



Mike Cook

Engineers must resist pressure to build environmentally unsustainable schemes if we want to be judged well by future generations, says 2020 Gold Medal winner and former Institution Vice-President, **Mike Cook. Report by Jackie Whitelaw.**

THIS YEAR'S INSTITUTION GOLD MEDALLIST, Mike Cook, is considering the address that he will give on receiving the accolade. And what a time to be doing it, as the climate emergency, Covid-19 and movements to address past injustices collide.

Cook has been given the award to celebrate a career that has included a seven-year spell as senior partner of Buro Happold, the design of standout projects such as the Queen Elizabeth II Great Court at the British Museum (**Figure 1**), and being the driving force behind the launch of the Structural Engineers Declare Climate & Biodiversity Emergency campaign (www.structuralengineersdeclare.com; see the June issue of *The Structural Engineer*).

But he is now acutely aware that if there were challenges dealing with climate change before the Covid-19 pandemic, the tangle of issues and opportunities ahead, as the world adapts to the post-pandemic environment, is altogether more daunting and exciting for engineers.

Fundamental rethink

The UK government wants to 'build, build, build' its way out of economic collapse following the devastation caused by coronavirus, as will individual firms, but how is it possible to make that happen without being tempted or pressured to ignore the zero-carbon targets that must be achieved to ensure the planet remains habitable for our children and grandchildren?

'Over the last weeks, it has grown in my mind that our professional and personal responsibility to future generations is perhaps the biggest clarion call for us to do better,' he says.

'Engineers have to be fully

cogniscent of the bigger issues – not just carbon reduction, but ecological and social impact. We have to have a conscience and question whether the socially beneficial effect of a project is sufficient to outweigh any damage it will cause to the environment, nature and our climate.

'Structural engineers,' he says, 'have been trained to put a circle around their role on a scheme, to see it as "putting some structure in", integrating it nicely with the architecture and building services, making it all affordable and safe, and "that will do". Except perhaps now we might also make sure there is a little less embodied carbon in the structure.'

'But actually, this isn't enough. We have to deliver massively less carbon and can't do that within the ring-fenced

circle we usually work in. We have to take ourselves outside that comfort zone and start to question *why* we need a building, *why* it is that big, *why* it is where it is and *whether* it is creating huge transport issues or damaging the ecological balance. And, of course, ask what we can do to make it of greater social value.

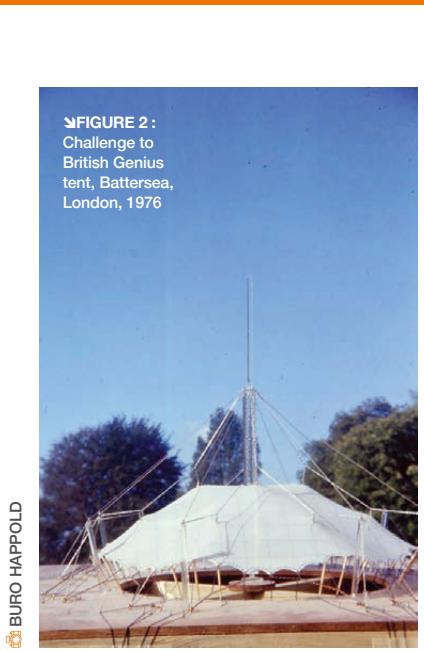
'We have to imagine future generations looking back and holding us to account not just for the little structural parts but for the whole thing, and being prepared to answer the questions: "Could you have stopped this? Did you try?"'

People, professions and whole nations turned a blind eye to issues 20 years ago, 200 years ago, but are now being called to account – statues are falling, reputations are being destroyed. It will be no different for engineers in the future if environmentally damaging schemes are built for short-term gain, Cook argues. 'We must resist the pressure to build the wrong things. It is up to us to embed climate accountability into our work.'

'If Covid-19 lets the government off the hook and it is allowed to ignore the massive climate emergency that is

▼FIGURE 1:
Queen Elizabeth
Great Court at British
Museum, London, 2000





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◀FIGURE 2:
Challenge to
British Genius
tent, Battersea,
London, 1976

a UK Green Building Council seminar on climate risk where he detected a rapid change in the attitude of lenders and investors, who want to be able to account for that risk and quantify it in the medium to long term.

'If investors are taking climate risk seriously, they will not be investing in unsustainable schemes. Investors carry the risk, and they can't chance their assets being unvalued and useless in the future.'

For firms like Buro Happold, he says, this means being as awake as possible to the rapidly changing context that engineers practise within. 'My job is to make sure that the firm is listening, sensing future trends and responding to them, but most importantly, advising our clients how to build in resilience and avoid developing assets that will become undesirable and even stranded in the future.'

Guiding principles

Cook, 65, has been at Buro Happold almost his entire career, apart from a brief spell at Arup at 18 before he went to Cambridge University to study engineering. He was assigned to work during that year with Ted Happold, who at the time was at Arup before leaving to found the Buro Happold practice.

'Ted was collaborating with Frei Otto on a timber lattice structure with unbelievably complex sinuous curving surfaces. I was predicting whether the building would buckle by hanging nails on a model – that moment connected me with Ted and the practice for all time. I was hooked on the idea that buildings don't all have to be the same and was able to apply that rule in my own work wherever I could.'



TED HAPPOLD AND FREI OTTO OPENED MY EYES TO A BETTER, LIGHTER, MORE NATURAL WAY OF DOING THINGS

Tension structures and shells have been the theme of Cook's engineering for the past 40 years: modelling the Challenge to British Genius tent in Battersea in 1976 (**Figure 2**), supervising the Hong Kong Cultural Centre cable and concrete roof in 1986 (**Figure 3**) and designing the Khan Shatyr conical cable-net roof in Astana, Kazakhstan in 2010 (**Figure 4**), as well as the shell structures of the British Museum courtyard roof in 2000, Sage Gateshead Music Centre in 2004 and Smithsonian Museum, Washington in 2007 (**Figure 5**).

'Back in the 1970s, Ted Happold and Frei Otto opened my eyes to a better, lighter, more natural way of doing things. I bought into that idea, especially when I realised that tension and compression structures mean the engineering is also the architecture, so that puts you in the front seat of the project able to influence design from the start,' he says

'It was Ted Happold's resounding principle that we should "touch the earth lightly" in all we do as engineers. When structural design is informed by respect for nature, we are guided towards efficient use of materials and can create an element of delight that is essential to human experience.'

◀FIGURE 3:
Cable and concrete
roof for Hong Kong
Cultural Centre, 1986

threatening our survival, it will be held to account by future generations for having failed us. But we can't ignore our own role in that either. We can't ignore our own complicity in the "big-elephant-in-the-room" problem, while dealing with immediate Covid challenges at the same time.'

Cook worries that plans to address climate change are already unravelling. 'There seems to be an instinct to think that we can go back to the bad old ways of pumping money in almost without thought as to the long-term consequences,' he says.

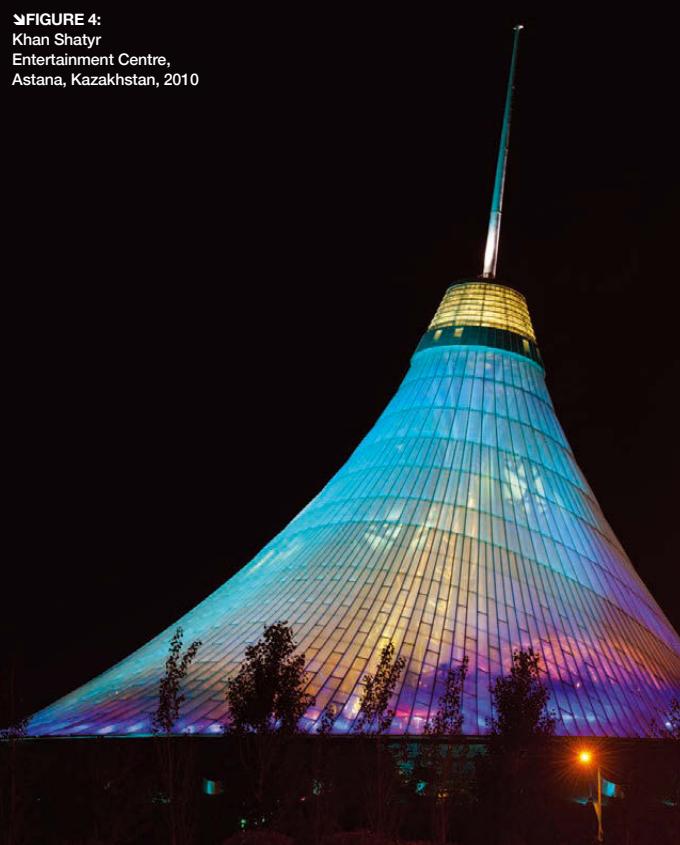
'But we have to hold the line, argue that that work can still be created while the rebuilding investment is put in the right places and used in the right way.'

'Let's boost the green economy, not build tunnels and roads that are likely to be unnecessary and are certainly going to add to our carbon footprint. We'll still need infrastructure but the big projects on the books were imagined as much as 20 years ago, and designed two or even 10 years ago for a very different world.'

'We need to reappraise projects that come to us historically formed, especially if the criteria we used to define them hasn't caught up with the recognition of the climate emergency declared by government and industry. We have to satisfy ourselves they are right for the issues facing us now. It is our responsibility to future generations to ask the question, *Why build?*, and whether these schemes have been considered for their full effect on future generations, including climate impact and natural harm.'

Cook has hope that the damage that could be caused by dusting off schemes without reappraisal could be limited by pressure from funders.

He recently joined, online obviously,



■FIGURE 4:
Khan Shatyry
Entertainment Centre,
Astana, Kazakhstan, 2010

Speaking up

Cook sees the climate agenda as a chance to reset engineering and the role of the engineer. 'People have asked me why I always end up with the really good jobs. My reply is that they don't always start good, but you have a chance to make them better. Have an agenda, know what you want it to become and work hard to get it there. Your own agenda can help shape the outcomes.'

'I always say "sit forward" at the meetings. Don't sit back and wait to be asked. You have an equal voice around the table. Use it.'

Cook's view is that engineering businesses need to be helped to realise how they can transform economically and stay relevant, when doing what is best for the climate becomes the main driver of infrastructure investment.

'Client demand will shift, so work will shift and a lot of the brainpower of engineers will be used not necessarily to build shiny new buildings and bridges, but to make better use of what we have already got, to remodel it, and to act in an advisory capacity to help clients rethink what they need buildings for.'

'We can do better than just making things people think they want. We can help clients and their businesses navigate through some of the challenges coming up with advice on how to decarbonise buildings and

■FIGURE 4:
Smithsonian Museum,
Washington, 2007

order to uncover the problem so as to discover the solution. And that solution may very well not be a building at all. For structural engineers, this means developing really good relationships with their clients and with architects,



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infrastructure and make it work twice as hard for us. We need to help clients work out what they actually need and help them find it.'

For decades engineers have wanted to be treated as 'front-end' consultants and taken seriously. This is the opportunity, Cook believes.

'Business practice has underplayed the "consultancy" element and overemphasised the "doing", so to a harsh critic the profession appears to deliver what anyone asks for and will bring a profit. So long as our business models say we have to turn every opportunity into bricks and mortar, we are not going to achieve prime consultancy status or achieve the targets of the Engineers' Declaration.'

'We have to shift people into a fresh way of thinking, train them to operate at stage zero and talk to the client in

so they want to talk to you at an earlier stage.'

Although Cook is working hard to get industry lined up behind the principles of Engineers Declare and to make it understand the urgency of dramatic transformation needed to meet the target of zero carbon by 2050, he admits he is worried that, even so, it might be too late to avert the worst.

'We may have gone past the point of no return. The incessant rise in humanity, the insane consumption levels and nature's response with climate degradation, melting ice caps and failing crops all put us on a one-way road. But we have to try, don't we? And by trying we have a chance of bringing some benefit even if we are just buying some time.'

'The big question for our profession is – are we doing enough? Or should we be speaking in a single, louder voice, saying things people don't want to hear but need to know? This is certainly a time for us to be working together more closely than ever.'



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