

# Chemical Engineering and Leadership – a journey



Fellows, Members, Colleagues, Distinguished Guests,

Thank you all for coming and taking time out of your busy agendas to join us here today. I am sorry that time has marched on so far, but I am sure you will understand given the important business we have just conducted at our Annual General Meeting; and in recognising the superb work of our medal winners – to whom I offer my own warm congratulations.

Those who know me know that I am a down-to-earth person, pretty much allergic to formalities and high-fallutin' language.

So standing here with this proud Chain of Office and addressing you as President of the Institution of Chemical Engineers makes me feel all at the same time honoured, privileged, humbled and rather nervous. The only way I can 'process' all that is to be myself, so please bear with me!

I want to talk today about 'Chemical Engineering and Leadership'. About the challenges we face both as an Institution, and as a profession.

And how I hope that the experiences I can draw on might help.

## Disclaimer

### Disclaimer

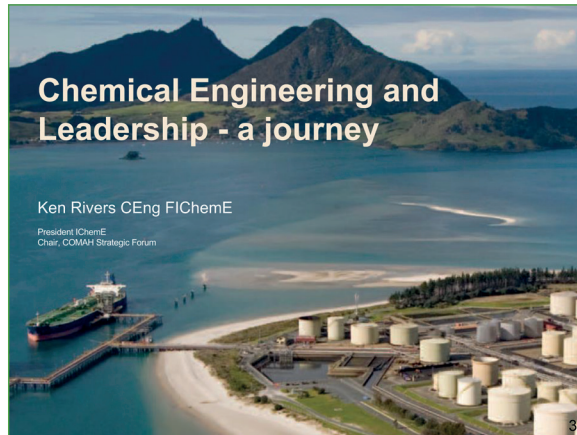
This presentation contains views and opinions that are solely those of the presenter and do not necessarily represent the views of my current or previous employers or any of their affiliates.

The presenter reserves the right to deviate from the script and urges the audience to exhibit extreme caution in applying anything that you hear or see during this presentation. Should you feel unwell please see a doctor.

Anyone of a nervous disposition should probably leave the room now.

Before I go further, here is my own personal disclaimer on what is coming...

**So with that out of the way, let me start my remarks on Leadership with these guys.**



But firstly – why this slide behind me?

IChemE is of course committed to advancing the contribution of chemical engineering worldwide for the benefit of society, so I think it worth reflecting on other activities around the globe.

But also reflecting the art of what is possible (and what engineers can achieve) when there is a **mental model and mind-set shift**.

Hence this image of a high hazard, potentially catastrophically polluting industry operating in a pristine environment.

The image is dear to my heart. I was CEO of the Refining NZ facility pictured here on Whangarei Bay – the legendary meeting place of the whales.

So with that in mind let me greet you properly – and in Maori...

**Tēnā koutou, Tena koutou, Tena koutou katoa (greeting)**

Tēnā koutou katoa, E ngā mate, haere, haere, Hoki atu ra ki te pō

E te whare e tū mai nei, E ngā mana,

e ngā iwi, e ngā reo

Tēnā koutou katoa

Acknowledge those who have gone before and that we are only here today because of them. So let us acknowledge their presence. They are also part of us being here today

Greetings to you all.

To the dead, Be at peace

The house that stands here,

To those people of note, the iwi, the voices

Greetings to you all

**Haere Mai (welcome):** near or far, north, south, east or west, chemical engineer or not.

## Leadership and Commitment



The All Blacks and Richie McCaw play with an intensity and commitment that others find difficult to match. It's all about the team, it's all about delivery and it's never about the self.

That it is one of the distinctions between managers (where it can be about self) and leaders.

Let's step back: what is leadership? And how is it different from management?

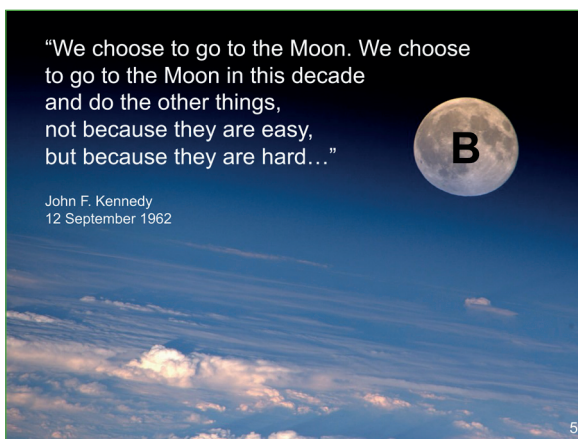
There are tons of books on this theme – more even than on thermodynamics – and they all seem to say something different (unlike thermodynamics!)

At Shell my role was to find structure in disorder and de-mystify complex situations. Only after I left Shell did I come to understand that this is normally called 'simplifying'.

OK so let me simplify –

Competent managers are highly skilled at moving from A to B, marshalling the resources available and organising to deliver a specific goal within a set of boundaries and parameters.

## Moon shot



### So what does a leader do?

- decides what B is and sets the level of ambition
- creates the compelling vision
- builds the guiding coalition
- excites, energises and empowers
- supports, resources, stands back and encourages.

## Leadership journey



That is one of the insights from my leadership journey I would like to share with you today. And how what I have learned – through failures and challenges as often as through successes – might apply to the challenges we face as IChemE and as an engineering profession today.

And it has been quite a journey.

I started out at the ICI Agricultural Division as a student apprentice – no more in existence, even the name Imperial Chemicals feels archaic, from another era, another time.

So much change at Shell too. Although it is still a massive company, it has many fewer refineries.

And yet the Chemical Engineering profession has never been more important nor the role of chemical engineers more critical.

Challenges have become more significant and more complex.

I remember when energy was about whether we could provide enough of it, and how we could stop smog and acid rain in Scandinavian lakes.

Now the list of challenges is a long and complex one: air quality, plastic waste, climate change, renewables, journey to zero carbon, fuel poverty and so much else that complicates the path towards sustainability.

All these issues are inter-linked. And all link in turn with immense overarching challenges around population growth and prosperity.

Hence the ever greater premium on the ability to apply systems thinking to complex and interactive problems; to draw from a broad range of expertise; and to bring all the pieces together to deliver understanding and generate decisive action.

But there is yet more of course. Starting with the need to harness the technological advances my good friend John McGagh spoke about so powerfully a year ago – the revolution in computation, communications, digitalisation, artificial intelligence, big data...

All this in an environment where society has become less tolerant of risk.

And where the role of the 'expert' is increasingly queried, or regarded with suspicion.

Where some in politics and social media reject what they see as unpalatable truths getting in their way.

It is clear that IChemE's role as a learned body – helping to harness insight and influence as an educational and qualifying body to ensure competence and standards – has never been more important.

As the world changes, so too does our profession.

The boundaries of our discipline – and other disciplines – are blurring

The old model of fixed distinctions between different types of engineers is becoming ever less relevant to the new generation.

As chemical engineers work in new fields and their career paths cross boundaries.

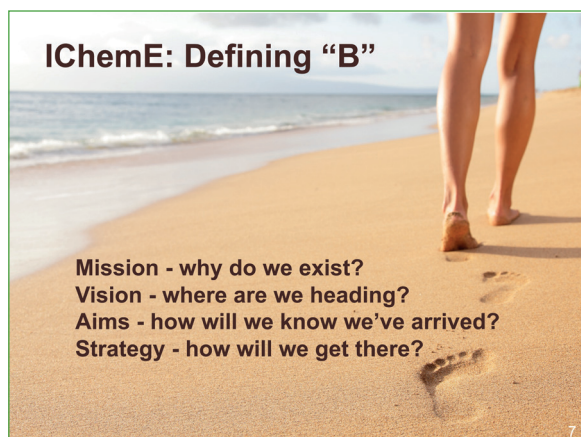
This shift has brought challenges for IChemE and also the broader engineering profession. But also opportunities.

Some of you will be familiar with the Uff Review – the latest in a long series of such reviews.

Reading carefully between the lines, it had a stark message: that without radical change, the Professional Engineering Institutions or PEIs, would go the way of the dinosaurs – I will come back to this point later.

More recently, this change was accompanied by signals that things within our Institution and relationships with our members were not all that they once were – and need to be.

## IChemE: Defining “B”



**The way forward – defining where 'B' is and what we need to do to get there.**

So how does a Professional Engineering Institution like ours respond and help shape change?

We step back and take stock.

We address our purpose and mission – the essential “why are we here?” question. For IChemE this is clearly set out as...

*Advancing chemical engineering's contribution worldwide for the benefit of society.*

This is a big goal – global and embracing the whole of society.

Of course it is – we chemical engineering professionals, working with others, have a major contribution to make in solving some of the very biggest challenges humankind faces:

- water
- energy
- nutrition
- health
- safety
- the challenges and opportunities of the digital revolution.

So the 'B' we set is rightly ambitious, achievable and important.

We then move on to our vision – where do we want to be in 5-6 years time? For us, the focus is on our centenary in 2022.

The vision is clear – to be:

*Led by members, supporting members and serving society.*

Next our aims and the strategies to get there – what does success look like? How will we know when we have achieved our vision?

Then the really hard bit – the honest look at where we are today.

From all the work we have done, and all the issues John McGagh talked about earlier, we can say two things:

1. We are not yet where we need to be – big changes lie ahead.
2. We have a much better understanding of the change that is needed and have made important first strides towards it.



So that is the big picture.

But for IChemE, as for other PEIs and all large organisations, it is always easy to get distracted.

- to start much more than you finish
- to lose focus and dilute effort
- to allow urgent things to turn off important and good things
- and in our case, critically, to become distant from our members.

So we are taking all we have learned over the past year or so and using it to ensure that our strategy and resources are focused on the right blend of value-adding priorities. Council took that forward today and I look forward to working with the incoming Board of Trustees to implement it.

We are clear: what we need now is not another round of navel-gazing so much as consistent execution focused on

- our members
- our partners
- our professional role as a qualifying authority
- our influencing role as a Learned Society.

In short, the value we bring to our members and to the society we serve.

## Capability to Deliver



Staying with the theme of execution.

Having decided on where we are going and the strategies to get there, we need to look at a set of key drivers – resources, organisation, processes and systems – in sum, our capability to deliver.

This of course demands a full-time leader to drive the work through to 2022.

Hence the early effort we put into attracting an experienced new Chief Executive of the highest calibre. Jon Prichard is showing time and again the right mix of skills and experience to take on the strategic delivery of this ambitious plan.

Whilst much of this is about what management needs to do under the new Chief Executive, there were also things that the Council needed to change.

That in turn led us under the strategic leadership of Jonathan Seville to the need to develop and consult on the governance reform proposals which I am delighted were voted on and approved today at the AGM.

The details have been well communicated. In summary, they include:

1. A smaller, more focused, fully elected Board of Trustees.
2. The separation of charitable and representative functions by creating a new Congress as the voice of all our members.
3. Smart updating in areas such as our currently clunky proxy voting system.

We also want to deliver more authority, more responsibility and more accountability to members – through the so-called "hub and spoke" model. This is a complex area and needs to be worked on further – with input from the new Board and Congress.

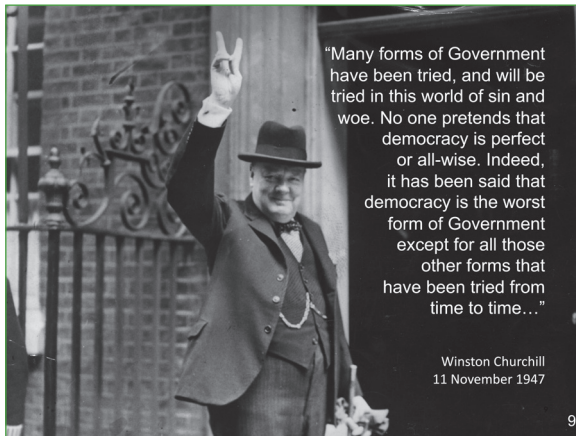
With all this going on, it was a bit of a shock to face a "vote of no confidence" at an Extraordinary General Meeting in January - where many of the issues already in the process of being addressed were brought up.

But I always like to look at the positives. What the calling of the EGM did do was to generate an unprecedented level of engagement (31% vote); a resounding level of support that gave us further encouragement to move this change agenda forward; and a strong mandate to proceed.

The EGM process also helped us to improve our ability to articulate the IChemE strategy – focusing more clearly on members leading, supporting members and serving society.

A good example of a point I will come back to later: more diverse inputs lead to better conversations and so to better outcomes.

## Churchill – Democracy



Pausing to reflect and draw breath....

The net effect of all these changes is that we have taken some significant steps towards that delicious thing known as democracy.

We all enjoy Winston Churchill's light-hearted but very serious dictum that "Democracy is the worst form of government, except for all the others."

I know what he means. Democracy can sometimes feel like it makes things more complicated and slower.

Despite that, I am delighted that we have been bold in our own decisions around this.

I have little experience of democracy – it does not really happen in business!

I can do inclusive, I can do meritocracy, I can do everything from "tell/sell" to "consult, participate, co-create" and right up to "you do it".

So excuse me if I struggle a bit.

Once again, we are clear on the goal – to be led by members in support of members and in the service of society.

But there will for sure be bumps on the road as we proceed and we will need lots of help.

We have to boost participation levels in order that future decisions are fully robust.

I am concerned that some of the very best members of our community may be reluctant to step forward for fear of making themselves into targets.

We of course want to have full and frank debates. But these need to be conducted in a professional and constructive manner. People have on occasions been treated poorly when they "put their heads above the parapet".

Future leadership teams will need to have the nous and the clout to lead this great Institution with distinction, reinforcing our capability to deliver on our promises. To put it bluntly: popularity is desirable but competence is essential in our leaders.

And we will need help to move smoothly on from the politics to the real 'stuff' – our fundamental value proposition based on Qualifications and the Learned Society.

It will be my huge honour to lead and work with the new team of Trustees just confirmed in our roles at the AGM.

We have a great responsibility to demonstrate that our democracy can bring broad legitimacy and great effectiveness.

So I am struggling. And I need everyone's help.

And I am delighted that I am struggling because this is the way of an Institution that is genuinely engaging with members and having members engage.

And at a personal level it takes me out of my comfort zone and that is the place where I learn – so thank you!

## Piecing it all together



As I said before, we have had to spend quite a lot of time and effort on more 'internal' – some say 'navel gazing' – matters of strategy and governance.

This period is over. With our more modern, more enabling governance structure approved by members, we can turn our attention to the 'heavy lifting' now needed on matters of substance and partnership – the Learned Society and Qualifications.

Central to all this is Member Engagement – both the Board, Congress and Staff engaging with Members, and Members engaging with each other across the IChemE community.

How can we sustain and build on the 31% of Voting Members who made their voices heard at the EGM? The recent Trustee elections were 16% (against a longer run IChemE average of 11-12% (and lower still in other similar membership bodies). But the governance resolutions vote was lower again.

Yes, we have the authority to proceed on this basis. But we should all want the participation to be higher and the resulting mandate stronger.

So we are putting much renewed effort into engaging and communicating with Members to encourage and support higher levels of involvement. This involves both the professional, authoritative and influential substance and the development of more dynamic channels.

But we can, and should, go beyond this.

I see an opportunity here for some really profound mind-set shifts and mental models that could lead to properly transformational change.

So what do I mean?



## Opportunities for Transformational Change (Buncefield)



Buncefield – process safety is a passion of mine.

Back in 2005, I was looking after Shell's Stanlow refinery in Cheshire. One December morning, just 120 miles away, there was an explosion that rocked the industry and led to a transformation in the way that the Regulator and the Regulated worked together.

Buncefield was just not supposed to happen. Petrol tanks did not blow up when they overfilled. They might catch fire – it might be a really big fire – it might go woopmp but it did not go bang!

This event shocked the industry. But it also shocked the Regulator and shocked the public. Remember the pictures of devastation and the huge black cloud.

Of course the Inquiry rightly said that it should never happen again.

But progress was slow – as often happens when you are trying to find out what went wrong when most of the information has been destroyed.

The public was getting agitated – the Regulator was getting agitated – the industry was getting agitated –

There was a full-on crisis of confidence, both in the industry and in the Regulator.

## Tennis



We've got to do something...

A better game than tennis...

FROM:

Demanding and objecting...

The game: 15/love – 15 all - 30/15 and on and on...

TO:

## Mind shift

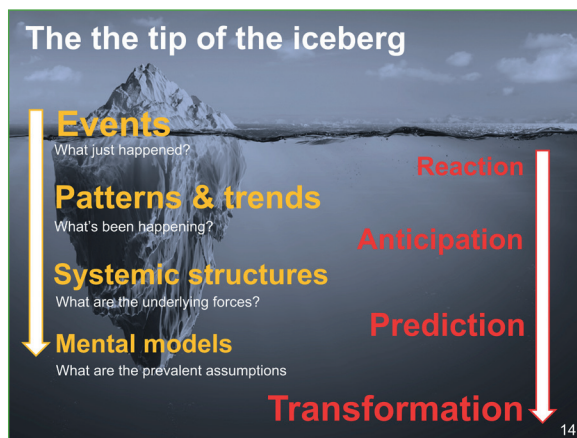


So, whilst the Major Incident Investigation Board (MIIB) continued to investigate what went wrong.

The newly formed Buncefield Standards Task Group started to look at all the things that needed to go right and to agree what action should be taken.

So successful was the collaborative model that it was used for the implementation of MIIB findings and its echo is in the formation of Control of Major Accident Hazard (CoMAH) Strategic Forum working to improve standards and performance.

## Process safety transformation – Iceberg – mental models



Use Texas City as an example of 'mental models' to move beyond preventing the repeat of specific events to preventing huge swathes of incidents.

Explain how, as we go down the iceberg, we move from tackling the incident, to tackling similar situations, to resolving forces at play, to delivering transformational change.

Remember also: "We might not know what went wrong but we do know what needs to go right".

# Major hazards strategic forum process safety improvement in UK

An iceberg floating in the ocean. The tip of the iceberg is above the water, while the much larger part of the iceberg is submerged below the surface. This visualizes the concept of mental models, where what is visible is only a small part of the underlying reality.

**Major Hazards – Mental Models**

- Good practice to common practice
- Stop re-learning the old lessons
- Understand what good practice is
- Focus on what needs to go right
- Be warned - this could happen here
- Speaking another language
- Respond consistently to broadly similar issues

**These lessons apply beyond the process industries...**

15

- good practice and the journey to making it common practice
- achieving more consistent responses to broadly similar issues
- good performance and good practice lead to higher levels of recognition of what is going on.

Lessons that apply beyond the process industries...

## Grenfell Tower



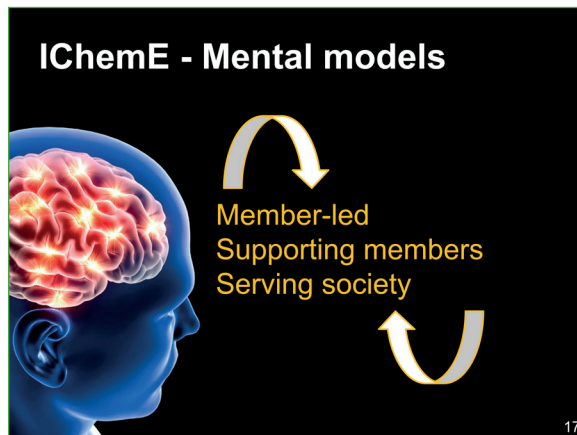
So how can this happen, fully 12 years after Buncefield?

I cannot begin to do justice to what lies behind that dreadful image and the news we all recall with such horror.

What I can do is two things:

1. Help ensure that our profession of chemical engineering does whatever it can to learn the lessons from Grenfell and prevent any further tragedies like this, and does it as well as it can.
2. Renew my determination as your President to see through the sort of transformation that we need for our Institution to do its job as well as it can possibly be done.

## Mental models (IChemE)



The phrase “Member-led, supporting members, serving society” came to me during one particularly tangly part of our journey as a leadership team over the past year.

I use it a lot, and make no apology for that.

For me it captures the very essence of who we are and distils the value that lies at the heart of our purpose.

From that base, we had two important discussions – one about ‘customers’ and the other about competition.

I dislike jargon as much as I dislike pomposity. But please give me a moment on this.

In my world the ‘customer value proposition’ is critical. Through rich discussion and listening well to feedback, we recognised that it was not as clear to us as it could and should be who our customers are (you, our members), and as members how central you are to everything that we do.

This resolved at a stroke a ‘stone in the shoe’ issue we had been struggling with:

- we offer value to society, in line with our charitable purpose, by delivering benefits through our skills and advice
- and we offer value to our members by supporting them in doing this critical work better so that they can be credible and authoritative members of wider communities of practice working to effect positive change.

## The Meat in the Sandwich



Which brings me on – with apologies to vegetarians everywhere – to what might be called “**The Meat in the Sandwich**”...

What does all this look like as we move forward with the implementation of the governance reforms agreed today?

Professionalism, openness and partnership must sit at the core of what we do.



Chartered status and professional registration is a mark of trust to employers, partners, customers, clients, regulators and ultimately to the wider public.

We are not in the business of chasing ever increasing membership numbers, rather we should aspire to secure the right proportion of professional members within a sustainable membership. I have tasked Jon and the staff team with a target of 40% qualified in the next period.

This professionalism will be evidenced by the peer-reviewed nature of our products, our championing of continuous improvement, and our promotion of the highest technical, ethical and moral standards as demanded by our Code of Professional Conduct.

Second, I want to see a renaissance in IChemE's historical role as an authoritative and trusted learned society. We value knowledge, we create knowledge and we share knowledge.

As we set out in our respected work Chemical Engineering Matters, this includes some of the biggest challenges – and opportunities – in the world today: in energy and chemicals, in pharmaceuticals, in food production, in the delivery of secure water supplies.

Also of course safety and process safety.

And who can forget the major transformation – some say revolution – my friend John McGagh set out for us last year as cognitive digital technologies advance at an exponential rate?

We apply our knowledge and experience in collaboration with others to serve society through safe and sustainable process and product design and operation.

IChemE embraces over 40,000 members in more than 100 countries. Our members are found in a wide range of industry sectors, and at different stages of their careers, from students and graduates in training through to senior Fellows at the very highest levels of leadership in business and academia.

Just look at the recently-published UK 'Rich List': engineers are suitably prominent, including one of our Honorary Fellows – Jim Ratcliffe – at the very top.

Or how about President Xi Jinping, the leader of China and arguably one of the two most powerful political leaders in the world – another Chemical Engineer reaching places others cannot go.

We provide connection to a powerful professional network and we will inspire our member volunteers to interact with their colleagues and peers to share knowledge in order to help make the world a better place.

## Better Conversations



Which takes us back once again to our members and the importance of engagement with, and between them.

Not because we have to (though we do).

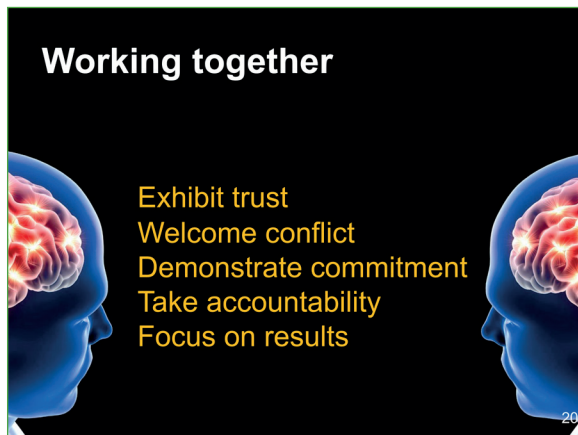
Not because we want to (though we absolutely do).

But because we need to – because it delivers far better outcomes.

It may take longer to get to the outcomes as we spend time on good conversations and deep thinking.

But the extra time is richly repaid through better results and far greater resilience of the approach we collectively adopt.

## How we work together



This slides summarises some of the characteristics that in my experience help good teams work together well:

- **exhibit trust** – I am comfortable being vulnerable about my weaknesses and can be completely open
- **welcome conflict** – I can have a passionate dialogue about issues that are important and can disagree, challenge and question in the spirit of finding the best answers
- **demonstrate commitment** – I genuinely buy in because no stone has been left unturned
- **take accountability** – I am committed to decisions and standards of performance, and hold myself and others directly to account
- **focus on results** – I look at what is best for the enterprise.

## IChemE Mindset Shift



### “Led by members, supporting members, serving society”

I hope I have been clear that the occasionally bumpy course of the last year has been good for the Institution. We are stronger and see more clearly because of it.

This slide is a 'warts and all' depiction of where we came to realise we either were, or were in danger of being; and where we could and needed to be.

#### From

Internally focused ('navel-gazing')  
 Reactive  
 Debate by noisy minority  
 Top down (Council + 'Rugby')  
 Process/procedure

#### To

Externally Engaged  
 Proactive  
 Broader internal engagement  
 Participatory governance  
 Substance



Emphasis on 'footprint'  
Asserting & broadcasting  
Contemplative/defensive  
Impeccable/distant

Emphasis on outcomes  
Listening and discussing  
Open/assured/confident  
Authentic/warm

Some have said that it will take another year to complete this shift – not just of management or even of leadership, but of culture.

Maybe...

Like all good things, it will take as long as it has to take. But I know we all share a sense of urgency to ensure it takes no longer than it absolutely has to.

I really hope that this vision, and the steps we are already taking, will inspire all members to throw your weight behind what we want – and are clear we need – to do.

We will succeed, together.

I take this as the model for how the Board of Trustees and Congress will operate, and as the basis for our enhanced focus on member engagement.

You should hold me and all the Trustees to account on this basis. And all those accountable to me and to the Chief Executive will know very precisely what is needed.

I hope that all members will recognise their role in this picture as well.

Are we engaging externally, building partnerships?

Are we embracing change and our responsibilities pro-actively?

Is our internal engagement working?

Is our new governance structure encouraging and enabling more members to participate?

Have we escaped the trap of procedure to focus on substantive work?

Are we focused on outcomes rather than other measures of 'worth'?

Are we listening and discussing and learning rather than just asserting what we already think we know?

How do we come across to members and partners and those we seek to influence – as people worth dealing with or not?

Overall a shift from a mind-set of controlling and competing to one of collaborating and contributing.

How are we otherwise to play to the full the role we can and should play in meeting the challenges of today and seizing the opportunities before us?

In doing so, we need to recall with humility the massive changes addressed with great fortitude and imagination by those who came before us – war, economic depression, social upheaval, technological disruption.

Our profession truly attracts and empowers some of the most creative and resilient people on earth.

And we must ensure that it continues to attract such people across the generations, and that we support them in developing and applying their skill.

## Mental models - Engineering professions



Thank you for joining me on this passionate journey. I have just one more topic to address before I conclude.

I mentioned some time ago two profound conversations, one about customers and the other about the competition – or I should say 'competition'.

I had in mind the old and now the new debate about the relationship between IChemE and the other Professional Engineering Institutions.

I know that for some the others will always be the competition. I respectfully disagree.

In the world of change, challenge and opportunity I have described, I just cannot see that as the way forward.

We need to reflect further on how the Uff Review addressed the issue.

I do believe that the group of leading PEIs has a fabulous opportunity to be a strong and resourceful part of the future, demolishing the 'dinosaur' allusion once and for all.

As the boundaries between issues and disciplines evolve, so must we.

As I said before, the way ahead lies in collaborating and contributing.

We are by no means the biggest of the PEIs. We have much to learn from others.

But maybe the journey of change that we are embarked on enables us to play the role of catalyst. To facilitate an exciting period of change and partnership, bringing our combined skills and experience together to be equal to the scale and complexity of the challenges and opportunities ahead.

That debate is under way, and we welcome it.

We look forward to acting as partners shaping the environment together.

Not as competitors fighting each other for the last pockets of breathable air.

## Muffin



Building on that theme, I sometimes hear chemical engineers describing the profession as if it were a breed apart. Such passion is laudable, but not always helpful.

My predecessor, John McGagh, uses the metaphor of the blueberry muffin – chemical engineering as one blueberry among many other engineering, science and technology blueberries.

I think he's right. Our discipline has one foot firmly planted in engineering and the other in science. But we by no means have a monopoly on expertise and, in an increasingly multi-disciplinary world, the blueberries for sure have to combine forces.

## Leadership stories



Reflecting on my leadership journey, one thing I forgot to mention is that 'Leaders tell stories'.

I hope you have enjoyed some of mine this evening, and that they have been both entertaining and illuminating.

On one level, I am still processing with colleagues a busy, surprising and at times challenging year.

As the hallowed process safety saying goes: 'Never waste a good crisis'.

As long as we don't just shrink back from what we need to learn from it all, what we have heard and reflected and acted upon will make IChemE a stronger and more effective organisation.

I look forward to sharing more stories to illustrate this as the year progresses.

## Leadership stories



I know that quoting yourself is not quite the done thing in polite circles – But I hope it will be OK among us ChemEngs!

So let me take my quote (which I stand by 11 years later) and paraphrase it instead.

As you know, I thrive on drawing parallels between situations, and lessons from them.

So from the Buncefield Standards Task Force report, the parallel observation I would make is this:

"How trustees and management respond to incidents such as the EGM, and how members respond, is a measure of the strength of IChemE. A decisive and dynamic response with all parties co-operating is the product of a democratic and advanced professional body".

## All Blacks



So let's go back to where we started in New Zealand with the mighty All Blacks.

What defines you is not being knocked over but how you get up.

## Closing words

*We have come too far not to go further. We have done too much, not to do more...*

*Ta Hemi Henare*

27

My closing message – which is on the back of my business card and applies to IChemE and also to our profession:

Kua tawhiti kē tō haerenga mai kia kore e haere tonu. He tino nui rawa ōu mahi kia kore e mahi nui tonu.

We have come too far not to go further. We have done too much not to do more.

**Tēnā koutou, Tena koutou, Tena koutou katoa.**

Thank you.