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2020 vision: 'For an understanding of the future, look to the past'

> **WHAT IS THIS LIFE IF FULL OF CARE, WE HAVE NO TIME TO STAND AND STARE… NO TIME TO SEE IN BROAD DAYLIGHT, STREAMS FULL OF STARS LIKE SKIES AT NIGHT… A POOR LIFE THIS IF FULL OF CARE, WE HAVE NO TIME TO STAND AND STARE**
>
> **WILLIAM HENRY DAVIES**

Introduction

In appointing me its 100th President, the Institution has conferred upon me a tremendous honour and provided me with an amazing opportunity for which I am thankful. The weight of responsibility is enormous but the road ahead, although challenging, is exciting and I count on your support as we walk it together.

The choice of title for this address is almost a given in the year 2020. It is opportune to pause and reflect on what has been achieved under the leadership of 99 illustrious past presidents.

Recent presidents have contemplated the future of our profession and how we must adapt and develop to meet the evolving challenges that face us. In 2018, under Faith Wainwright's presidency, Council was tasked with considering developing trends, methods, materials, etc. and the outcome was the seminal strategy publication, *The future of our profession*[1] **(Figure 1)**.

The Board formally adopted the report's recommendations and the Institution's April 2019 Technical Conference entitled 'Strategically shaping the future of our profession' explored three of the seven key issues in greater depth:

→| data and artificial intelligence
→| future of education for engineers
→| resilience.

↓**FIGURE 1:** The Institution has set a strategy for an evolving future

The Institution has since set up a task group to monitor progress as initiatives are rolled out, and its various committees and panels are also theming their activities around the key priority areas.

Although the intention of this address is not to stargaze, the wisdom of Confucius is relevant: *'Study the past if you would define the* future'. Technologist Mike Ivicak gave this a slight twist: *'For an understanding of the future, look to the past'* **(Figure 2)**.

Ivicak went on to say: *'The past and the future are actually not so different. Every past event has a cause or causes that, as we look back at them, typically make sense to us from our vantage point in the present. Likewise, each past event has implications and influences the events that follow it.'*

Brief history of the Institution

Let us recap how, when and why the Institution originated. On 21 July 1908, a small group of eminent architects and engineers led by Edwin O. Sachs met in the smoking room of the Ritz Hotel in London.

Concrete was the emerging material of the day and it was decided to set up a specialist learned society devoted to defining standards and rules for the proper use of that material for acceptance in the London County Council regulations and for the construction industry in general. So the body was named the Concrete Institute. Ironically, the Ritz was the first steel-framed building to be completed in London.

It quickly became obvious that the membership was too restricted and so, in 1912, the focus widened and the named expanded to the Concrete Institute, an institution for engineers, architects, etc.

World War I intervened, impeding growth and depleting membership. But afterwards, in 1922, recognising that there was more to life than concrete, and other materials were also developing, the name of the corporate body changed to what we have today: the Institution of Structural Engineers.

↑**FIGURE 2:** To understand the future, we must look to the past

In 1932, overseas representatives were appointed in Australia, New Zealand, South Africa and India, and in 1937 the first overseas branch (later to become a division) was founded in South Africa.

The Institution gained its Royal Charter in May 1934. A Supplemental Charter was later granted in November 1965.

Presidential milestones

It is pertinent to look back over the past 112 years and explore issues which were relevant at milestone dates. Time only permits me to review the 1st, 10th, 25th, 50th and 75th inaugural addresses. Let us see if there is any commonality and if history does indeed repeat itself.

The first President was the Rt. Hon. Robert Windsor-Clive, 1st Earl of Plymouth. He was a politician of some note and was First Commissioner of Works from 1902–05. He did not deliver an inaugural address, but said a few words at the luncheon which marked the establishment of the Institute in July 1908.

Windsor-Clive's main theme was the cosmetics and aesthetics of buildings and he is on record as saying[2]: *'We have got to get out of any new material [i.e. concrete] the best we can, and so fashion and form it that it will be an element of beauty.'*

The first presidential address[3] was therefore delivered in 1911 by Sir Henry Tanner, a prominent architect who was knighted in 1904. It was untitled, but he highlighted two main issues:

- **competence,** including the need to provide members with good technical guidance, a regular journal, and the aspiration to introduce an examination
- **competition** in tendering for work, which was driving down cost, and the need for the designer to become an independent consultant instead of working for the contractor.

Of interest, even though almost 110 years ago, he spoke of the need to design structures to prevent fire spread, referring to it as 'fireproofing'. The modern term is, of course, 'fire safety'.

The 10th address[4] was delivered by Henry James Deane, consulting engineer, in 1927. Again, Deane's inaugural address bore no title. His main topics were:

- the **construction** materials then available to the structural engineer, i.e. concrete, steel, timber and masonry
- Institution governance and the need for a robust **committee** structure with four headline committees, named 'Sectional Committees', to develop the understanding of these four principal materials.

The 25th President, Gower Pimm, who had been a Royal Engineers officer and appears to have been a specialist in geotechnics and foundations, gave another untitled address[5] in October 1944. He majored on the need for:

- **collaboration** with allied professions
- **corporate** specialisation (as he described it) founded upon and reliant on fundamental research.

The 50th incumbent was Bernard Stone of Andrews, Kent and Stone fame. Ewart Andrews was the 15th President and Lewis Kent the 40th President. That firm also went on to produce the 71st President, David Lazenby. Stone's address[6], delivered in December 1969, was wide-ranging and entitled 'The role of the consulting engineer in the '70s'. He majored on the need for:

- good **communication**
- **collaboration** with other professions and with contractors (in this context he cited the then recently achieved lunar landing as an outstanding example of teamwork involving 'scientist, technologist and technician')
- **competence** (e.g. 'we must be expert in those matters in which we claim to be experts')

DON MCQUILLAN: A CAREER IN BRIEF

Don graduated from Queen's University Belfast (QUB) with First Class Honours in 1975 and immediately joined the consulting engineering practice Kirk McClure Morton, which was acquired by RPS in 2004. He has been with the same company under its different guises throughout his 44-year career, operating at director level since 1989.

Don currently specialises in forensic engineering and expert witness work and is an RAE Visiting Professor at QUB. He is passionate about mentoring younger professionals. Outside work, Don is an advanced motorcycling instructor.

In 1989, Don became the first member from Northern Ireland to be elected to the IStructE Council. He has been involved at HQ ever since, including 27 years as part of the editorial team developing *The Structural Engineer*. Don served as Northern Ireland Regional Group Chairman in 1999/2000 and was a Board member from 2008 for three years.

A career highlight was leading a young team in delivering the iconic, award-winning Waterfront Hall, Belfast in 1996. Don has also been responsible for the restoration and re-erection of a 150-year-old, cast and wrought iron footbridge over the River Blackwater, built by James Dredge of Bath.

FIGURE 3: Recurring themes and the four 'Cs'

- **communities** and the desire to have a broader membership.

Professor Patrick Dowling, the 75th President, was singular in the content of his address[7], delivered in October 1994. It was simply but poignantly entitled '**Communication** or isolation?'

This all clearly shows that the primary topics of **communication**, **competence**, **communities** and **collaboration** have been constant considerations for the Institution as it has developed over the years (Figure 3).

While the specifics of the challenges, opportunities and pressures that face us today may be different, few would dispute that history does indeed repeat itself and the four main 'Cs' remain every bit as important as the Institution charts its position in the future. None of these addresses, however, mentioned 'climate change', which has only come onto the radar recently.

We shall now briefly, as part of the 2020 **vision**, consider six main topics.

Values

Professional competence and the communities we serve are our raison d'être.

Competence

The Institution's professional examinations differentiate us from other engineering institutions and are at a standard recognised to be among the highest in the world. While we strive to widen our membership to embrace a wider community of engineers, wherever in the world they practice, we remain committed to the objective of the examinations, i.e. competence in fundamental engineering principles.

The UK's Grenfell Tower tragedy (Figure 4) has very starkly highlighted the need for competency in specialist areas over and above what is tested by our examinations. Moving forward, high-rise and perhaps other types of high-occupancy buildings will be categorised and only engineers with specific proven competence will be permitted to design such structures.

This is not just a UK phenomenon and in both Australia and New Zealand, for example, there are significant discussions at governmental level on competency gateways for those in the built environment professions whose safety-critical work has significant impacts on the public at large.

The Institution has already set up specialist diploma accreditation in the areas of offshore, seismic and fire

engineering and will continue, where relevant, to establish approved skills registers.

Mandatory reporting of continuing professional development (CPD) has been in place since 2014, and it permits a very wide and general curriculum of learning activity. We may, however, now be moving inevitably towards a culture of CPD which is both more relevant and specific to our specialisms. An example already exists under the Structural Engineers Registration (SER) design self-certification scheme which operates in Scotland and the Channel Islands.

We may even be moving to a system of periodic re-accreditation and/or re-licensing, as is the norm with structural engineers in Singapore and many other professions and organisations. For example, advanced motorcyclists and drivers qualified with the Royal Society for the Prevention of Accidents (RoSPA) have to re-test every three years to maintain their higher-standard licence. The same is true with certain Institute of Advanced Motorists (IAM) Roadsmart licence classes.

Following the May 2018 publication of Dame Judith Hackitt's post-Grenfell Report[8] on building regulations, the sector was tasked with undertaking a comprehensive review of competency requirements across all aspects of the industry. Led by the Construction Industry Council (CIC), some 150 organisations have been involved and we believe it almost certain that there will be a push towards tighter regulation of competence.

Moving forward, therefore, demonstration of competence will continue to be a very significant issue for us all. The international reach of the Institution provides us with the ideal opportunity to learn from competency schemes operating in other parts of the world. Collectively, we must embrace these challenges and convert them into opportunities.

↗FIGURE 4: Grenfell Tower fire, London

↓FIGURE 5: *The Structural Engineer* – an evolving publication

Communities

Inclusivity in all that we do and strive for must become ever more central in our thinking. In this regard, it is gratifying to see the progress already achieved. In respect of gender, for example, none of the inaugural addresses cited refer to female members – although the first woman to join the Institution was Florence Mary Taylor in 1926, when she became an Associate Member. Sarah Buck was the Institution's 88th and first female President, followed by our 98th President Faith Wainwright. My successor and 101st President will be Jane Entwistle.

In 2020, 36% of Board members were female and 43% were from outside the UK. With regard to Council, 25% of members were female and 27% were from outside the UK.

Although the Institution has come a long way, we cannot be complacent, and we must continue to strive to be all-embracing. Not only does the Institution have to be inclusive, it has to grow and nurture its international community.

We must continue to give our members, particularly in smaller practices, the support they need in terms of both technical and business guidance. The *Essential Knowledge Text* and *Business Practice Note* (BPN) series produced by the Institution have proved to be a tremendous success, embracing a wide spectrum of fundamental engineering and business-relevant information.

It is also gratifying to highlight, based on membership surveys, the vital and pivotal role which our magazine, *The Structural Engineer*, continues to play in this respect. It has been a privilege to have been involved over a 27-year period with the editorial team. I have witnessed the evolution of *The Structural Engineer* from a hybrid journal into a stand-alone publication **(Figure 5)**, alongside the launch of a dedicated research journal, *Structures*.

Both titles are highly acclaimed and each issue has something of relevance to the various communities and specialist interests of the Institution's international readership. In particular, Technical content such as the *Technical Guidance Note* series remains the most popular element, with Professional guidance (such as the BPNs) a close second.

One of our most vibrant communities is that of our young professionals, who go from strength to strength and whose talent and enthusiasm know no bounds. With some 50% of our membership in Student and Graduate grades, we are an increasingly youthful organisation and this bodes well for the future of the Institution.

In our rapidly evolving and developing world, the ability to communicate effectively and efficiently with our members and communities is of paramount importance. To this end, the Institution is investing heavily in a digital transformation project to facilitate the requisite connectivity. This is a long-term programme over the next three to four years that has commenced with the very welcome new website delivered in mid-2019.

Charitable status

With our collective passion for structural engineering and matters relating to the built environment, it would be easy to overlook the Institution's formal status as a charity. Charities operate by virtue of their contribution to public benefit. In our specific field, the safety of the public broadly summarises our principal obligation as a charity. We discharge this duty primarily through our interests in the competence of structural engineers and the communities through which our members share and learn from each other.

The Institution gained charitable status in 1964 and strives to keep up to date with best governance practice to meet the requirements and recommendations of the Charity Commission. Our governance is reviewed on a periodic basis and one of the recommendations of the last review was to separate the roles of President and Board Chairman. The overarching benefit will be to optimise Board efficiency in dealing with an ever-increasing workload.

So, for better or for worse, the 100th President will go down in history as the first not to chair the Board. The President will, however, continue to chair the Council. We wish the new Board Chairman, Peter Terrell, every success, and assure him of our full support. He

←FIGURE 6: Chinyingi Bridge, Zambia

> BROUGHT UP IN NW ZAMBIA, I WAS MESMERISED BY TWO ICONIC BRIDGES

↗FIGURE 8: Waterfront Hall, Belfast

brings a welcome new dimension to the Institution.

Inspiring others

There is always a need to attract others into our profession and the best way of achieving this is to tangibly inspire with the work we produce. The Institution's annual Structural Awards help promote this ideal, celebrating creativity and the best in structural engineering on a world stage.

The question is often asked of me, 'Why did you become an engineer?' Born and brought up in North-Western Zambia, and before ever knowing what an engineer was, I was mesmerised by two iconic bridges which struck me with a sense of awe and wonder.

The first was the largely unknown suspension footbridge at Chinyingi **(Figure 6)** over the mighty upper Zambezi River south of the Angolan border. At that time (it may still be so), it was the only bridge on the vast section north of Victoria Falls.

A priest, Crispin Baleri[9], who was stationed on the west bank, solicited redundant steel cable and structural sections from the copper mines in central Zambia. With engineering intuition (for he had never read engineering at university), a bit of 'trial and error' and, it is reputed, San Francisco's iconic Golden Gate Bridge as his model, he managed to construct this fantastic structure which has a span of some 340m.

To account for the sag and the river's flood levels, he had to raise the height of the towers several times. In addition, he had to retrofit the lateral stay cables. This was 'Bridges to Prosperity' for an isolated community at its absolute best before the term was ever coined. To say the bridge is 'lively' to cross is an understatement!

The second is the famous 158m, steel, arched Victoria Falls road, rail and pedestrian bridge; the brainchild of Cecil Rhodes and designed by Freeman Fox and Partners (then Douglas Fox and Partners) **(Figure 7)**.

Unwittingly, therefore, those two bridges inspired me to become an engineer. Inspiration, however, also comes from other people. Two men were very influential in mentoring me and moulding my career: Professor Adrian Long when at university and Dr Gordon Millington when I started professional life.

Gordon taught us to 'think outside the box' before the term was coined, as well as to 'push the boundaries'. As a result, a very rewarding career unfolded which was not confined to the normal spectrum of structural engineering projects. Two highlights are worthy of mention.

Waterfront Hall, Belfast

Opened in 1997, this 2250-seat, multi-configuration concert venue **(Figure 8)** features the 'terraced vineyard' concept. The average age of the project team on completion was just under 30 years, and yet innovative solutions were produced to what was a very complex and challenging design brief. It won a Structural Awards Special

↓FIGURE 7: Victoria Falls Bridge, Zambia

> "BEING APPOINTED AS ENGINEERING EXPERT AND ADVISER WAS AN AMAZING EXPERIENCE

Commendation in 1997, the outright Concrete Society Award also in 1997, and the international FIP (Féderation Internationale de la Précontrainte) Award for Outstanding Structures in its category in 1998.

Forensic engineering and expert witness work

A major rail infrastructure project in Hong Kong (Figure 9), comprising an underground extension to an existing station, resulted in major public safety concerns in mid-2018. The Chief Executive of the Hong Kong government immediately set up a high-level Commission of Inquiry to investigate the safety of the structures. Being appointed as engineering expert and adviser to the Commission was an amazing experience.

What can you do?

So we, in turn, have an obligation to not only attract young people into engineering, but to mentor younger professionals and to inspire them towards creativity. Sarah Buck, in her inaugural address[10], used the similar word *enthuse*. We have all benefited from the inspiration and guidance of structural engineering professionals as our careers have developed. As part of our 2020 vision, I encourage all of you to consider what you will do to support the next generation.

Society

Everything we do impacts on society, even though the public at large has little understanding of the significance of our work or the value of our contribution. Things tend only to make news headlines when they go wrong, e.g. the recent tragic bridge collapses at Florida International University in March 2018 and in Genoa in August 2018.

↑FIGURE 9: Don's expert witness work has recently extended to Hong Kong

Structural safety

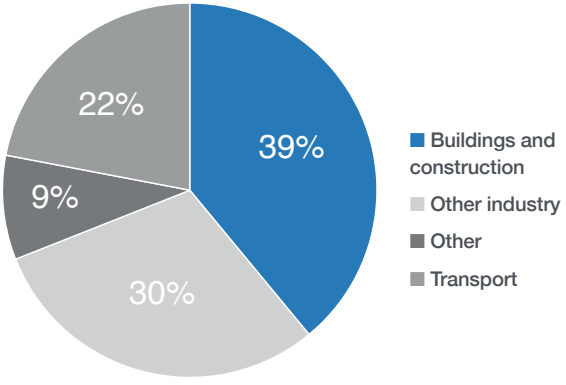
The Institution is a key member of Structural-Safety, incorporating CROSS (Confidential Reporting on Structural Safety) and SCOSS (Standing Committee on Structural Safety). Structural-Safety is a tripartite organisation which includes the Institution of Civil Engineers and the UK Health and Safety Executive, and has done sterling work led by Dr Alistair Soane.

Its aim, derived from the aviation and other industries, is to learn from failures in a non-adversarial and non-recriminatory manner and to disseminate that knowledge so that the same mistakes critically inform professional practice and do not recur in the future. Similar schemes are gaining impetus in Germany and South Africa.

The UK model is now starting to be rolled out internationally with the establishment of CROSS-AUS in September 2018 and CROSS-US launched in June 2019.

In June 2019, the UK Ministry of Housing, Communities and Local Government (MHCLG) published its response[11], in the form of a consultation document, to the recommendations of the Hackitt Report. It appears likely that the government will introduce a CROSS-based whole-life system of reporting beginning, at least, with high-rise, high-occupancy buildings. That would result in tremendous kudos for CROSS and would reflect the vital nature of its model and work.

↘FIGURE 10: Contribution of buildings and construction to CO_2 emissions[14]



Towards a zero-emission, efficient, and resilient buildings and construction sector, Global Status Report 2017. By International Energy Agency for the Global Alliance for Buildings and Construction, coordinated by United Nations Environment Programme. www.worldgbc.org/sites/default/files/UNEP%20188_GABC_en%20%28web%29.pdf

Sustainability

Climate change is a frightening reality that will test the future resilience of our infrastructure. It rains a lot in Northern Ireland compared with many other regions of the UK but, on the back of at least 10 significant climate events in just a few years, the Committee on Climate Change in its summary report

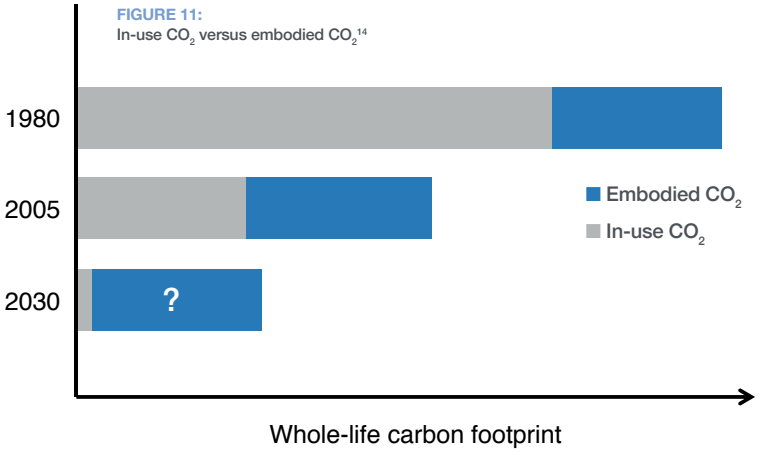


FIGURE 11:
In-use CO_2 versus embodied CO_2[14]

Cole and Kernan (1996), Sturgis and Roberts (2010) and Lane (2007)

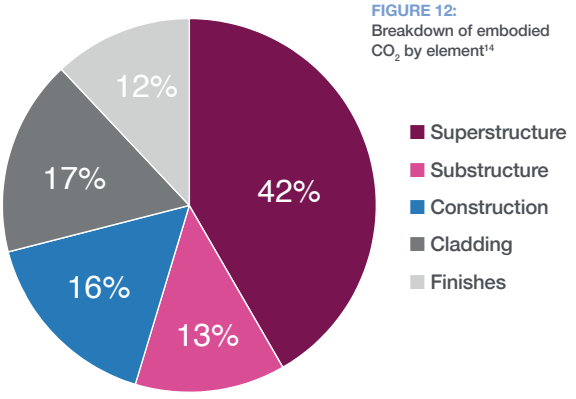


FIGURE 12:
Breakdown of embodied CO_2 by element[14]

Kaethner S.C. and Burridge J.A. (2012) 'Embodied CO_2 of structural frames', *The Structural Engineer*, 90 (5), May, pp. 33–40

for Northern Ireland[12] predicted that by the end of this century summer rainfall will reduce by up to 41%, winter rainfall will increase by 27% and temperature increases will be between 0.8% and 4.2%.

The main culprit, of course, is carbon dioxide (CO_2) emissions into the atmosphere. The depletion of the earth's natural resources and the need to reduce carbon emissions weighs heavily on our collective shoulders.

Under the Climate Change Act 2008, the UK government set a 2050 target of reducing emissions by 80%. That, however, was amended in June 2019 to a new, more stringent goal of 'net zero' greenhouse gases by 2050. This is a hugely significant challenge for all built environment professionals.

In July 2019, the Institution set up an online declaration, as did other professional bodies, under the banner 'UK Structural Engineers Declare Climate and Biodiversity Emergency', inviting sign-up from senior company representatives.

The commitment was to *'commission and design buildings, cities and infrastructure as indivisible components of a larger, constantly regenerating and self-sustaining system in balance with the natural world'* and to *'…strengthen our working practices to create structural engineering outcomes that have a more positive impact on the world around us.'*

In addition, the Intergovernmental Panel on Climate Change (IPCC), the United Nations body for assessing the science related to climate change, warned in October 2018 of the need to limit global warming to 1.5°C for a climate-safe future[13].

Climate change therefore remains one of the biggest challenges for the Institution and its members. This wake-up call requires not simply a step-change, but a quantum-leap change in mind-set, attitude and process if we are to stem the inevitable tide and preserve Planet Earth. Our main focus must be on reducing our overall carbon usage.

In this respect, the research project MEICON (Minimising Energy in Construction) by the University of Cambridge and the University of Bath is to be applauded and encouraged. Its *Survey of Structural Engineering Practice* report[14] highlights that buildings (at 11%) and their construction (at 28%) account for 39% of energy-related CO_2 emissions **(Figure 10)**.

←FIGURE 13:
Structural engineers must embrace UN Sustainable Development Goals

Significant cuts have been made in operational embodied carbon to the point where net-zero is now achievable **(Figure 11)**, whereas the embodied carbon of the structure has changed very little. Positive action on this is now urgently required. It is generally accepted that the structure accounts for up to 70% of the total embodied carbon of, for example, a typical tall building **(Figure 12)**.

The Institution first published guidance on the subject in 2011. *A short guide to embodied carbon in building structures* stated that '… *structural engineers need quick and easy tools to perform relatively crude comparisons of ideas'*[15]. Some useful data were presented, but more up-to-date and extensive information now needs to be compiled to develop this into an extensive, common-base, user-friendly 'carbon calculator'. We need to promote carbon counting and to lobby government if necessary to make it a criterion when judging projects for our Structural Awards.

A headline report issued in June 2019 by C40 Cities, Arup and the University of Leeds[16] explores the impact that urban consumption has on global greenhouse gas emissions. It assesses what individuals, businesses and governments can do to reduce consumption-based emissions within cities and beyond, presenting some startling facts. The targets identified for us as structural engineers are extremely challenging, including:

- →| a 20% reduction in demand for new buildings
- →| reusing 22% of all building elements
- →| a 35% reduction in steel and a 56% reduction in cement across all projects
- →| designing 90% of all residential buildings and 70% of all commercial buildings in timber
- →| replacing 61% of cement with low-carbon alternatives.

In addition, we need to actively continue to research and promote performance-based design as an alternative to prescriptive codification in order to optimise structural efficiency. We need to promote the use of timber, which could reduce deliveries to building construction sites by 60%. All this would achieve a 29% reduction in CO_2 emissions in this industry and is the minimum required to achieve the 44% target for carbon reduction.

We also need to better educate our clients and to help them understand the implications of their decisions. We must ban the demolition of existing buildings. We must aim for new buildings to have a design life of at least 100 years – and preferably 200 years – and to design them in such a way that they can, if necessary, be deconstructed and erected in a different location.

We also need to embrace and proactively address the 17 United Nations Sustainable Development Goals[17] (UNSDGs) **(Figure 13)**. To this end, a half-day workshop was held during the July 2019 Council meeting to stimulate thinking and develop action plans.

The Institution subsequently established a Climate Emergency Task Group to ensure a proactive response to the critical challenge, comprising four main strands:

- →| policy and standards
- →| communications and upskilling
- →| sharing performance data and best practice
- →| knowledge, teaching and research/ industry collaboration.

Even at a grass-roots level, we can all make some kind of a voluntary contribution to society and the UNSDGs: whether in promoting engineering at primary or secondary school level, even at tertiary stage; or mentoring within our own organisations; or we might even be able to use our training, skills and experience to engage 'hands on' to deliver or develop basic infrastructure for a deprived community. The Bridges to Prosperity programme, previously mentioned, is highly commendable in this regard.

We were privileged to return to Dipalata in North-Western Zambia in 2015 to the little mission station where we first lived to 'give something back' to the villagers there. Prior to that we had designed, on a voluntary basis, with the input of a benevolent architect, a new 20-bed maternity hospital with theatre **(Figure 14)**. Next came an airstrip, followed by a 10-bed male surgical ward extension.

On arrival, we were given a 6m high steel water tower to erect on a preconstructed raft foundation (timber rapidly succumbs to termite attack). There was minimal scaffolding, a few surplus timber planks, one pulley block and four villagers with no experience of construction work or erecting steelwork **(Figure 15)**.

Bilharzia – a waterborne parasitic disease – is an endemic problem in that part of tropical Africa. The villagers wash in the river and drink from it and nearly everyone contracts this organ-attacking illness which can lie dormant for years.

It was discovered that the village had an excellent artesian groundwater source and, the previous year, volunteers from Canada had drilled several wells

> **WE WERE PRIVILEGED TO RETURN TO DIPALATA IN 2015 TO GIVE SOMETHING BACK TO THE VILLAGERS THERE**

↓FIGURE 14: Dipalata Maternity Unit, Zambia

and left them ready for connection. So the steel tower and storage tank were erected and several hundred meters of feed and distribution water pipe installed, complete with a well-head pump.

It was the most rewarding project of my entire career **(Figure 16)**. Those villagers now have a reliable and sustainable source of potable water and the bilharzia will eventually be brought under control. In some small measure, two of the UNSDGs were partially addressed (health and wellbeing; and access to water).

The moral of the story is that, as engineers, we can make a tangible and positive contribution, in many different ways, to society. Please ask yourself, 'How can I help?'

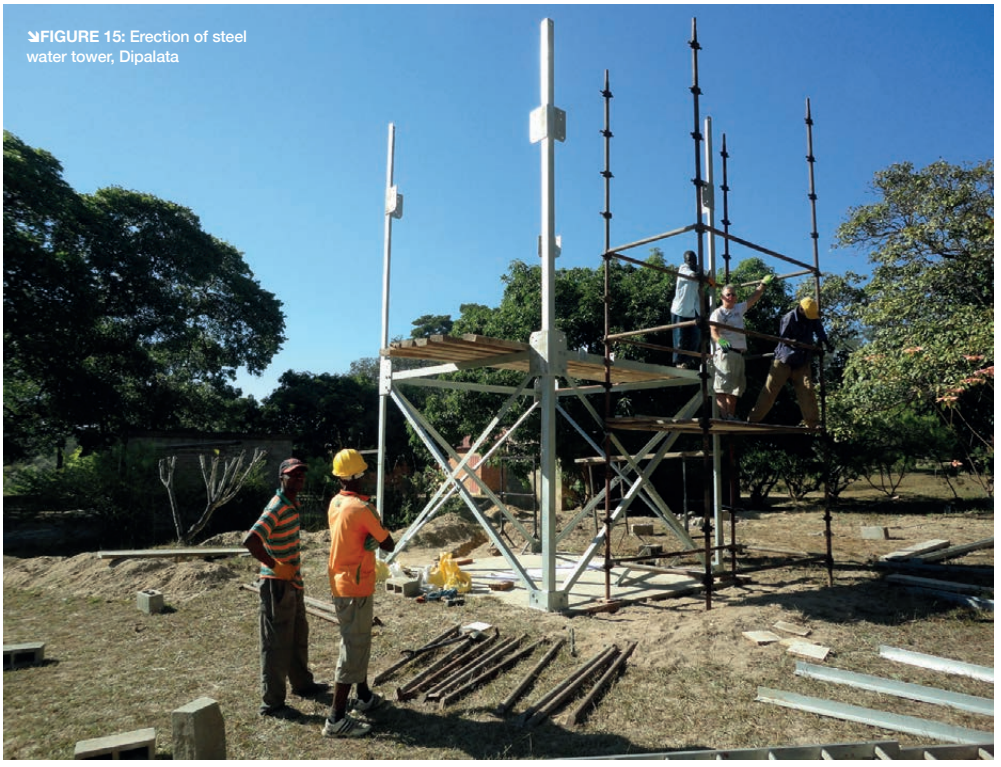
Internationalising the Institution

The growth and reach of the Institution beyond its UK foundation is part of its strength and truly does enable us to be recognised as an international organisation. In many ways, however, and for which there need be no apologies for the Institution's British roots, we have not always modified our language and adopted behaviours to move away from our UK-centricity. Ultimately, this will hold us back, and the Board is now fully engaged in considering how we structure and position the Institution to become truly international – dare we say global – in the years ahead.

To achieve that global position, a radical overhaul of our basic structure, which has evolved since the formation of the Institution, is required. Thanks to the advantages of digital communications, we now have the exciting prospect of enhanced engagement from even more members based outside the UK and with that our ability to share, learn and grow rises exponentially. Inclusivity takes on a new meaning and, with it, an Institution comprising UK plus international members must rapidly become a notion consigned to a bygone era.

A shift in electoral representation will be required to mirror more realistically the needs of an international membership. Our strength as an inclusive professional cohort will give greater opportunity and clearer routes for members to both contribute and to aspire to formal leadership positions within the Institution.

Equitable solutions will, however, require compromise and the adoption of new ways of thinking. We all recognise the world is changing and the Institution, too, must continue to change and adapt to remain relevant, not only to its professional members but also in its ability to discharge its obligations for public benefit.



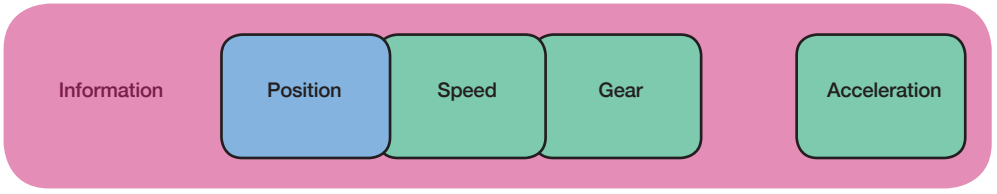
↘FIGURE 15: Erection of steel water tower, Dipalata

↑FIGURE 16: Completed water tower, Dipalata

Observation – anticipation – planning

Reverting again to the world of advanced motorcycling and motoring, we can learn from the system of 'observation – anticipation – planning'. Put simply, on a rolling basis, one has to constantly glean all available information on the road and traffic conditions; one then has to use experience and judgement to anticipate different scenarios developing; then one has to continuously and dynamically plan to deal with those emerging situations.

Closely allied with this concept is the System of Advanced Motorcycle Riding **(Figure 17)**, commonly referred to as IPSGA[18]. It becomes second nature to an advanced rider because it is *'a way of approaching and negotiating hazards that is methodical, safe and leaves*



↑FIGURE 17: IPSGA system of advanced motorcycle riding

nothing to chance.'

The flexible system consists of 'information processing' and four phases: *position, speed, gear* and *acceleration*. Each phase develops from the preceding one and the processing of information is central to the entire system.

The analogy to us as an Institution, moving in a rapidly evolving, hazardous and changing world, is strikingly obvious. We need to be ever aware of what is going on around us and ahead of us, we need to aim to where we need to be position-wise, and we need to be moving at the correct pace and with sufficient flexibility to stay out of trouble and to take advantage of each successive challenge and opportunity.

Next 100 (or 30) years?

The UK government's hugely challenging net-zero-carbon edict must be achieved within the next 30 years. In context, the majority of our members will still be practising in 2050. Rather than trying to foresee the changes another century will bring, the exponential rate of change demands that we perhaps more realistically consider 30 as the 'new 100'.

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In conclusion let me leave you with a series of rhetorical questions:

- What massive step-changes will the 130th President recap on?
- What skills will a structural engineer need and have?
- What will have happened to Planet Earth's climate?
- What will the 130th President identify as the issues and challenges of the future?
- Which country will he or she be from?
- Where will the Institution's HQ be?
- What medium will be used to deliver the 130th inaugural address?

It is likely with the current rate of change that, even using our wildest imagination, we will get it badly wrong both in direction and content.

Future focus

In conclusion, there are three immediate areas of priority which we, as an Institution, need to focus on to remain 'ahead of the game', to crisis-manage our depleting resources, and to develop proactively in a world of rapid and accelerating change:

- **competence** and how it will need to be tested
- **climate change** and how we rise to the challenge, both corporately and as members
- creating a truly **international** and **representative** Institution.

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> **WHERE THERE IS NO VISION, THE PEOPLE PERISH (LACK DIRECTION)**
>
> **PROVERBS 29:18**

Watch online

You can watch a recording of Don's inaugural address at: **www.istructe.org/resources/career-profiles/don-mcquillan-presidents-inaugural-address/**.

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