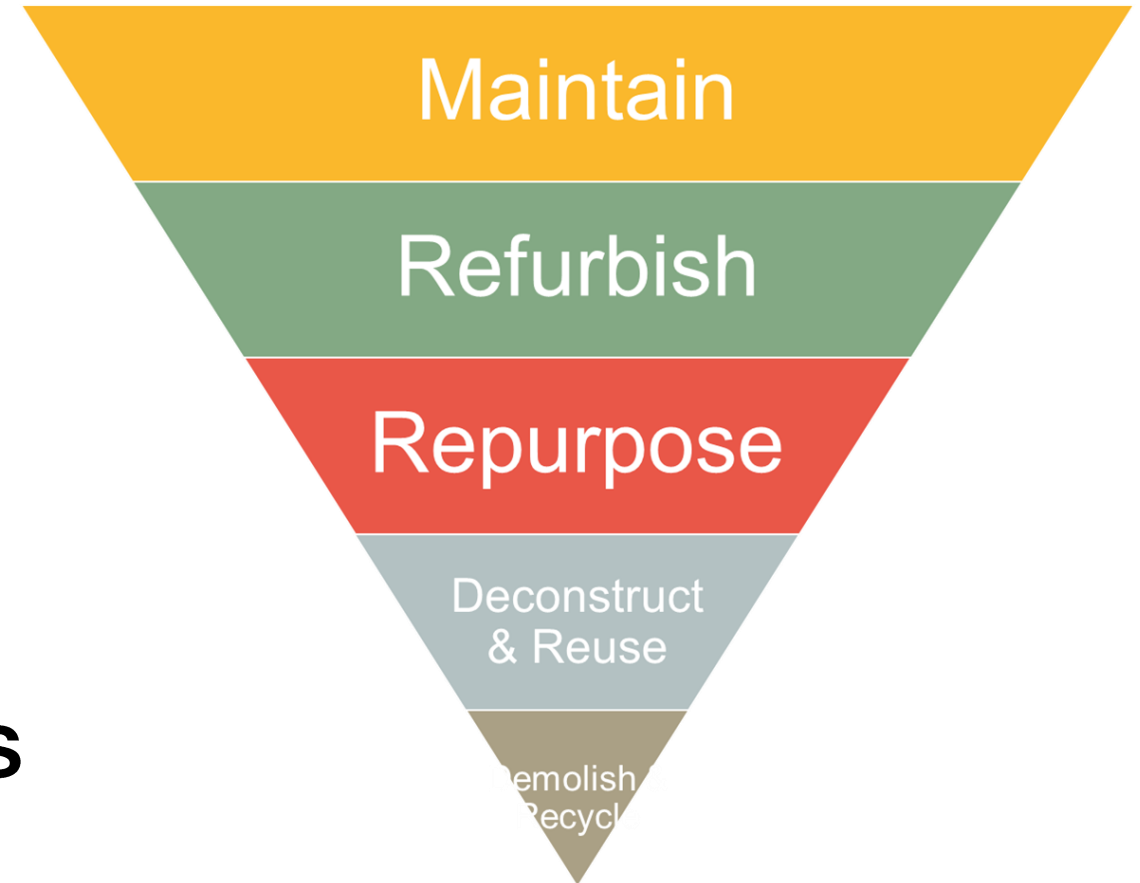
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**Part 1 – Get informed**

**Part 2 – Reuse of existing buildings**

**Part 3 – Reuse of existing materials**

**Part 4 – Designing circular new builds**



# Part 1 – Get informed

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1. What is the circular economy & how can it be applied to structures?
2. Concepts to be aware of
3. Current barriers to adoption and what can be done
4. Deconstruction vs demolition
5. Quantifying the impact (metrics)
6. Data (material passports, BIM, material exchange)

# Part 2 – Reuse of existing buildings

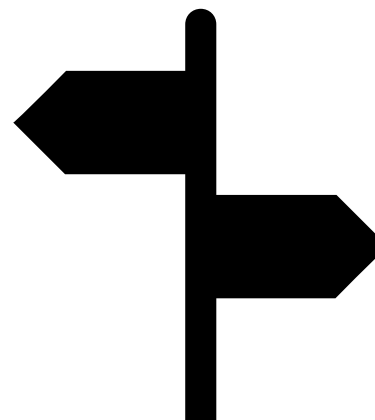
7. Business case for reuse

8. Feasibility

9. Analysis & justification

10. Design

11. Construction



SCI PUBLICATION 138

## Appraisal of Existing Iron and Steel Structures

DIGEST

DG 366 Part 1

### STRUCTURAL APPRAISAL OF EXISTING BUILDINGS, INCLUDING FOR A MATERIAL CHANGE OF USE

Part 1: Requirements for a structural appraisal

Stuart Matthews

This Digest gives guidance to professional engineers on the structural appraisal of existing buildings, including making a structural appraisal for a material change of use.

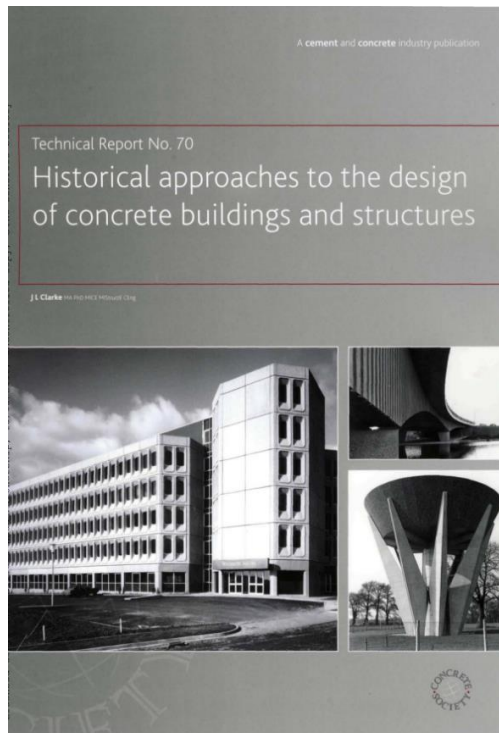
Part 1 considers the overall regulatory requirements, and in particular the disproportionate collapse issues associated with Requirement A3 of the Building Regulations Approved Document A: Structure. It describes what constitutes a material change of use and reviews the Building Classes (see Section 5 of Approved Document A: Structure). It also examines means of reducing sensitivity to disproportionate collapse in respect of Building Classes 2A, 2B and 3, as defined in Table 1.1 of Approved Document A. The provisions in the structural Eurocodes for reducing sensitivity to disproportionate collapse are also discussed.



Figure 7: Immitate masonry facade of a Victorian building employing 'traditional' forms of construction

are subtle differences. For example, Scottish Building Regulation 12 concerning conversions poses more onerous requirements. The fundamental principles of structural appraisal described in this Digest, though, will be generally applicable in all three legislatures.

In the context of the Building Regulations, a structural appraisal in respect of a material change of use must assess compliance with the requirements of Part A, Structure, of Schedule 1 of the Building Regulations. The primary concerns are structural safety, strength and stability of the building under normal loads and actions (Requirements A1 and A2), as well as reducing its sensitivity to disproportionate collapse under accidental loads and actions (Requirement A3). In many



# Part 3 – Reuse of existing materials

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**12. Reuse potential audits of existing buildings**

**13. Legal considerations** (warranties, insurance)

**14. Materials** (steel, timber, masonry, concrete, facades)

**15. Practicalities of deconstruction**





# Part 4 – Designing for circular new builds

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## 16. Design for circular new builds

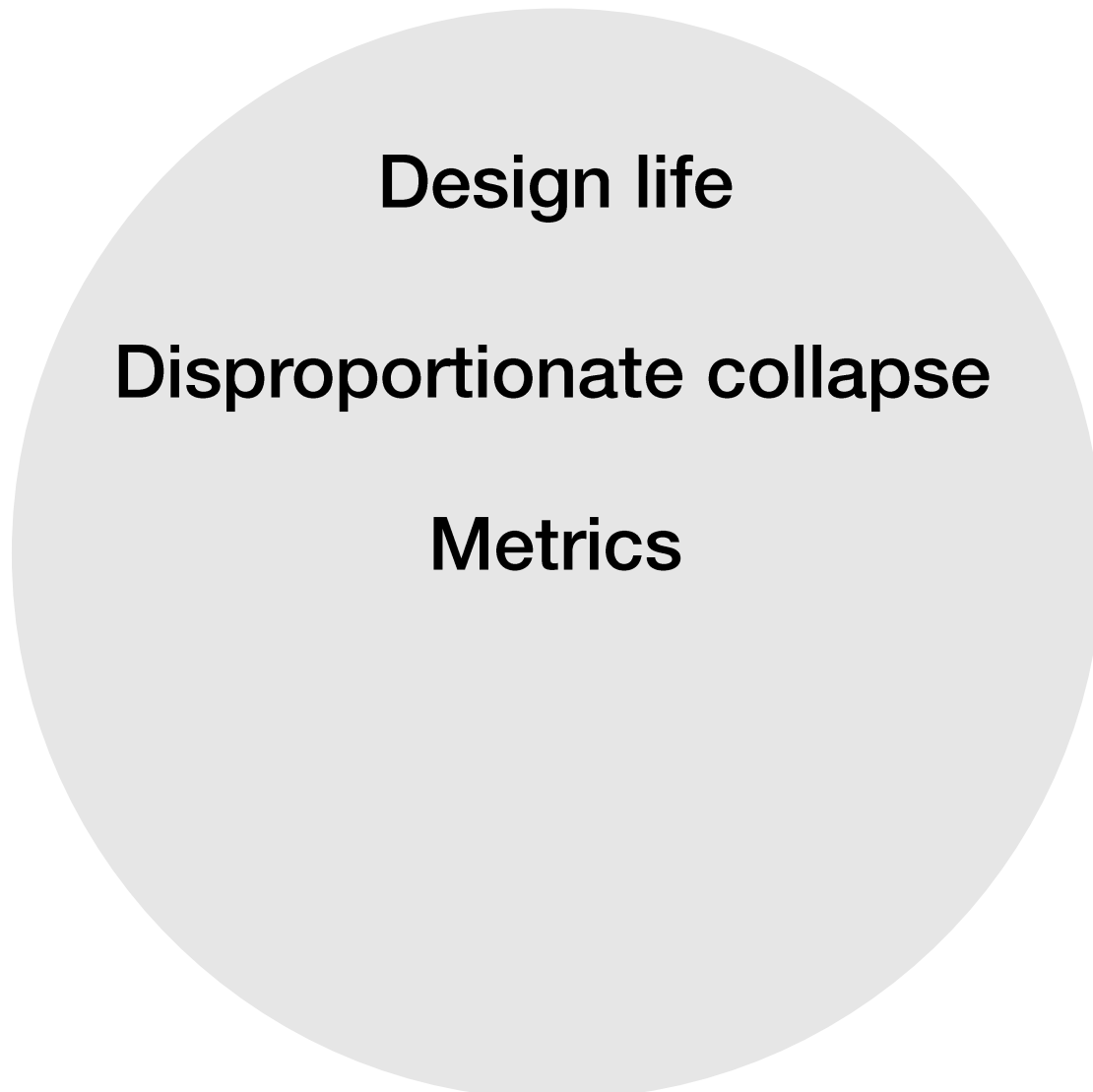
- i. Design for longevity & adaptability
- ii. Design for deconstruction & reuse
- iii. Circular materials
- iv. Resource efficiency

## 17. Biogenic materials

# The big issues to be resolved

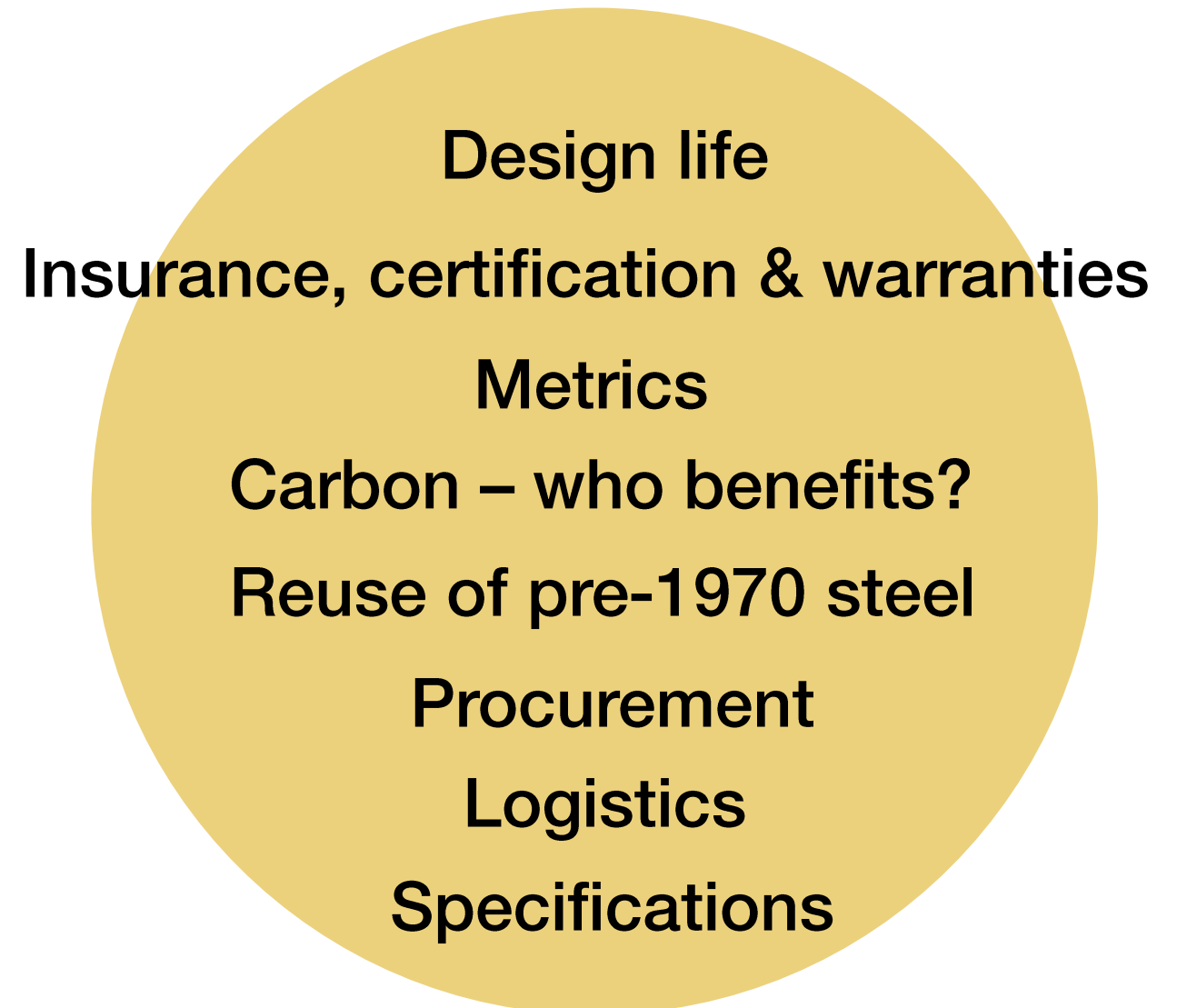
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## Reuse of existing buildings



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## Reuse of existing materials



# Who's involved?

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elliottwood

The Institution of  
**StructuralEngineers**



Civic Engineers



The  
University  
Of  
Sheffield.



BEALE&CO

Griffiths  
Armour &



ARUP



# Timescales

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- **9<sup>th</sup> March: Industry round table to discuss content**
- **Summer: Final draft**
- **Publication: End 2022?**



# How can you get involved?

- ‘Big issues’ input
- Case studies
- Reviewing drafts

## Build Nothing Case Study 3

Project: Middleport Pottery

Client: Royal Doulton

Structural Engineer: Integral Engineering Design

Carbon saving: 2,516,000kgCO<sub>2</sub>e/632kgCO<sub>2</sub>e/m<sup>2</sup>/97% (Modules A1–A5)

### Introduction

The Grade II\* listed, Middleport Pottery is the last remaining site in Stoke-on-Trent still producing world-famous earthenware using traditional methods from original buildings (Figure 6.7). Over time, the full range of buildings on site were no longer required and they were gradually deteriorating when the site was bought by The Prince's Regeneration Trust in 2011 keeping the Pottery as the key tenant.

Figure 6.7: Middleport Pottery



The brief was to reopen all the buildings and regenerate the site with a new café, shop, function rooms, educational spaces, activity centre, and archive, and the opportunity to showcase the pottery-making process. The challenges were:

- to upgrade the buildings without losing the raw industrial feel that makes them special
- to keep the pottery business live throughout the works
- to do all works within an extremely tight budget

All of the challenges were best addressed by doing as little as possible, which is also the approach taken in any listed building, so our aim was to work closely with the team to see if we could Build Nothing.

# Thank you

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# Thank you

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