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Presidential Address
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An opportunity for change
Let's not return to business as usual

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Fellow members of the Institution, colleagues from the industry and the wider science and engineering fraternity, I take office as President in an unprecedented way and in unprecedented times. We have held a virtual annual general meeting and now I am delivering a virtual president's address.

The ramifications of COVID-19 have impacted everyone and the professional institutions are of course no exception.

We are concerned for the health of our colleagues and loved ones, and we are concerned for the operation of our places of work, be that right on the front line in the health service or in the wider community of businesses that have been impacted by the interruption of their normal activities. I realise full well that many listening will have experienced the loss of someone or be enduring the stress of working in the healthcare estate or perhaps managing on a much reduced income.

CIBSE is continuing to operate and provide services to our members in the best way we can. We have responded to the crisis in very immediate ways addressing business continuity and technical guidance, and we have also considered the longer term strategic issues.

CIBSE COVID-19 response

We have issued guidance to our regions, groups and societies. Our meetings are wherever possible being held on line, the Grow Your Knowledge webinar series has been launched, discounts have been given on online training courses and one day courses normally delivered face to face are being converted into an online format.

In response to emerging information, our healthcare group is updating its guidance on building services installations and recommendations on operation to limit the potential to spread the infection.

And we are contributing to the Construction Industry Task Force and Royal Academy of Engineering as they advise government on the construction and engineering aspects of the crisis.

In a very practical response, our colleagues in the Hong Kong region have answered the Construction Industry Council's call for assistance and donated thousands of pounds to purchase much needed personal protective equipment for the NHS and dispatch this to the UK.

And at the strategic level, CIBSE's Royal Academy Fellows and our technical department have been responding to calls for advice from the Royal Academy of Engineering and the Government's Scientific Advisory Group for Emergencies on the construction sector's response to COVID-19 and our views on the role that we can play in the economic recovery that must follow.

When an emergency of this kind arises our attention is focused substantially on the immediate measures we must take to get through the crisis. This is understandable – indeed necessary. But a crisis takes our eye from other pressing problems which also need action, and it can deplete the reserves of personal energy and hard finance that we need to deal with the longer term issues.

One such issue is climate change. I am certain that when the scientists and the macro economists have crunched the numbers in a year's time we will see that in a brutal irony COVID-19 will have done more to curb the rise in global CO2 emissions and improve air quality since 2010 than any deliberate intervention.

History shows us that over the past 50 years crises of various kinds have brought about reductions in CO2 emissions, only for them to rebound and overtake the previous levels within a matter of a few years. Previous crises have in fact often damaged long term efforts to control CO2 emissions and pollution because governments, anxious to stimulate their economies have tended to de-regulate and delay things like stricter building regulations for fear of inhibiting investment.

This is one time where this must not happen. As governments around the world devise their economic stimulus packages the way in which this money is spent will affect future emissions. There is an opportunity to invest in what economists call 'structural changes' like clean technologies and the education and training of the workforce who will implement these which will bring about reductions in emissions as economic growth returns. We must all keep the pressure on our politicians to make sure that this argument is heard.

One structural change which this crisis has already forced upon us is home working. Many businesses have had some capability in that area for a long time, but this has never been tested before on this scale. I hope that the uptake in the technology and the shift in the general approach to working will allow a re-evaluation of the opportunities in that area, re-balance our lives somewhat, and cut down our commuting emissions.

Often the automatic reaction to the end of a crisis is to want a return to business as usual – but actually let's pause there and ask ourselves if we actually want to do quite that?

We engineers and other professionals in the built environment need to do all that we can to ensure we have real influence and deliver on tangible solutions for safe, energy efficient, high performing buildings and infrastructure after this crisis has passed. That is an enormous challenge and to meet it is going to require a step change in the way in which we approach our projects.

It means that in the next two years we need to be designing all new buildings to net zero carbon standards, and it means that we need to embark on a much more ambitious programme of refurbishment of the existing building stock – combined with ways of de-carbonising the energy supply to those buildings. The existing stock is frankly a much larger problem than the new buildings. We need to tackle these, and do that in a way that involves joined up thinking and doesn't lead to the mutilation of our historic buildings or to the dysfunctional outcomes of Grenfell Tower.

There is no silver bullet for this. It requires a range of policy measures, but one thing we can say for certain in the UK is that government needs to apply equal weight in its thinking to demand side policy instead of prioritising supply as it has done.

This year's budget did contain some encouraging news about initiatives in this area, but considering the scale of the problem it did not go far enough. An immediate boost to our sector for instance would be providing a longer term guarantee for the renewable heat incentive scheme, and re-introducing the feed-in tariff for on-site renewable electricity generation.

Globally we could do better in our international cooperation and learning from practices in different parts of the world. There is no doubt that some countries do better than others in certain areas. Some of the variations are due to local circumstances and natural resources. We don't all enjoy the access to geothermal energy of Iceland.

District heating and energy from waste



But there are technologies with applications that are flexible enough to allow wider translation to many parts of the world that we can learn from. The Danes for example, with no particular natural resource advantage, have managed to implement energy from waste schemes and district heat networks on a scale that so far most other countries have not managed.

Another major theme which is emerging is 'demand management'. We are increasingly talking about 'optimisation', 'smart buildings' and 'smart grids'. These things are aimed at efficient operation and matching accurately supply to demand by load shifting. This is made possible by data.

Big data



Harnessing the mass of information that is all around us to identify where problems have occurred or where building performance can be improved.

This data gives us the opportunity to anticipate as well as react, and the interconnectivity of the internet of things allows automatic interventions on a scale not previously possible.

Issues accompanying these developments however tend to be: extremely lean system design and sensitivity to minor external influences; reliance on complex technology which, if it goes wrong, tends to go very wrong; and vulnerability to malicious attack.

My request to all those working in this exciting area is please think about these things. While the opportunities are great, so too are the dangers. Our pursuit of low or net zero carbon buildings can lead to such a focus on that one issue that other aspects of building performance like safety, air quality and comfort are subordinated. We need more holistic systems thinking in our design processes, and we need optimisation that is not so sensitive that our systems fail or at least suffer dramatic reductions in performance due to relatively minor variations in external influences.

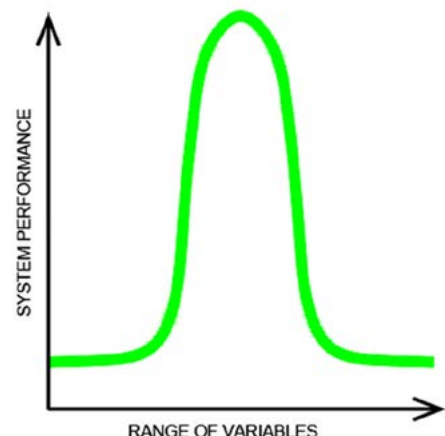
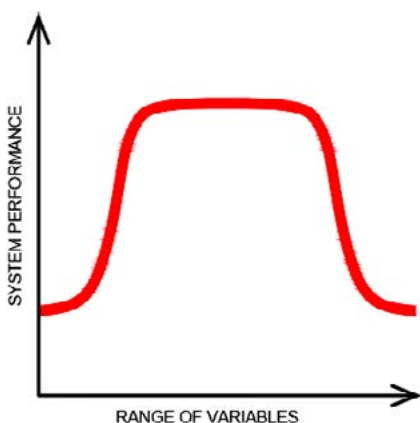
Our systems designs need to be able to deal with uncertainty. If some dramatic unlikely event occurs then generally we try to design our systems so that they are not irrecoverably damaged by this. But in the face of relatively common behavioural variations or unusual but foreseeable changes in external influences we need our systems to continue to work, and to do so at relatively close to optimal performance.

August commuter problems



Only last August in the UK a coincidental loss of two electrical power generators within a short time of each other lead to a widespread power outage on the national grid.

The outage did not last long, but the consequences were disproportionately large as it was discovered that the control systems on new electric trains had to be 're-booted' by technicians brought in from outside as the onboard train crews could not do it, causing long delays. Our optimisation curves need to look like this.....



And not like this.....

And even if it is necessary to sacrifice some of the theoretical peak performance of a system on one variable to get good performance over a wider range of circumstances and other variables then often this is the better design to obtain good performance of the system in the real world.

In our industry we have a well known gap between models and actual building performance that suggests our models do not properly reflect the real world. Part of the explanation for that is they are usually optimised to an ideal – and therefore wrong - set of assumptions where nothing changes and nothing ever goes wrong.

CIBSE is the lead industrial partner in a research project at the University of Strathclyde in Scotland where we are investigating the feasibility of simulating building performance over a long term period of many years.

CIBSE/Strathclyde resilience testing project

Over this simulated time period, failures of building systems, changes in building occupancy and changes in the external environment are being modelled to test how adaptable and resilient the building design will be to these disruptive events.

It is a very ambitious programme, but we hope to prove the concept that such simulations are possible and can provide valuable information on the sensitivity of building designs to non-ideal operation and the effect of disruptive events on the performance over many criteria. Then there is our vulnerability to malicious attack.



Malicious attack in the data world can take two forms.

The first is acquiring information about people and buildings and using this for purposes other than those intended by the subjects. How do organisations look after this information and prevent it from being acquired by others?

The second is the ability to hack into our information or control systems and intervene in the operation of these as an act of vandalism, for extortion or for even more sinister purposes. CIBSE published guidance on cybersecurity aspects of building services as part of the Digital Engineering Series early in 2019.

CIBSE publication on cyber security DE 6.1

DE6.1 is intended to assist those that commission, design, construct and operate built assets in understanding the implications of security on building services design.

These may relate to national, commercial or private security. Each has specific requirements and this guidance looks to prompt thought about appropriate solutions for each application. It also identifies the need for dedicated security experts to review and feed into each design.

In spite of the current dislocation CIBSE presses on and is adapting to new ways of working. This is a storm that must be weathered and it cannot be allowed to blow us off course. Our mission to empower our members and influence other stakeholders to deliver a high performing and resilient built environment is too important. As we recover from this crisis and things return to some semblance of normality I urge us all to pause and ask what kind of normality do we really want. We need to take this opportunity to reflect - and let's not return to business as usual.

Wherever you are listening to this message, all at CIBSE, the board and I hope that you stay safe and healthy and we send you our good wishes.