

Welcome!

For all your news, views and events

In HFN #99, we present notes from the March and June Hazards Forum events, the latter looking back a year to the Grenfell Tower fire of June 2017. John Munnings-Tomes also reflects on the Piper Alpha disaster, whose thirtieth anniversary passed in July this year. There's also our usual news round-up and a calendar of forthcoming events.

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In the news

Grenfell 1 year on

14 June saw the first anniversary of the Grenfell Tower disaster, in which 72 people were killed and over 70 were injured. The HF discussed the incident at its [June event](#). The [official inquiry](#) is on-going.

Plane crash kills 112 in Havana

On 18 May 2018, Cubana de Aviación Flight 972 crashed shortly after take-off from José Martí International Airport in Havana, Cuba; 112 of the 113 passengers and crew were killed; the sole survivor suffered major injuries.

Freight train derailment causes explosion near Princeton

On 17 June 2018, 23 wagons in an 89-wagon freight train derailed just outside Princeton in Indiana. Five of the derailed wagons were carrying propane. There were no reported injuries, but an explosion led to the evacuation of homes within a one-mile radius. An investigation has been launched.

CSB issues Arkema findings

The [CSB](#) has recently issued its findings into the 29 August 2017 high-potential major accident hazard at the Arkema plant in Crosby, Texas. Flooding at the site as a result of Hurricane Harvey impaired both plant and emergency services response to the failure of the refrigeration system required for the safe storage of manufactured organic peroxides. People within a 1.5-mile radius were evacuated, while stored organic peroxides spontaneously combusted as stored temperatures rose, prompting deliberate ignition of other stored materials. The investigation makes a strong case for a better understanding of site flood vulnerability, particularly regarding critical systems that need to keep functioning to ensure site safety once evacuated.

MunichRe publishes article on first half of 2018

MunichRe has published [an article on NatCat review covering the first half of 2018](#). After a challenging 2017, with a particularly destructive autumn hurricane season, actual insured property loss from NatCat events in the first half of 2018 has been moderate, notwithstanding the tragic loss of 3,000 lives, roughly half from meteorological events.

Explosions in China's Sichuan Province kill 19

A series of explosions at a chemical plant in China's Sichuan Province on 12 July 2018 has resulted in 19 deaths and 12 injuries. Eyewitnesses reported several explosions over a 10-minute period, that caused major damage to multi-storey buildings. Local authorities were quick to blame 'illegal construction', and a government team has been sent to further investigate the incident cause.

CCPS Safety Beacon now available

Check-out the CCPS monthly [Safety Beacon](#), to which you can subscribe. It is aimed at delivering process safety messages to the processing industries and wider. A more recent bulletin built on the term 'chronic unease', and considers there to be a thin line between confidence and arrogance, using both the Titanic and Union Carbide's Bhopal tragedy to illustrate this. Chronic unease is a positive factor to be sought in a (process) safety culture, a characteristic that should be present from the board to the 'shop floor'.

IChemE released new regular publication

The IChemE has launched a new regular publication under an 'ISC Safety Lore' banner. Two publications have been released to date that consider lessons to be learned from incidents associated with process plant start-up and the maintenance of atmospheric storage tanks. For more information, click [here](#).

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An evening with...

Stewart Macartney, Jonathan Gosling and Alan Cheung discuss hazards and procurement

In contracting work, different procurement approaches can incentivise different behaviours, which in turn strongly influence delivery performance in time, cost, quality and safety. But different situations and types of work benefit from different procurement methods: it is not a case of ‘one size fits all’.

Where appropriate approaches are used, great work often follows, but in these cases the success is often unsung and the heroes stay under the radar. However, inappropriate approaches lead to relationships unravelling, leading in turn to sub-standard and sometimes disastrous results, both within the timeframe of the contract itself and for the quality of the legacy product. Poor quality as a legacy can undermine safety in the long term.

At the ICE on 21 March, the Hazards Forum explored this paradigm from the three perspectives of experience, management research and behavioural science.

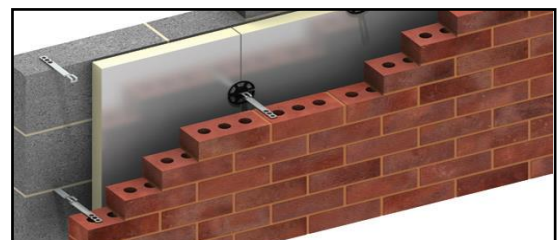
Introduced by Luise Vassie, the evening was chaired by Steve Rowsell, who brought a lifetime of experience in major project procurement and spoke of the ‘adversarial problems’ and commercial pressures that can be associated with it, adding the importance of ‘transparency of costs’, robust performance management, the destruction of silo working and encouragement of innovation as vital factors.

The first speaker was Stewart Macartney, who worked on the [Independent Inquiry into the construction of Edinburgh schools, following the collapse of a wall at Oxfangs School](#) in 2016, the latter revealing how contracting practices (affecting both design activity as well as on-site work and supervision) impacted the eventual product to the detriment of the public it was striving to serve.

Stewart presented on the collapse itself and its immediate impacts, where the same defects that contributed to the collapse of the wall at Oxfangs were found in another 17 schools built as part of the same contract. He drew out the lessons from which the public sector and construction industry have learned, and to which all would do well to heed.



As Stewart pointed out, ‘the fact that no injuries or fatalities to children resulted from the collapse of the gable wall was a matter of timing and luck’. Much of the problem with the wall had resulted from bedded wall ties, some of which had been poorly and inadequately fitted, others of which were missing altogether. This meant that the two layers of walling were less resistant to wind as they should have been. There were also problems with missing bed joint reinforcements and missing wind posts (*inter alia*).



The investigation found that beneath these issues were problems with design, the presentation of design information and the drawings. What is more, similar issues were evident in other schools projects across Scotland.

Was it down to procurement? Private financing was used to build the school, in a model that saw the local government leasing the buildings. This arrangement was used because of a lack of public funds, and to transfer risks to the builders and funders.

A joint venture company (formed to build 17 schools) sub-contracted to six contractors, who further sub-contracted some of the work to sub-contractors (groundwork, steelwork, cladding and so on).

Bricklayers were paid by piecework. But there were no competency checks and the important matter of how to install a wall tie correctly was not taught in technical colleges - apprentices were expected to 'pick it up on the job'. More worryingly, some of the bricklayers did not understand how critical the ties were to safety and structural integrity.

Stewart noted that the way the bricklayers were paid meant that - had they flagged up the issue - there would have been delays, which would have lost them money. There was clearly a missed opportunity for a separate pair of eyes to check the works. Indeed, there wasn't even a Clerk of Works in evidence.

The fragmented contractual approach to construction meant that considerable effort was needed to maintain standards. Gaps between the different work packages worked on by the various contractors and subcontractors created gaps in knowledge - and safety. The lack of a holistic overview led to an increase in risk.

Stewart explained that the inquiry recommended that local authorities need to act as an 'intelligent customer' when involved with erection of public buildings. Furthermore, due diligence needs to be applied at all times, and the correct sequence of work needs to be followed at all times. Quality objectives should be set and appropriate time and resources should be allocated.

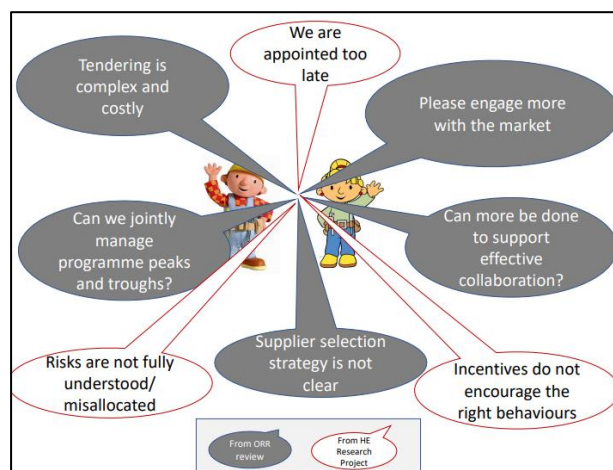
Stewart added that a review of building standards is currently under way. Changes to legislation are highly likely. But how long will we have to wait to see the improvements?

Up next was Dr Jon Gosling, a pioneering researcher into appropriate contracting at Cardiff University.

As the slide opposite shows, whenever different parties exchange goods or services, he identified that 'exchange hazards' may occur, most usually in the form of opportunistic behaviours to maximise one party's gain to the detriment of everyone else.

The question is: how do you control the hazard, or even to play opportunism against itself for the greater good? Jon considered appropriate procurement choices and contracting processes to minimise 'exchange hazards', optimising the underlying incentivization mechanisms, conditions and overall relational climate for a project.

Jon began his presentation by painting 'a dark view of humanity', noting that we are constrained by bounded rationality and are given to opportunism. This means that sometimes we might not disclose all the risks, and sometimes we might work for ourselves, rather than the good of the project.



The problem with contracts, Jon went on, is that they require specific investments and involve uncertainty. Indeed, investments can lock us into particular relationships and sometimes ‘all these things combine to make a perfect storm.’

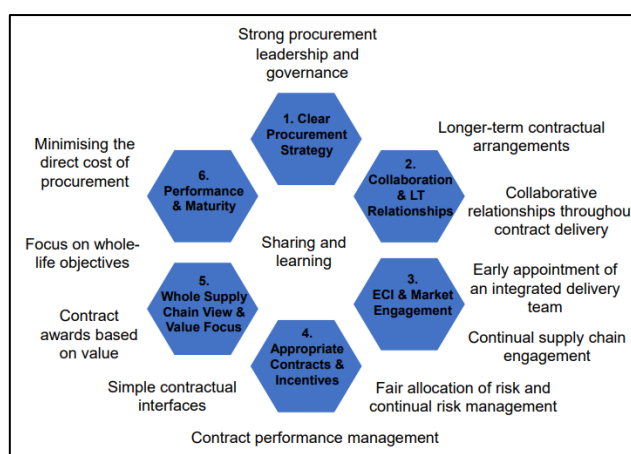
Problems with procurement and contracts centre on the supply chain. Often, suppliers are appointed too late in the process, often risks are not fully understood - especially at the interfaces between contractors and subcontractors. With a nod back to the situation at Oxfangs School, Jon added that incentives do not always encourage the right behaviours. As you go down the supply chain, the lateness factor can increase, particularly where companies not involved in the design phase are concerned. Sometimes the overall strategy of a project is not clear. Could more be done to encourage collaboration?

The short answer is: yes.

Jon and his team developed a checklist capability review, drawing on government reports and academic literature. From this work, a set of themes emerged...

- **Clear and aligned strategy** (‘getting all the strategy documents linked to business drivers or government priorities, making sure they filter down the whole supply chain’)
- **Collaboration, integration, long-term relationships** (‘evidence this has positive impact on costs, time and project consistency’)
- **Early contractor involvement and market engagement** (‘evidence that both have a positive effect on quality problems’)
- **Appropriate contracts and incentivisation**
- **Whole supply chain view** (‘look broadly across the network of companies working together to try to spot problems before they happen’)
- **Performance and maturity** (‘capture learning and move forward’)

Jon and his team tried to take these themes to build a set of best practice principles, illustrated below:



From this work, a key concept emerged: braiding, that is the use of the right forms of relational and contractual governance for uncertain situations.

One way to achieve this is via contract options - that is, different pricing structures can alter the risk profile:

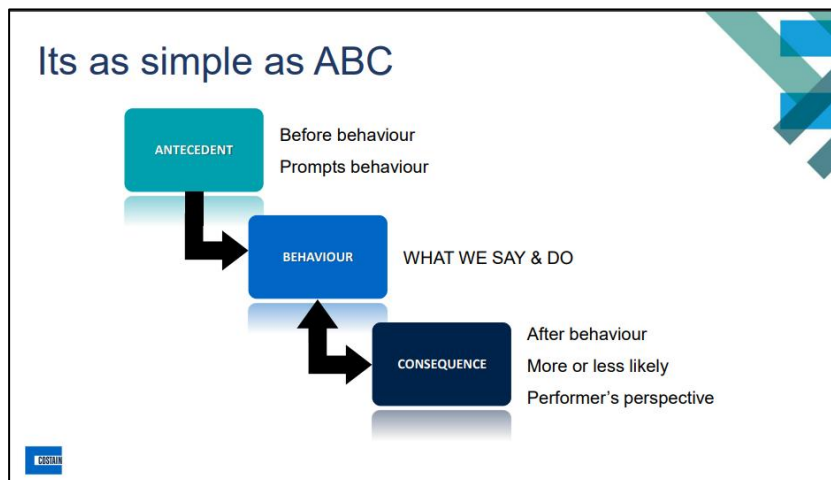
Contract Options	Innovation Categories
<ul style="list-style-type: none"> • Fixed price • Target cost (pain-gain) • Cost/Time re-imbursement 	<ul style="list-style-type: none"> • Solutions developed from adapting existing designs • Solutions developed from codes and standards • Solutions developed from research

In essence, we need to look at how contracts interact across the spectrum, how they link together and what the rationale is behind the interfaces. We need to understand the nature of uncertainty and our relational ties, and we need to structure our governance decisions to find appropriate ways to manage the storm.

The final speaker was Alan Cheung, Costain’s Group SHE Operations and Behavioural Management Director.

Alan is a leading figure in the application of behavioural science to achieve practical outcomes. Extending Jon's themes of contracting practice, he looked at how the operational climate that appropriate or inappropriate contracts create, leads, entirely foreseeably, to the behaviours we see, and which often affect worker safety as well as build quality.

He explained why and how the actions of those in the procurement and office functions in firms have as much to do to ensure good outcomes as those on the ‘front line’. He made the point that we don’t always get what we want or what we were expecting – despite giving what we think are clear instructions. Science tends to make things predictable. Behaviour science does that for behaviours.

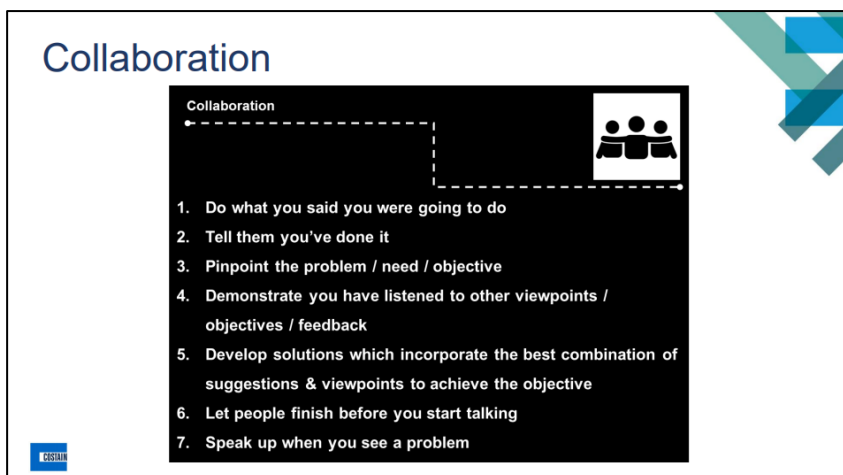


Consequences are not always negative. We need to look at it from the performance perspective.

Do we ask for the right things? Alan told a story about his teenage son, who was asked by his gran to buy roses. She wanted flowers, but got chocolates. Thus when we write an instruction, a contract or a method statement have to be *absolutely* clear.

Behaviour occurs because we avoid something we don't like (negative reinforcement), or we get something we do like (positive reinforcement). It is driven by the greatest source of reinforcement available at the time and will often result in us not realizing the behaviour we were actually looking for. In terms of procurement, what are the reinforcers there? Might it be about saving money? Might it be something that is at odds with actually getting the work done? It would in fact lead to an entirely unintended outcome, as far as the project is concerned. For example, one company purchased a fleet of vans, but chose those without air conditioning to save money. In the summer, the heat inside the cabs made those driving them more likely to lose concentration, make a mistake, have an accident...

It's about empathy - putting ourselves in other people's shoes - especially when we are putting contracts together. Collaboration is vital:



The slide is titled "Collaboration" in a large blue font. Below the title is a black box with white text containing a list of seven points. To the right of the list is a small icon of three people. The slide also features a decorative graphic of overlapping blue and green squares in the top right corner and a small blue square with the word "ESSENTIAL" in the bottom left corner.

Collaboration

Collaboration

1. Do what you said you were going to do
2. Tell them you've done it
3. Pinpoint the problem / need / objective
4. Demonstrate you have listened to other viewpoints / objectives / feedback
5. Develop solutions which incorporate the best combination of suggestions & viewpoints to achieve the objective
6. Let people finish before you start talking
7. Speak up when you see a problem

ESSENTIAL

In short, procurement is all about PEOPLE.

There followed a discussion involving the 'floor'. A point was made that sometimes we do 'just enough to comply'. What is needed is cultural change. How does the project create the right environment to promote the right behaviours? That could be in health and safety, or quality terms. This is seen as a leadership issue.

Are clients securing the right suppliers? Do they have the right skills and capabilities? Clients need to be looking much more closely at how they are going to ensure they're working with companies that will deliver on the assurance requirements.

There are too many incentives to get a job done quickly. This can compromise safety and integrity.

Building Information Modelling was seen as the next stage of development in combatting the problems of procurement. It does need to be used properly, however.

Sometimes in construction, there's either an obvious defect or an obvious design error. There often has been little 'checking'. Who should be responsible for the checking? The feeling was that the

checking process needs to be a combined one, with sign-off achieved jointly. There needs to be confidence that the contractor has processes in place that will be followed, with a degree of supervision and audit behind it.

Procurement is far from a straightforward process. We have to recognise the uncertainty and that there often isn't a 'single solution'. Looking at the risks, the wide range of impacting factors and the driving of behaviours during implementation - these things must be pulled together.

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Piper Alpha Disaster – 30th Anniversary

John Munnings-Tomes looks back at this watershed event

The 6 July 2018 marked the 30th anniversary of the Piper Alpha disaster in the UK sector of the North Sea. At around 22:00 that day, there was an initial release of volatile hydrocarbon resulting in an explosion followed by fire and then further explosions that ripped through the Piper Alpha platform.

Within the space of a few hours, 167 men lost their lives (165 onboard and 2 rescuers) and all that was visible was a smouldering wreck of the drilling module. Of the 61 survivors, many were left with lifelong physical and mental injuries.

The event remains the world's most tragic offshore industry event in terms of number of lives lost, and also the biggest in the 10% impact it had on UK oil production at the time. It also led to financial losses of an estimated £2 billion (the equivalent of US\$ 5 billion today).

This event, together with a number of other sector major accidents, was instrumental in the formation of the Hazards Forum in 1989.



Never have the words 'watershed event', been more appropriate for a catastrophic incident. Piper Alpha, and its impact on the offshore oil and gas sector remains a very emotive topic, and has for a generation defined the direction of Process Safety in the North Sea, and beyond. There are a few examples in any industry where the 'ripples' of an event have been so widely felt globally.

The 30th Anniversary is all the more poignant as we see a generation of offshore workers, engineers, and management retiring, in many cases hastened by the increasingly challenging economic environment to which the oil and gas sector is subject (i.e. chasing harder to get oil for a lower landed price). This makes it all the more important that the lessons from Piper Alpha continue to receive due attention by the next generation.

The Public Inquiry into the Piper Alpha Disaster (more commonly known as the Cullen Report¹) remains as one of the better examples of a public enquiry, and essential reading for a Process Safety Practitioner (particularly those in the offshore sector). There are many examples of Public Enquiry documents from losses in the Oil & Gas and Process industry sectors which are easily accessible for

¹ Not to be confused with the 'Cullen Report' into the [train accident at Ladbroke Grove](#) in 1999.

free from the web – Longford Gas Plant, Montara, Texas City, Varanus Island and Macondo, in addition to the growing body of investigations from organizations such as the CSB, but not currently Piper Alpha. It is, however, positive to note that after lobbying by the IChemE this summer, the UK Health and Safety Executive has agreed to make a copy of the Cullen Report freely available on their website in future.

Much has been written and said on the subject and impact of Piper Alpha, although on this the passing of the 30th anniversary, attention is drawn to two examples:

- Piper Alpha survivor Steve Rae has made it his duty to ensure the lessons from Piper Alpha are not forgotten, and speaks to industry groups regularly on the subject. He particularly emphasizes those attributes needed with companies and work sites to develop and maintain a positive safety culture, something he refers to as the ‘six Cs’: Commitment, Change Management, Control of Work, Competence, Complacency & Communication. A full version of a recent article where Steve describes the importance of the ‘six Cs’ can be found [here](#).
- Sir Brian Appleton, who contributed to Lord Cullen’s inquiry as a Technical Advisor, subsequently made a presentation to share with industry, which was recorded. This recording was a ‘staple’ of safety conferences and in-company discussion in the early 1990s, and it has thankfully been preserved for viewing [here](#). The presentation not only provides a listener with a first-hand experience of the inquiry process and its purpose, but also distils the inquiry outcome into four key broad root cause lessons:
 - Safety is the responsibility of all (line) management
 - Safety needs a systematic approach
 - The quality of Safety Management (decision making) is crucial
 - Auditing needs to ensure that activities that we deem must be done a certain way to ensure a safe operation, are done that way every single time, every single day

The concluding remarks of Sir Brian’s presentation continue to resonate today, perhaps more so as we use increasing sophisticated techniques to manage process safety and asset integrity:

... the sum and quality of all our individual contributions to the management of safety determines whether the colleagues we work with live or die...

John Munnings-Tomes is the Chief Risk Engineer at Navigators Technical Risk.

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An evening with...

Dame Judith Hackitt, Angus Law and Steven Flynn consider Grenfell one year on

On 19 June, the Hazards Forum held an event with the ICE to consider the Grenfell Tower fire of 2017 and ask ‘where do built environment professionals go from here?’.

Following a period of respectful silence, chairman [Lord Robert Mair](#), President of the ICE, welcomed the delegates and extended the Forum’s sympathies to those affected by the incident. He reiterated the need to understand the risks associated with building environment works and to share the lessons from Grenfell widely. As we said: ‘What do we now know? What do we now need to do? And, how do we go about doing it?’

Lord Mair then referred to former ICE president Peter Hansford, who is leading an independent review infrastructure assets. An interim report – [In plain sight: reducing the risk of infrastructure failure](#) – was published last November, and found there to be no undue risk in much of the UK’s infrastructure. However, there ARE areas that need closer scrutiny, namely: communications, professional development and governance. Three groups have been formed to take forward the expert panel’s recommendations. The final report is due in the autumn of this year

Lord Mair then introduced the first speaker, former HSE Chair Dame Judith Hackitt, who presented the findings of her [Independent Review of Building Regulations and Fire Safety](#), published in May 2018

Dame Judith made a key point very quickly, noting that many of the lessons learned by many in the process industries have clearly not be learnt in the broadest sense, and not by all yet. She said that we needed to break down the barriers to the sharing of knowledge - and soon. She added that her review was very much in the wake of Grenfell, but quite separate from the Public Inquiry, and had a broader remit, namely to consider the regulatory system behind the British building environment works, assessing their effectiveness with particular emphasis on high-rise buildings.

There was a need to see if other industries, other countries, were ‘better at doing things than ourselves’. The government had made clear that the review needed to be done ‘at pace and with some urgency’. Terms of Reference were therefore published quickly, ahead of an information-gathering phase, which led to an important mapping of the existing regulatory process. ‘Once we’d got it down on paper,’ said Dame Judith, ‘it was blatantly obvious to anyone what it was not going to work.’

In short, it was over-complicated, over-bureaucratic and gave too many people too much impetus to try to get round it in order to avoid being caught up in the maze. Indeed, it was obvious to most of those involved with using it, many urging the panel to recommend radical reforms. It was also clear that the ownership model needed to be changed, more specifically a move away from a system in which people waited to be told what to do.

The final report recommended:

- Clear accountability for clients, designers and contractors during construction.
- A stronger regulator, with a stronger enforcement and sanctioning package (re criminal proceedings, fines and so on), there having been in the past too much conflict of interest in that the built environment industry could effectively chose and even pay for regulation.



- The introducing of a 'safety case' regime for high-rise complex buildings (in particular, occupation cannot begin until an as-built building has been demonstrated to be safe).
- Clear responsibilities to actively manage safety during occupation (whereby owners will need to demonstrate to the regulator that buildings are being managed to ensure safety and integrity).

Dame Judith noted that many of these things would seem obvious to those working in the Process Industries, but there was - and is - an urgent need to help colleagues in the built environment sector make the same 'mental leap'.

The report asked why the residents had not been listened to, and recommended that a culture of engagement and government funding to support residents and landlords working together. There should also be an independent no-risk route for redress on safety issues. Existing guidance needs to be strengthened – and simplified, but the industry needs to demonstrate its capability to take ownership once that has been done. Dame Judith also noted that competence was needed across the whole industry and that people should only be doing what they have the competence to do, and know when they have reached their limits.

There was also a key recommendation in regards to safety critical component labelling and testing.

The key principle is that buildings must be thought about as systems; they must be regulated as a system, and accountability must be at the heart of that system. Builders also needed to appreciate their responsibility to build buildings that are safe.

In many ways, Grenfell was similar to the [Flixborough disaster](#) (a 'bypass' at the plant wasn't engineered properly) and [Piper Alpha](#) (an oil platform was converted to a gas platform, but the consequences of so doing were not thought through). At Grenfell, the building was changed in a manner not controlled or thought through.

Dame Judith pointed out that the chemical and process industries have known about process safety for decades, but have failed to share that knowledge with others and failed to help them see how to apply it more broadly to their areas of responsibility. We tend to 'put up barriers' but now we need 'to think harder about knowledge sharing and how we train and recognise professional skills across disciplines.' The need for interdisciplinary working is now, and that need is urgent.

Success means delivering safe solutions for everyone, which will in turn lead to increased public confidence in what we all do as engineers.

The next speaker was Dr Angus Law, BRE Lecturer in Fire Engineering at the University of Edinburgh, who discussed what has been learned, whether there are beliefs that have now been broken, and the on-going journey after a tragic event like Grenfell.

After introducing himself, Angus pointed out that he was involved with the Grenfell public inquiry, so would not be talking about it or taking questions about it.

Angus began by describing our beliefs about fire. We may have moved on from the Greeks – who believed fire to be a gift from Prometheus – but what have we replaced it with? We understand 'making a fire', 'striking a match' and so on, and from these experiences we gain a level of experiential knowledge, from which we eventually work out how to do something. This idea translates to areas

such as civil infrastructure, Angus noting that history is littered with examples of cathedrals being built, which then fall down and are rebuilt. This is a way of learning, and we have to learn these physical principles so we that can achieve.

Regarding fire, we realise that the fires we're seeing (such as Grenfell) are outside the experiential knowledge we have. To understand this, though, we need to look to the past.

In 1861, a building caught fire in [Tooley Street, London](#).

So enormous and so devastating was the blaze that it was decided that regulation was needed in terms of building size. This was done, and Angus pointed out that today's limits on area are still based on those nineteenth-century figures. Thus experience led to regulation in a move to try to stop Tooley Street from happening again.

Similarly, when the Empire Palace Theatre in Edinburgh caught fire in 1911, everyone managed to get out in 2½ minutes, and this timing became the basis for escape planning that is still with us today. For materials, we need to come forward to the 1960s, 70s and 80s. But what we need is more fundamental knowledge of the ignition processes.



The point is that our fire safety regulations pre-date our fundamental knowledge of the fire phenomena, and when we step outside what is based on our experience, we run the risk from disaster.

This was evident in the [Mont Blanc Tunnel fire of 1999](#).

Fire grew so quickly was because the fire involved a lorry carrying margarine. This had been categorised as a low-risk material, but in fact the hazard it represented once it was actually on fire was similar to a diesel-powered car. This sort of problem is prevalent today.



One of the things that makes fire different as a hazard is that a fire will evolve with time – and we can react to this and intervene. Fire fighters are held as heroes, and rightly so. But this changes how we perceive fire events – if a fire is successfully put out, it can mean that we don't learn all the lessons that are there to be learned about our buildings. What went right, not just what went wrong.

Out of belief, experience, and fundamental knowledge, only the last one can consistently deliver safety. Angus added that 'tick box' exercises often protect those who won't or can't apply fundamental knowledge. This promotes experiential knowledge and can mean we don't always recognise success.

History tells us we are doomed to make further disasters unless we:

History tells us we are doomed to make further disasters unless we:

- Engage with these issues;
- Recognise the difference between experiential knowledge and fundamental knowledge; and
- Embed knowledge in the design process.

The final speaker was Dr Steven Flynn, who discussed how the offshore industry responded in the wake of the Piper Alpha and other tragedies, and what the built environment industry might expect to happen..

Steven noted that [Piper Alpha](#) was right at the beginning of his journey in safety, and brought about ‘huge regulatory change’. Cullen identified failings in management, emergency response, procedures and equipment (*inter alia*).

It was clear that the regulatory framework needed to change. Ultimately, the work done led to the [Offshore Installation \(Safety Case\) Regulations 1992, which today exist as a 2015 version](#). This was radically different from what had gone before (which had been much more prescriptive). Goals had to be set, actions had to be risk based, and operators had to demonstrate that risks had been reduced to a level as low as reasonably practicable (ALARP). The Regulations also set out what had to be achieved, but didn’t say how (although more specific requirements were later added). Another fundamental difference was that the regulator itself also changed – from the Department for Trade and Industry to the HSE.



As a result, dedicated teams were set up to oversee all the changes, supported by technical specialists. As a result, moreover, the understanding of hazards was transformed, and management systems, procedures, monitoring, training and competence assurance were all significantly enhanced. People really started to focus, to understand the key issues prevalent on these platforms. Companies also came together to solve common problems and the workforce became very engaged.

Steven then presented some ‘nuggets of learning’ from the whole process:

- Senior management focus and dedicated resources are needed as part of a carefully managed plan.
- Beware of over-analysis – apply sound engineering practice.
- Specialist support is essential, but the company concerned must understand, ‘own’ and implement findings.
- Extensive communication and co-operation is vital between the workforce, companies, contractors...and regulators.
- Implementation, maintenance and management of change require continual effort.

Ultimately, the changes that came out of the Cullen report led to safer, more efficient and more co-operative operations.

There followed a discussion involving the floor. The point was made that there are similarities between Piper Alpha and Grenfell, and that the oil and gas industry ‘still think that Piper Alpha is never going to happen again’....and could there be another Grenfell? Dame Judith replied that ‘unless we change the system, I think there is every possibility of another catastrophe’. A big mistake that could be made in the built environment industry is to think we can solve the problem by changing a few key features. We need to focus on fixing a system and not a specific problem. When you look below the

surface, the built environment sector is 'so far back' from everyone else, that there's much we could share that would bring them up to speed quickly.

On the matter of whether our competence systems were failing, Dame Judith said there was in fact 'a whole different question' around current CPD systems for professionals, in that they were not rigorous enough. There are often also too many different systems involved and 'you cannot read across from one to the other'. Part of the problem is that none of us are as good as we need to be about owning up to what is outside our competence and then calling for help. Angus added that we need to make sure people understand that accreditation doesn't necessarily mean competence. Furthermore, the less competent one is, the more confident one often is in one's own abilities. Steven finished by reiterating that competence is essential, but has to dwell in a system and a culture established by senior management.

A member of the audience asked if our fundamental knowledge of fire was sufficient for us to build sufficiently rigorous regulations. Angus reflected that, if we do not feel confident that we can do something, should we be doing it? Should we not be stopping and reflecting? There will always be things we need to know more about. Therefore, we should not build a building until we have the requisite knowledge to do so.

Another point was raised regarding the concern that has been expressed for many years about the conflicts of interest evident in the regulation of the built environment industry and the way contractors and builders are potentially having too much influence on building design. Why has it taken so long for anyone to listen and do something? Dame Judith said that the difference between belief and the unpalatable truths known by experts has been seen in other industries, but that often a tragedy (like Grenfell) is needed to 'break the mindset'. Grenfell, indeed, 'has shifted the paradigm' such that 'no one can deny the horror of what might happen any more'.

There was agreement with the need for organisations to own their safety cases. This led to a point about the management of change, which led Steven to comment that technical expertise is vital, but management needs to be educated at the same time. Indeed, companies need to realise that the safety case is actually at the heart of their business. There needs to be a drive from the top. That said, technical people need to talk in 'management language', referring to consequence rather than statistics and so on, as this increases empathy and heightens the chance of success. Dame Judith added that management needed to be trained to ask the right questions: it's not 'is it OK?', but 'what can go wrong?'

Regarding the problem of the principle designer role being 'broken up' during the course of the project in the built environment world, Dame Judith said that the key point is not the title, but who the duty holder is. 'If you contract out the work, you have NOT contracted out the responsibility. YOU remain the duty holder,' she added.

On the subject of standards, Dame Judith said a mix of standards and guidance was needed, although 'some things are so important that you need prescription'. She closed by saying that the built environment industry wants to innovate, but needs to understand and take responsibility for the risks of so doing. Steven added that the call here is for the industry to 'set up to the plate', and should not leave it to the regulator to manage your business.

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Coming up

The [Events](#) section of our website has more information and details of any updates, which may include additional events or amendments to those shown below. Please note that attendance is by invitation.

Date	Event	Venue	Contact/further information
September 2018			
18	Hazards Forum – Cyber security and safety systems	IET	https://www.theiet.org/
October 2018			
22-26	ICE Global Engineering Congress	ICE, One Great George Street, London	https://www.theiet.org/events/2018/256221.cfm
December 2018			
6	Hazards Forum – Learning and learning systems	London, awaiting final location confirmation	https://www.ice.org.uk
January 2019			
w/c 14 or 21	Ageing infrastructure and life extension	Thomas Ashton Institute for Risk and Regulatory Research, Manchester	https://www.ashtoninstitute.ac.uk/
March 2019			
19	Hazards Forum - Space	ICE	https://www.ice.org.uk

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