



## Engineering in an Emergency

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### Abstract

In 2023, the world was 1.5°C warmer than pre-industrial levels. Globally, we have now lost two thirds of our wildlife, and are still struggling to bring people above the poverty line. Meanwhile the use of construction materials is responsible for 15% of global emissions, 30% of waste generation, and 50% of resource extraction. But perceived 'easy wins' for reducing such impacts keep being disproven, and whilst digital technologies, MMC and AI are all touted as the saviours of material reduction, today's structures are more inefficient than ever. The industry therefore needs to step back and revisit our basic goals and mindsets. We must scrutinise and be held to account for the damage we are inflicting on the climate, ecosystems, and humanity, to treat all living beings with equal sanctity rather than as things to balance against the demands of our paying clients, and to start acting in a wholly positive and regenerative, way.

**Keywords:** materials; structures; design; climate; net-zero; embodied carbon; ecology; biodiversity; regenerative design

### 1 Introduction

At a time when yet more and more records continue to be broken year on year, are we really treating the phrase "climate emergency" seriously enough?

The global construction industry has made countless commitments around the world. Materials producers have set out roadmaps, design firms have committed to halving emissions, and clients and funders are making more and more 'net zero' promises. Yet if you walk onto a construction site today, you would be forgiven for thinking that there is no such emergency. New road bridges rise out of the ground in the same way they were doing a few years ago, whilst the automotive industry they support gets on with decarbonising. Retrofit of buildings is on the rise in some cities, but in most places it is still perceived as 'second best' to new-

builds. A handful of projects are trialling new materials for the first time, but these are few and far between. And across all of this, a lack of effective regulation increases cost and complexity when trying to design in a low-carbon manner.

How do we change this? Is it enough to for just some of us to reduce carbon on just some of our projects? Will short-term economics remain the only hard line that cannot be crossed, with all other aspects of sustainability treated as secondary? And why are we focussing on carbon, when the rest of our ecosystem is breaking down too?

This paper summarises the problem as we know it today; highlights the biggest and most impactful decisions that must be made on our projects now; and demonstrates how we must now move our north star away from simply doing a little less damage, and towards repairing and restoring the ecosystem that provides us with our only home.