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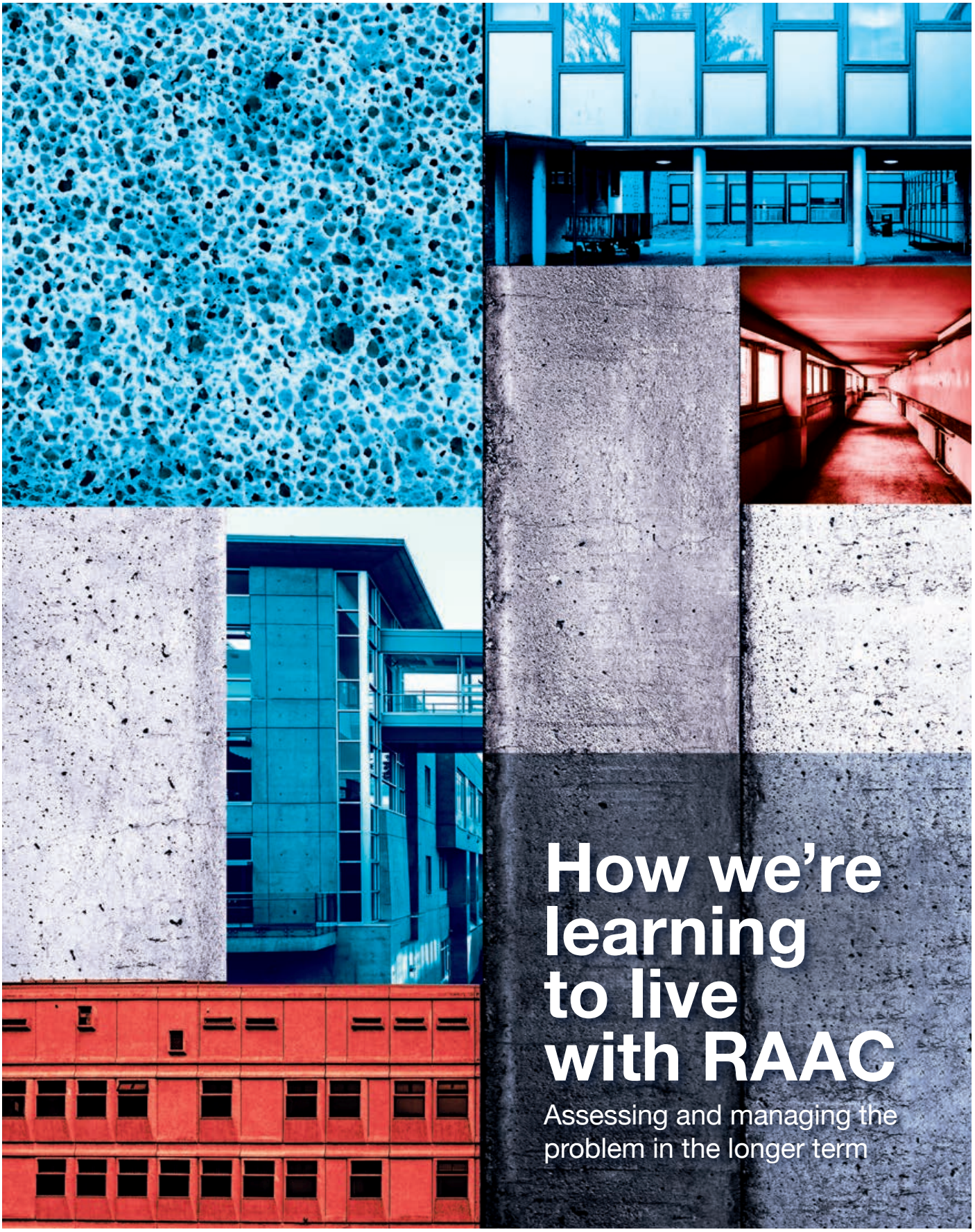
health, safety and wellbeing in the built environment

Winter 2023

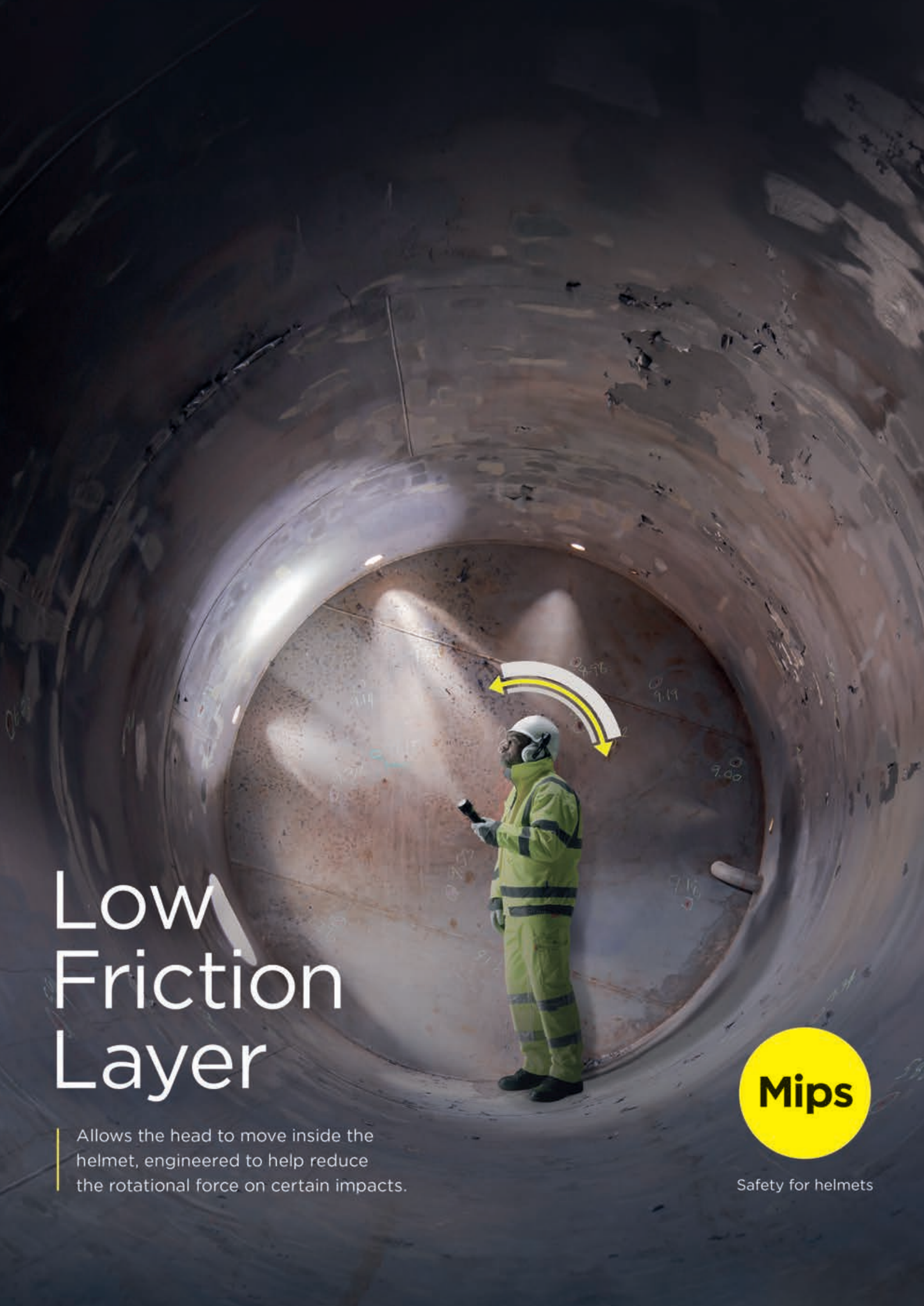


How we're learning to live with RAAC

Assessing and managing the problem in the longer term

aps association for project safety

The BSA across the four nations • Dutyholder roles • Northern Ireland focus



Low Friction Layer

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Mips

Safety for helmets

CPD: Thermal insulating materials for pipes

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While we aim to use images that demonstrate best practice in this magazine, some are for illustrative purposes only.

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"The principal designer role is about design, and then protecting people by design. And the design-led aspect of it is fundamental to getting that right
Paul Bussey, Allford Hall Monaghan Morris

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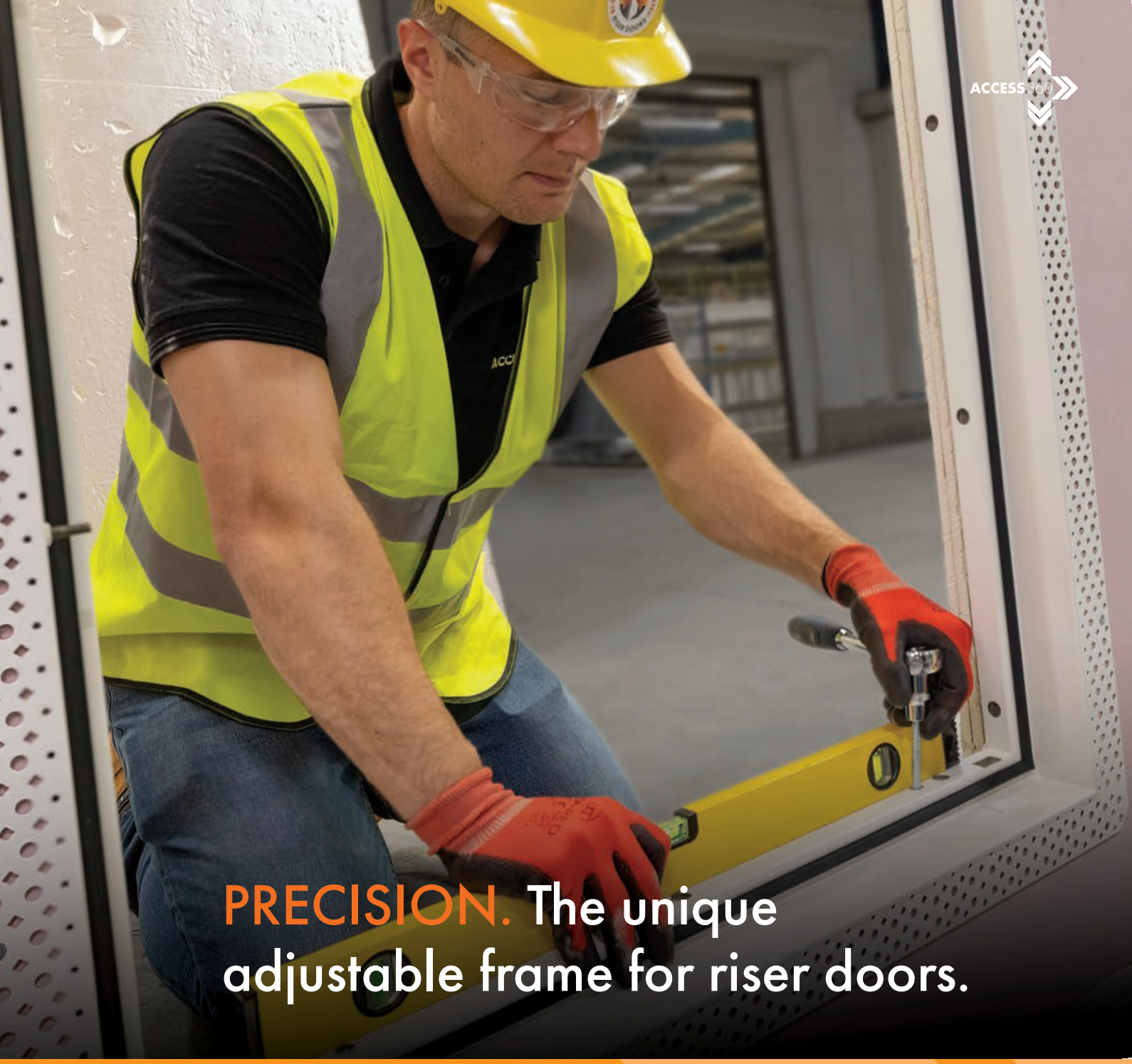

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Welcome

Even in the darkest of winter days we must keep on working together in the hope of building a brighter New Year, says **Lesley McLeod**

There are times when the world seems a very dark place. This edition of *Project Safety Journal* (*PSJ*) – the magazine for members of the Association for Project Safety (APS) – is hitting your desks and inboxes not just when winter is reaching is deepest depths but when the world around us faces conflict.

We are bombarded with images that appal and move us to pity in equal measure. Naturally, APS takes no sides but we echo the hopes for peace expressed so eloquently by the singer and environmental campaigner Feargal Sharkey, who recalled the bravery on both sides that brought an end to the Troubles on the island of Ireland and his wish that a similar breakthrough might be found for others.

It is just a coincidence we hear from John Murray and Paul Cheyne – our colleagues and champions in Northern Ireland – for our feature on APS in the regions. We also highlight the events and webinars you get inclusive to your APS membership and reveal a little of the association's plans for the New Year, when we will be on the road bringing APS out to you.

Lesley McLeod
Association for Project Safety

> **APS's greatest strength and asset is the skills, knowledge and experience of its members**

It is one of our founding beliefs that sharing your valuable experience can help shape for the better work in the built environment so it is less risky than it otherwise might be. This copy of *PSJ* is no exception. We always recognise that APS's greatest strength and asset is the skills, knowledge and experience of its members and we showcase Paul Bussey – a health and safety guru known to many of you.

Appropriately for the time of year, our CPD piece is on thermal insulation. There is more on the Building Safety Act, that seemingly never-ending saga: a challenging opinion piece from Anthony Taylor; and more on what the regulations mean for dutyholders. There's also a very helpful explanation from our own Andrew Leslie about how the Act will make a difference in parts of our four nations seemingly unaffected by the legislation. Safe to say, like Santa's all-seeing eye, there is really nowhere you can hide.

Our experts also reflect on one of the biggest news stories to have hit the construction sector in recent times. We take an in-depth look at the controversy over reinforced autoclaved aerated concrete (RAAC) that broke just as schools in England were due to return after the summer holidays. The implications are certainly likely to reach far beyond our schoolrooms.

I have always felt the world would be a better place if we each did just one small thing to improve things around us. I know one small positive action may seem like a snowflake melting on the breeze but, if we all acted together, we could become a blizzard for good.

But, for now, and with hopes for a brighter New Year ahead, let me on behalf of the team at APS headquarters wish you and yours all the very best for this festive season and peace and good health in the coming months. ●

Lesley McLeod is CEO of the Association for Project Safety.

More hospitals and schools on RAAC list

Building Cost Information Service warns of rising remediation costs

Costs associated with remediating school and hospital buildings containing reinforced autoclaved aerated concrete (RAAC) are set to rise, as more NHS buildings are found to contain the material.

If not properly installed and maintained, RAAC panels have been found to fail without warning.

Though the risks associated with RAAC have been known for some time, the issue came to national prominence at the end of August, when the Department for Education (DfE) changed its guidance on RAAC, resulting in the closure of schools, after incidences of sudden failure.

NHS England has also been surveying, monitoring and remediating its RAAC buildings for several years but during October a further 18 hospitals were added to the list, bringing the total to 42.

David Crosthwaite, chief economist at the Building Cost Information Service (BCIS), said: "It was inevitable that, as estate managers undertook reviews of the building stock, more cases of RAAC would be found.

"Looking at the list of affected NHS sites, they range from large hospitals through to small community hospitals. Within those, we don't know whether we're looking at small sections of roofs or replacement roofs for entire sites being necessary, so the potential range in costs will vary massively.

"We know that, for example, at the Queen Elizabeth Hospital in King's Lynn, which was already included in the government's new hospital building programme, the majority of buildings on the site are affected."

BCIS estimates the cost of removing a RAAC-affected roof from a 10,000 sq m four-storey hospital and replacing it with a new metal roof is in the region of between £1.75m and £2m. Refurbishment of the rooms below are estimated at around £700-£800 per sq m.

Above: Hinchingbrooke Hospital in Cambridgeshire is confirmed to have RAAC planks

Crosthwaite added: "Where remedial work is possible, rather than starting again with a new building, the challenges, and inevitably costs, increase when the setting is more difficult to access, when there's specialist equipment on site and, of course, when it's not as easy to move the occupants out as it is perhaps temporarily to pause face-to-face education.

"Clearly, ongoing maintenance budgets in the public sector are going to be under pressure for some time, but the whole RAAC situation has proved exactly why investment in ongoing maintenance work – to keep buildings operational and their users safe – is so crucial."

Meanwhile, scores of more buildings across the country, including university buildings, courts, theatres and police stations, are being found to contain RAAC.

In October the DfE added another 43 new schools with RAAC, bringing the total number of schools where RAAC is present to 214. ●

See RAAC feature p10.

New golden thread details clarified

Experts welcome list of documents to be stored

Experts have welcomed further clarifications to the development, maintenance and operation of the 'golden thread'of information.

Part 4 of the Building Safety Act 2022 covers the procedures for the golden thread, mandatory occurrence reporting and handing over information. This applies for both new and existing HRBs in England.

The Department for Levelling Up, Housing and Communities (DLUHC) released the new details in October, in response to industry feedback. The clarification sets out the mandatory information required to be stored in the golden thread under the Building Safety Act, as well as requirements for residents and IT systems.

Allan Binns
Ryder Architecture

> **Recent clarifications are a much welcome steer for all involved**
> **Allan Binns**
> **Ryder Architecture**

Documents to be included for the golden thread include fire safety information as well as documents that clients for a scheme (conducted under the competent person scheme) have to provide to the responsible person, registration information and key building information.

The department restated that it is not mandating one single IT system for the golden thread. It said: "The government is not proposing the use of a single system, but that information and documents should be able to be transferred electronically to others."

The DLUHC noted the concerns raised about fire and rescue authorities needing to digitally access the golden thread. "The government will be mandating that certain golden thread information will have to be provided electronically to the local fire and rescue authority," it said.

"Government will continue working closely with the Building Safety Regulator to ensure that principal accountable persons and accountable persons have the necessary guidance to create and manage the golden thread information effectively."

Allan Binns, architectural director at Ryder Architecture, said: "DLUHC's recent clarifications are a much welcome steer for all involved in the built environment.

"While the guidance provides us with a good indication of what is needed, it is important to stress that each project will be unique. With this, an information manager must work with the client at the very start of the project to ensure that the documents and information gathered are not only fit for meeting the requirements of the gateways but are also compatible with the principal accountable person's approach to creating and operating a building safety case." ●

News in brief

ZOOPLA

Cladding was removed from the Lumiere building, Romford Road, London

Newham takes action over cladding

Newham Council has become the first local authority to prosecute successfully a building owner that failed to remove dangerous cladding from a residential high-rise in east London.

The local authority pursued legal action against Chaplair using powers under the Housing Act 2004. Chaplair had failed to remove flammable cladding on the Lumiere building by the 31 March 2021 deadline imposed in an improvement notice issued by the council in September 2020.

Work eventually began in May 2021, and the dangerous cladding was removed by February 2022.

Through its legal action, Newham successfully argued that there was no reasonable excuse for the delay. Chaplair was due to be sentenced at Westminster Magistrates' Court on 31 October 2023.

CIC celebrates milestone

The Construction Industry Council, the umbrella group for professional bodies and associations within the built environment, including APS, celebrated its 35th birthday in November.

Graham Watts, CIC's chief executive commented: "The fact that CIC has made it to 35 years is in itself remarkable. Most pan-sector construction or built environment organisations barely survive a decade (such as the Construction Industry Board and the Construction Confederation) and when I joined the CIC as chief executive in 1991 the headlines in *Building Design* that week were that the organisation was about to fold!

"Today, we have 37 members (the highest number ever) and 18 associate members and it is a tribute to all of them that the council has not only survived but gone from strength to strength."

Warning after car park collapse

A blaze which ripped through a car park at Luton Airport in October, leading to its partial collapse, has prompted safety warnings from fire industry experts.

BEDFORDSHIRE FIRE AND RESCUE SERVICE

A fire in a Luton Airport car park in October destroyed more than 1,400 vehicles

More than 1,400 vehicles were destroyed in the fire, which started on level three of Terminal Car Park 2 on 10 October 2023.

Andrew Hopkinson, chief fire officer for Bedfordshire Fire and Rescue Service, said there was no sprinkler system in the car park and that, had there been, it "may have had a positive impact on this incident".

The car park, which opened four years ago, is now likely to be demolished.

A statement from the Fire Industry Association, which represents more than 1,000 fire protection companies, said it "reiterates the importance of robust fire safety measures, especially in densely populated and high-traffic areas, to mitigate the risks and impacts of fire incidents".

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A new key to raising safety standards

Anthony Taylor is interim chair of the Building Safety Alliance, for which APS is a founding trustee. He sets out its ambitions to help landlords deliver their responsibilities under the Building Safety Act

The Building Safety Act, which came into force at the start of October, brings many fundamental changes to the way we design, build and manage buildings. There are new duties for owners, designers and constructors – and clearer responsibilities, including tighter control of the way higher-risk buildings (HRBs) are managed and operated.

Many of you will be aware of the new obligations this will bring for those managing and operating HRBs: the need to develop safety cases that show the Building Safety Regulator (BSR) that all steps are being taken to keep residents safe; the need to maintain a golden thread of information and proper data integration to meet the new dutyholding requirements of the (principal) accountable person; and, of course, the need for clients to set an easily recognisable standard of competence required of individuals delivering work, especially aiding those who may not know what to look for.

For landlords in both public and private sectors, this is new territory. Adopting these requirements across their accommodation – including existing stock – requires new approaches to building management, integration of data and the skilling-up of their teams. That way they can ensure that those they appoint to undertake building and maintenance are properly competent to do the work.

Anthony Taylor
Building Safety Alliance

It is against this backdrop that the Building Safety Alliance was formed to provide a broad alliance across the occupied sector. Since our inaugural meeting in March 2021, we have continued to grow rapidly and we are in the process of turning into a fully fledged legal entity – a charity – with APS as a founder trustee.

The other trustees include the Construction Industry Council, the Institute of Workplace and Facilities Management (IWFM) and The Property Institute (TPI) – essentially all the most senior and important professional bodies in our sector.

The executive officers of the alliance have already helped in the development of the PAS documents that form the foundation of a more competent workforce for dutyholders and their teams: PAS 8671 (principal designer), PAS 8672 (principal contractor); and PAS 8673: 2022, *Built Environment – Competence requirements for the management of safety in residential buildings*.

> **We want to equip those responsible for managing works to be able to check that the contractor who turns up to do the work is truly competent to do so**

We continue to help frame the practicalities of implementing the new regime and raising standards through our representation on the BSR's Industry Competence Committee, and the BSI's lead committee for the Built Environment (CPB/1), together with other committees dealing with aspects of competence and organisational capability – both of which are requirements of Parts 3 and 4 of the Building Safety Act.

Developing guidance

The alliance was supported from the start by the Department for Levelling Up, Housing and Communities (DLUHC) and the HSE (now the BSR). We have an ambitious programme of work through our special interest groups to deliver practical and proportionate guidance.

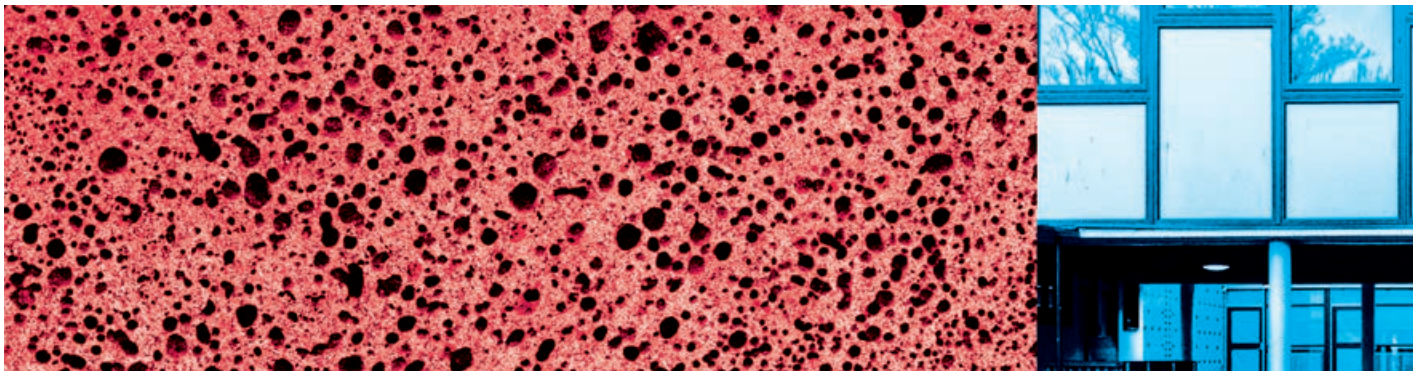
To give you a flavour, we will be developing guidance to aid those procuring work against a specification to set the standard of competence they require of those delivering the work. This could be used by organisations tendering for work to assure their client that they can and will provide the appropriate staff to deliver the work.

We want to equip those responsible for managing works within the building to be able to check on the spot that the contractor who turns up to do the work is truly competent to do so, using recognisable standardised criteria.

One of our special interest groups is tasked to develop guidance, then a scheme, to measure competence and 'organisational capability' – assessing the company rather than the individual.

Look out for our new guidance in the coming months. We have a long road ahead of us raising competence and changing the culture across much of the industry. The alliance and the collaboration it has fostered can help play an important part. The days of workers drilling through fire barriers when doing repairs or installing fire doors so badly they are rendered useless must be a thing of the past. ●

Visit buildingsafetyalliance.org.uk to find out more. Contact Anthony Taylor, interim chair, at anthony.taylor@resolvegroup.co.uk.



Learning to live with RAAC

As an initial scramble to investigate the problem of RAAC in schools subsides, attention must turn to longer-term questions of how the industry mobilises to assess, monitor and manage vast quantities of the material installed in public and private sector buildings across the UK. **Stephen Cousins** reports

Panic set in at the end of August when, just before the start of term, the Department for Education (DfE) decided to close over 100 schools in England in response to new concerns over reinforced autoclaved aerated concrete (RAAC), a lightweight concrete-like material that may be prone to collapse.

The abruptness of the decision was not only a shock to parents and teachers. Construction professionals were perplexed, given that the dangers of RAAC were already documented and the government itself had been warning about the potential for panels to collapse over a year before.

The lightweight concrete, with its bubbly fill material, was installed nationwide mostly between the 1950s and 1980s (see panel, p13). It can become a problem when risks are not picked up. These include the material being cut during building modifications, degrades in response to water ingress or overloading, and as a result of manufacturing defects, including end bearings that are too short.

As surveyors and structural engineers are scrambled to inspect schools and consider mitigation measures, attention must now turn to the sheer scale of the problem. An array of public and private sector buildings are likely to be affected as well as potentially hundreds of thousands of RAAC planks and panels used to build roofs, floors and walls across the UK.

RAAC is used across an array of building types. The number of buildings containing it is in the minority, but some hospitals, for example, have thousands of RAAC panels. The NHS in England started a £698m remediation programme in 2021.

New forms of assessment

RAAC now looks set to be treated as a building defect like asbestos or aluminium composite cladding. Living with it over the longer term will require more research into the material's properties and related risks, developing new forms of assessment, monitoring and systems for mitigation.

Surveyors and engineers will need training to understand all the risks and identify appropriate remediation measures. Assessment could require specialist knowledge, given the sheer number of panels and the fact that signs of degradation may be concealed under the surface.

Tony Jones, technical director at the Concrete Centre, tells *PSJ*: "As an engineer, you're never going to be able to examine every detail on every plank. You're going to need to apply your engineering judgement regarding the amount of intrusive work you need to do and what is an appropriate remedial measure… It's very hard to come up with a simple rule on risks associated with a failure at some point in the future. It will depend on what you find, which will vary from building to building, even from plank to plank."

> **"It's very hard to come up with a simple rule on risks associated with a failure at some point in the future**
> **Tony Jones, Concrete Centre**

Schools ordered to close

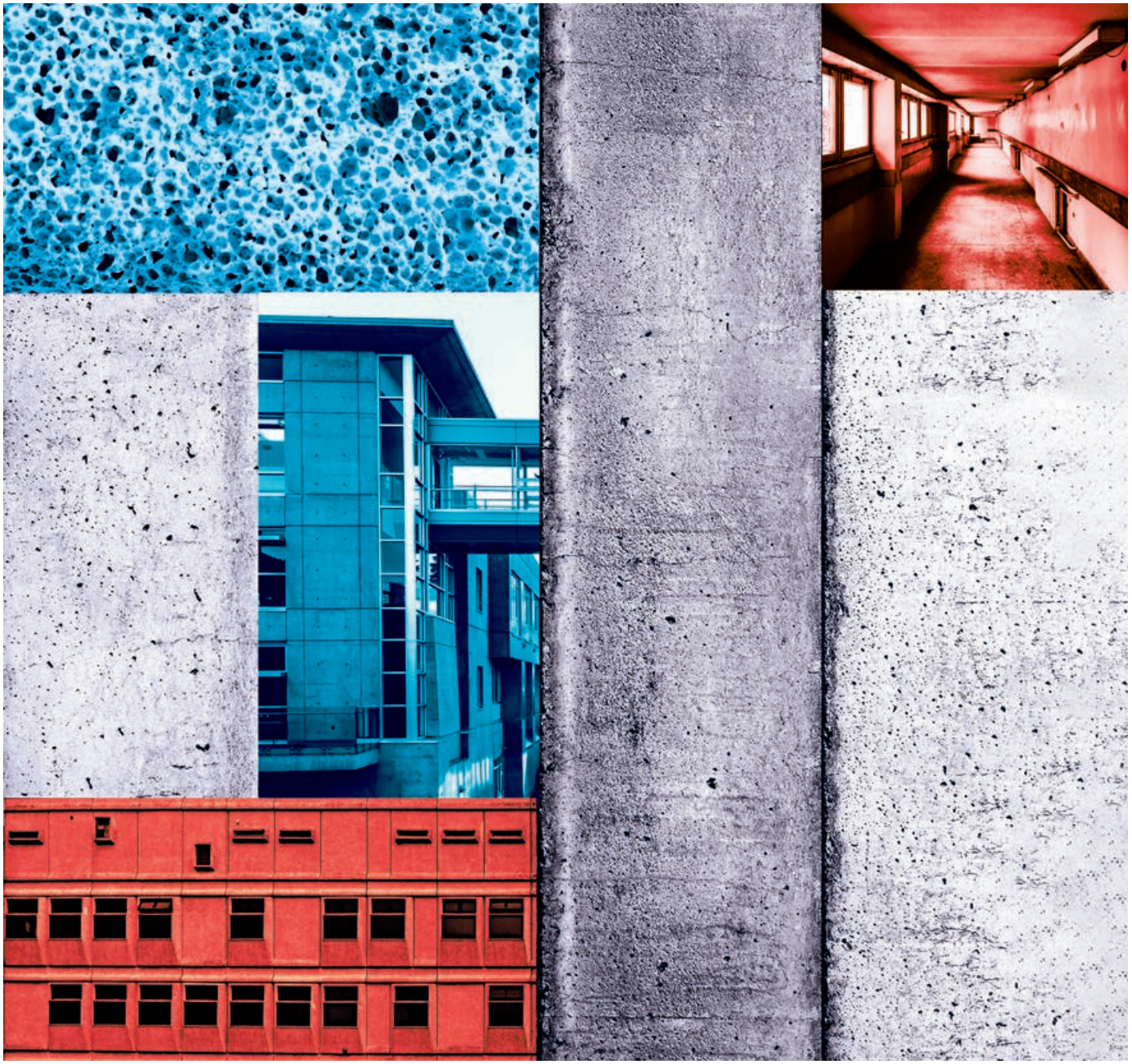
RAAC cast a shadow over the start of the autumn term when 104 schools in England containing the aerated concrete were ordered to close by education secretary Gillian Keegan.

The closures were triggered by the sudden failure over the summer of three RAAC concrete planks – previously classified as non-critical. Keegan asked remaining schools across England to respond urgently to questionnaires stating if they had any of the material installed and, where it was confirmed, to keep those spaces out of use.

A total of 214 schools in England containing the concrete had been identified at the time of writing. The severity of the response from the Department for Education (DfE), and the associated costs and disruption, put a spotlight on RAAC in public buildings, from courts to military buildings to hospitals, and large private sector properties built before the turn of the millennium.

"There's possibly not been a full understanding of the extent of RAAC within construction," Patrick Hayes, technical director at the Institution of Structural Engineers (IStructE), tells *PSJ*. Although public sector clients have been aware of it for some time, private sector building owners have not until now had the "trigger" to become aware of its potential presence in their buildings, he adds.

IStructE has issued guidance on managing RAAC and set up a dedicated working study group, which



was due at the time of writing to publish a desk-based study on the extent of RAAC in the private sector.

According to Hayes, the most common culprits are system build-type spaces put up in the 1960s and 1970s. These include supermarkets, airports, theatres and warehouses, which needed a lightweight material to create long-span roofs.

Concerns about RAAC date back to 1996 when a paper by the Building Research Establishment, on roof planks installed before 1980, warned of "excessive deflections and cracking".

The matter rose up the agenda in 2019 when the Standing Committee on Structural Safety, the HSE, IStructE and ICE, issued a joint alert warning that pre-1980s RAAC planks had a useful expected service life of around 30 years before replacement should be considered. However a number of experts point out that, providing the material is properly checked and well maintained, it can go on for longer.

Chris Gorse, professor of construction management and engineering at Loughborough University, says that the presence of pre-1980s RAAC does not necessarily mean it is inherently dangerous and the structural risks may not demand a widespread programme of demolition or replacement.

Loughborough University is the only institution to research thoroughly the structural issues with RAAC. Gorse and his colleagues were part of a consortium, including engineer Sweco, materials specialist Lucideon, Concrete Preservation Technologies and digital specialist IAconnects, examining the concrete on behalf of the NHS in England to inform its remediation programme.

214

A total of 214 schools containing the concrete have been identified

"The material is not inherently poor," Gorse tells *PSJ*. "As a lightweight aerated concrete with no coarse aggregates it has a relatively low compressive strength but, once the reinforcement is in place, in most cases it acts well as a beam and manages to transfer bending loads and shear stresses."

RICS guidance states that the widely reported '30 years' lifespan of RAAC, ▶

COLIN BABB

"should not be the deciding factor" in decision-making, as it can last longer if the building is well maintained and the original design factors, such as calculated load weights, haven't changed.

"Indeed, we've not found any evidence that RAAC was designed for a 30-year lifespan. The manufacturers' technical literature that we have reviewed does not make reference to this short lifespan," says Gorse.

"All of the beams that we have tested in the field and in the laboratory, some of which are 50 years old, have met or exceeded their original design strength. The main problem is with the bearing and ensuring that transverse reinforcement – reinforcement that spans the width of the concrete – sits over the bearing support."

In many cases, a lack of proper asset management and building maintenance have led to RAAC being damaged. Much of the RAAC recently reported has been "abused, neglected and overloaded" over the years, says Gorse.

This has caused "excessive deflections" and "significant water ingress", where rusting steel reinforcement has created spalling (breakdown of the concrete surface from the main body). Such deterioration is easily observed and remedial action should be taken.

Researchers found instances where panels were cut or pushed through building services, destabilising the concrete.

A "dangerous latent risk", which has resulted in at least one outright failure and other instances of partial failure or collapse, relates to a lack of reinforcement embedded in the bearing ends of panels during manufacture.

> **"All of the beams that we have tested have met or exceeded their original design strength. The main problem is with the bearing and ensuring that transverse reinforcement sits over the bearing support**
> **Chris Gorse, Loughborough University**

Mesh reinforcement

RAAC panels are embedded with two layers of mesh reinforcement. Longitudinal bars span the length and transverse bars span the width, locking the longitudinal members in place and transferring forces into them. Aerated concrete is weak and the integrity and positioning of the reinforcement is crucial to its performance.

Transverse reinforcement is most critical at the bearing ends, where planks rest on either a wall or beam and the loads are greatest. In forensically taking buildings apart, Loughborough found that the position of rebar varied substantially and sometimes veered outside of the bearing area specified by the manufacturer.

In addition, variations in the way panels were constructed on site meant that while manufacturers often recommended that panels were positioned over a 40-50mm bearing area, in reality beams with as little as a 10-20mm bearing have been found. Such poor practice significantly increases the risk that transverse bars would miss the bearing location.

If RAAC is inspected and found to have been constructed and manufactured properly, then the research, at least the work done so far, does not suggest that RAAC poses a significant risk. This being said, a surprising number of cases have been found where the bearings and construction are not adequate and immediate action is necessary.

Top: Three areas of Scunthorpe General Hospital have been closed after the discovery of RAAC

Above: Kings College Guildford found RAAC within two sports halls

"Where panels and bearing have not been inspected, or RAAC has been found to have excessive deterioration, remedial supports are necessary to protect building users," says Gorse.

New insights into the problems that can affect RAAC have shifted the goalposts in terms of how building owners and managers will need to assess and manage structures.

Jones comments: "Cases uncovered in the 1990s involved quite large deflections and cracks in planks so you had some idea before they failed that something was wrong. Now, we are starting to see another type of failure. If you have got RAAC you can't just assume that because it looks alright it is OK. In most cases there will need to be an investigation."

Official guidance from IStructE and Collaborative Reporting for Safer Structures UK (CROSS-UK), suggests that, if the presence of RAAC is not known, the first thing to do is to ask a chartered surveyor or structural engineer to carry out an inspection and risk assessment.

If RAAC planks are uncovered, a chartered or incorporated structural engineer needs to determine their

structural condition. The sheer number of buildings that will need investigation has raised concerns over the number of qualified professionals available.

A recent report by CROSS-UK uncovered a RAAC assessment carried out by people "who did not appear to have appropriate experience" and indicates that some schools may be engaging with the wrong people.

According to Hayes, a relatively small pool of around 24 chartered structural engineering companies have been carrying out RAAC investigations over the last two years. That number has since broadened. Both the RICS and IStructE have issued new guidance and are running training webinars on how to recognise RAAC and assess the risks.

"What we're saying is that any chartered or incorporated engineer that is familiar with our guidance, in particular the webinars and training that we're just putting out, should be able to identify it (RAAC) and recommend proposals," says Hayes.

Delving deeper into specific remediation measures and rolling out a programme of related training will take longer, he adds, partly because more research needs to be carried out to understand the material's behaviour.

This includes research into how RAAC performs on very narrow bearings and how to repair it without causing corrosion. It is difficult to bond the porous structure using current solutions. IStructE is developing performance specs for both temporary and longer-term propping systems.

The solutions ultimately put in place will depend on factors such as the severity of the deterioration, the use of the space and the level of risk posed. "Given that we can't wish RAAC away instantaneously, we're going to need a whole list of solutions, rather than just one," says Hayes.

The process could also be frustrated by the presence of asbestos within affected buildings built when asbestos was still legal to use, making it difficult to complete remedial works. According to the RICS, any remediation must take into account asbestos identification and requires careful management if it is present.

IAN CAPPER

Reigate's police station building was found to contain RAAC

Refurbishment work is another area where awareness of RAAC is critical. IStructE is in discussions with the Construction Leadership Council about delivering an awareness campaign.

"A big risk area is when people drill or cut into RAAC – for example when they carry out roof works above it. So we really need to raise awareness among workers in building maintenance and refurbishment so they can identify RAAC and know how to work around it safely," says Hayes.

> **"A big risk area is when people drill or cut into RAAC – for example when they carry out roof works above it**
> **Patrick Hayes, IStructE**

Sudden failures of RAAC panels are very rare and typically result from intrusive work – such as outlined above. Whereas degradation tends to be a slow process that can be tracked, highlighting the need for longer-term monitoring and maintenance strategies.

The industry mostly relies on manual inspections and data analysis but this approach may be prohibitively slow and prone to mistakes. Greater reliance on photographic data, or other forms of survey or sensors, could provide a more accurate record or a secondary record for cross reference. AI and machine learning can be used to interrogate the photographic data and instantaneously spot any changes

95.8%

Loughborough University's tool can identify cracks in RAAC with an accuracy level of 95.8%

Algorithm detection

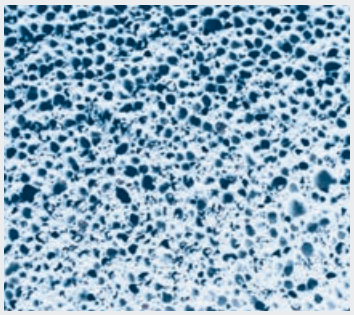
Loughborough University has developed a computer algorithm able to detect and predict the occurrence of cracks in RAAC. The tool was trained on 85,220 images of concrete on NHS trust estates, of which 1,800 were RAAC, including timestamps of the pictures. The system was able to identify cracks in RAAC with an accuracy level of 95.8%. The plan is to integrate the tool within the survey processes of NHS trusts' estate teams.

"We need an early warning that something in a roof, floor or wall beam is changing and we need to do something about it," says Gorse. "This is where machine learning and AI comes into its own. It can recognise things that people wouldn't recognise. it works as a really effective backup when you've got huge quantities of data."

The many strands to the RAAC phenomenon make it difficult to predict how the industry's response will play out over the coming months and years. But what is clear is the substantial costs and manpower required.

Building owners and managers clearly need a stronger understanding of RAAC and other materials within their buildings, to enable them to form a more detailed picture of the risks and how to control them. ●

What is reinforced autoclaved aerated concrete (RAAC)?



RAAC is a reinforced lightweight concrete formed into panels or planks. Unlike regular concrete, it contains no coarse aggregates. Instead a mix of fine aggregates and chemicals creates gas bubbles to increase its volume.

It is not as strong as concrete in compression and requires steel reinforcement to boost its strength. Because rebar does not bond well with the aerated material, transverse bars are needed to lock the longitudinal bars into place.

Compared with traditional concrete RAAC is a 'softer' material and as such can be easily penetrated, explains Chris Gorse, professor of construction management and engineering at Loughborough University.

RAAC was mainly used in flat roofs and in some floor and wall panel construction in the UK between the mid-1950s and mid-1990s. It was not installed in significant quantities after 1980.

It is thought to be more common in schools, hospitals and public buildings and has been discovered in theatres, courts, sports halls, public toilets and other non-domestic buildings.

How safety regulation is changing around the UK

The new regulatory regime as set out in the Building Safety Act came into force in England in October and will apply to all projects subject to building regulations apart from some excluded minor works. But how does it apply to the devolved nations? **Andrew Leslie**, head of membership at the APS, explains

The Grenfell tragedy and the resultant analysis of the self-evident failings in the design and construction sectors, along with a flawed building control system (in England), have spawned a plethora of regulation. This is aimed primarily at competence of all participants contributing to the built environment in England (and Wales) and assurances that designs and constructions are safe to build, occupy, maintain and demolish (recycle, hopefully).

Reforms across all parts of the industry jigsaw mean that building regulations in England have been significantly strengthened, not least by the introduction of dutyholders that mirror those in the Construction, (Design and Management) Regulations 2015 (CDM 2015).

Fire regulations have been beefed up, and building control significantly tweaked by the introduction of the Building Safety Regulator (part of the HSE) for higher-risk buildings (HRBs) and competency training for building control inspectors so that they will now become a registered building control approver.

Let's hope that the jigsaw has no missing pieces. Full details of all of this can be found on the APS website in our webinar series and briefing notes. Visit www.aps.org.uk/category/webinars.

Missed opportunity

All of the above has been authored and implemented in the full knowledge that the four countries comprising the United Kingdom have separate jurisdictions dealing with building regulation and fire safety.

Andrew Leslie
Head of membership, APS

> **The Act allows the Welsh government to implement a slightly different regime from that envisaged in England**

This is a missed opportunity to say the least. Even more galling is that Dame Judith Hackitt actually pointed to the Scottish building control system as being superior in the sense that the compliance checks of the proposed design by building control occurred early in the design process and resulted in a warrant to permit construction of the design.

Dame Judith said that the new regulatory framework must be simpler and more effective. Well, in this writer's eyes, it is most definitely not. The Building Safety Act (BSA) is hugely complex and there is no official guidance. Still, this article is about the effect that the BSA has on the devolved administrations, something that has not been discussed by the UK government or its agencies.

Legislation in force

The BSA came into force on 28 April 2022. It makes provision for the safety of people in or about buildings and the technical standard of buildings. The Act predominantly applies to England and Wales, with limited application in Scotland and Northern Ireland (NI).

It is in full effect under English law. The bits that concern the other three countries are also in full effect. All secondary legislation associated with the BSA and construction has been published and came into effect on 1 October 2023, but is subject to transitional provisions.

The Welsh government's white paper *Safer Buildings in Wales* sets out proposals for a comprehensive reform of building safety legislation and how it will apply to the principality. The Act allows the Welsh government to implement a slightly different regime from that envisaged in England and it published the results of its consultation on building safety for higher-risk buildings in September 2023.

The Welsh regulations will now be finalised, with some amendments to the proposals in the consultations being made for clarity/to ensure the policy is fully implemented.

The proposals are likely to be laid in the Senedd in autumn 2024, following the affirmative procedure. The general feeling is that consistency has been achieved in the most part between the English and Welsh proposals. The only key difference being the increase of scope in Wales where it has been decided to define an HRB as having one residential unit rather than two (as is the case in England) in the description.

Not much of the BSA applies to Scotland. Scotland has its own building regulation and fire safety regimes in place and will not adopt the new BSA dutyholders. Instead, the Scottish Building Standards Division is proposing the introduction of a Building Standards Compliance Plan and a new dutyholder, the compliance plan manager, who will monitor compliance through both the design and construction stages.

This scheme, which is still being scoped by a working group, is likely to be rolled out in 2025/6. Scotland has, since 2017, been introducing improvements to the Scottish building standards and fire regulations.

The situation in Northern Ireland is less clear, as Stormont is at the time

of writing in limbo. NI has its own building regulation and fire safety regimes and it is anticipated that it will follow the Scottish model.

How the Building Safety Act breaks down

The Act has six parts:

1. Introduction.
2. The Building Safety Regulator and its functions.
3. The Building Act 1984.
4. Higher-risk buildings.
5. Other provisions about safety, standards etc.
6. General.

There are also 11 schedules.

Part 1: Introduction This applies to the whole of the UK. But, as this part is an overview of the Act, it applies only in part and "where it touches".

Part 2: The regulator Only Section 2 applies to Scotland and Wales, only in as much as it mentions that the Health and Safety at Work Act, which applies in both jurisdictions, is amended by the BSA. Section 2 does not apply to NI. The remaining sections regarding the regulator apply in England only.

Part 3: The Building Act 1984 This does not apply in Scotland or NI. Some parts apply in Wales, but, for example, provisions relating to dutyholders and general duties, competence, lapse of building control approval, compliance and stop notices, breach of regulations and liability of officers of body corporate do not. This is presumably to be dealt with by the Senedd in due course.

Part 4: Higher-risk buildings This does not apply to Scotland, Wales or NI. ►

Sections relating to construction products and liabilities apply to Scotland and Wales unless relating to the other jurisdictions, but do not apply at all to Northern Ireland

Part 5: Other provisions
Some sections do not apply to Scotland, Wales or NI, except:
- Part 5 Sections 130-135 apply in Wales.
- The New Homes Ombudsman Scheme applies in all four jurisdictions.
- Sections relating to construction products and liabilities apply to Scotland and Wales unless relating to the other jurisdictions, but do not apply at all to NI.
- However, the sections on 'construction products: costs contribution orders' apply everywhere.
- The sections concerning architects also apply throughout the UK.
- The section on housing complaints does not apply in Scotland, Wales or NI.

Part 6: General Most sections apply in the UK, except sections on (English) crown provision, application to parliament and where the section on the power of Welsh ministers applies to Wales only (also not to England).

Of the 11 schedules, three apply to all four jurisdictions and three apply to England and Wales only. The remaining five apply only to England. The schedules amplify what is said in Parts 1-6.

To repeat Dame Judith Hackitt's objective: the new regulatory framework must be simpler and more effective. Answers on a postcard? ●

It might be helpful to visit the APS Building Safety Act Session 8 webinar where graphics aid the understanding of this overcomplex and confusing piece of legislation: www.aps.org.uk/product/building-safety-act-session-8.

Implementation of the new building safety regime at a glance

- **Very few provisions in the BSA apply in Scotland and NI.**
- **A greater number of provisions apply in Wales.**
- **The regulator does not have oversight of the building control sector in Scotland, Wales or NI. This situation may change in respect of Wales.**
- **The Defective Premises Act 1972 (DPA), (ref BSA, Sections 130-134), does not apply in Scotland or NI.**

The DPA applies to those providing a dwelling in England and Wales, whose duty is that they must ensure that they carry this out in a workmanlike and professional manner, with proper materials to ensure that it will be fit for habitation when completed.

The limitation period has been extended significantly from six years from the completion date to 30 or 15 years retrospectively depending on when the claim is made.

The amended DPA is now extended to include refurbishment works and remedial works although this amendment only applies prospectively. The limitation periods in relation to liability relating to construction products increase in all jurisdictions.

- **The New Homes Ombudsman Scheme applies in Scotland, Wales and NI. Part 5 Sections 136-143 cover housing developers of new homes and their owners who wish to make a complaint.**
- **Construction products regulations apply in all UK jurisdictions, with some sections of the Act not applying in NI. Part 5 Section 146 refers to Schedule 11 which introduces new regulations relating to construction products – covering safety, fitness for purpose, enforcement and procedural matters.**
- **Changes to the Health and Safety at Work Act (HASAWA) are specified in Part 2 of the BSA and refer to Schedule 1. This applies in Scotland and Wales, only to the extent that a few words change in Section 11, subsections 5 and 6 of the HASAWA. This part and the schedule do not apply in NI.**
- **Changes to the Architects Act 1997 apply in Scotland, Wales and NI. Part 5 Sections 157-159 of the BSA amends the Architects Act and covers discipline and CPD, procedural aspects and fees due to the Architects Registration Board for its services.**

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Dutyholders face up to new responsibilities

Jon Cooper, partner and head of health and safety, and **Andrew Westbrook**, solicitor, at Womble Bond Dickinson explain the new duties and liabilities of the roles under the Building Safety Act as now in force in England

On 1 October 2023, the new building safety regime that impacts designers working in England came into force. The regulatory changes are the latest to flow from the Building Safety Act 2022 (BSA) and, by extension, the 2017 Grenfell fire, in what is part of the sector's biggest legal shake-up for decades.

Designers are among those who need to be on top of the wide-ranging new secondary legislation, which arrived in draft format in August 2023. The various new regulations came into effect shortly afterwards and included, in particular, the Building (Higher-Risk Buildings Procedures) (England) Regulations 2023 and the Building Regulations etc (Amendment) (England) Regulations 2023.

Failure to comply with the new regulations could lead to significant project delays, civil claims linked to any delay-related losses and, potentially, a prosecution brought by the Health and Safety Executive (HSE) in its new role as Building Safety Regulator (BSR).

Jon Cooper
Womble Bond Dickinson

> **Dutyholder roles apply to all works covered by the Building Regulations 2010 other than non-notifiable work**

The scope of the new regulations is wide, including changes to building control procedures and new provisions for higher-risk buildings (HRB). More regulations and guidance are in due course expected to flesh out the landscape even further.

This article concentrates on one aspect of the new building regulations regime: the new dutyholder roles and responsibilities, including the liabilities that will be created, and how these are applied in England. (How this differs in the devolved nations is covered in the Building Safety Act article on p22-25 by Andrew Leslie.)

The dutyholder framework is fundamental to the new regime. It creates a system within which all parties must be sufficiently competent for the project at hand and a system within which dutyholders must coordinate and collaborate with each other, sharing responsibility for ensuring a project's compliance with the building regulations.

New dutyholders

There are now a number of roles in the construction process that bring new obligations and responsibilities in line with the Building Regulations etc (Amendment) (England) Regulations 2023. The key roles are client, principal designer and principal contractor, with requirements also attached to the roles of designer and contractor.

Because the framework builds on that already in place under the Construction (Design and Management) Regulations 2015 (CDM), it should not contain too many shocks, though the focus is now on building regulations compliance. Indeed, the same person could fulfil the same role under both regimes, if competent to do so.

The dutyholder roles apply to all works covered by the Building Regulations 2010 other than non-notifiable work, not just HRBs. Unsurprisingly, the demands on the role grow when attached to HRBs.

Principal designers, for example, should usually be appointed in writing before the construction phase begins.

When the project involves HRBs, this must be done before an application for building control approval (also known as Gateway 2) is submitted.

Dutyholders can fulfil more than one role if they have the competence and capability to do so. Where a dutyholder is an organisation, a suitably competent individual must be designated to manage the relevant duties.

Competence

Principal designers and designers must be able to evidence their competence. Designers can only accept jobs within their competency and clients can only appoint principal designers with sufficient competency for a particular task (and for HRBs must submit a declaration to that effect).

Being competent, when the dutyholder is an individual, means having the required skills, knowledge, experience and behaviours necessary to complete the design work so that, if built to the designs, the building would meet all relevant requirements.

Andrew Westbrook
Womble Bond Dickinson

“With delays linked to compliance failings, the risk of civil action by stakeholder parties will be high

“Failure to comply with the new regulations could lead to significant project delays, civil claims linked to any delay-related losses and potentially a prosecution brought by the Building Safety Regulator

Where the dutyholder is an organisation, competency means having the “organisational capability” to put in place an individual who meets that criteria. Competency is not defined further and there is no specific test for establishing it. The standard PAS 8671:2022 for principal designers has been published to be of assistance.

Any dutyholder who for any reason ceases to be competent must notify the relevant person (whether client or principal designer) that they can no longer fulfil the role.

When the work relates to HRBs, designers must attest they have not been seriously sanctioned in the last five years. Principal designers may have to make these investigations if appointing designers. Serious sanctions would include: a conviction for a fire safety, building safety or health and safety offence; being issued with a stop notice; or a compliance notice related to structural or fire safety contraventions. It is currently unclear if this includes an HSE Notification of Contravention, but it would be safe to assume it does.

The duties

The core general duty all dutyholders must fulfil is to ensure that the work they (or workers under their control) carry out is sufficiently planned, managed and monitored. This includes cooperating with the other dutyholders and providing information where required to ensure the building meets all relevant requirements.

Designers must not start work until satisfied that the client understands its own duties, for example, with regards to cooperation, the sharing of information and the periodic review of project work so as to identify whether it is HRB work.

Once work is under way, designers must ensure they consider other design work that directly relates to the project and report any compliance concerns to the principal designer.

Principal designers must coordinate all design work and designers to ensure they, in turn, comply with the regulations. Once their appointment has concluded, principal designers must give the client, within 28 days, a document explaining the arrangements it put in place to fulfil their duties.

The liabilities

Potential penalties for breaching duties vary and it remains to be seen how the BSR will use its new enforcement powers. But the reality is that a regulation breach is a criminal offence.

Serious breaches will likely lead to substantial fines, with prison sentences possible where either the dutyholder is an individual or where an organisation dutyholder has committed an offence with the consent, connivance or neglect of a director.

Given the very wide range of powers, it is hoped the BSR will issue an Enforcement Policy Statement to give some insight and transparency into how the regime will be enforced.

The BSR can also issue compliance or stop notices, while a failing could lead to a building control approval application (at Gateway 2) being rejected or a building control completion certificate (at Gateway 3) not being issued.

Any of these actions would likely result in project delay and costs, plus potential reputational damage and negative impacts on evidencing competency for future projects. With delays linked to compliance failings, the risk of civil action by out-of-pocket stakeholder parties will be high.

The clear ambition of this new regime is to improve safety standards by creating a more joined-up process. A key driver is the element of shared responsibility and increased accountability should anything go wrong.

Parties must now work more closely together, viewing the project as a whole, rather than only being concerned with their own narrow field of work. In essence, another party might be primarily to blame for a mistake, but would the mistake have happened with sufficient coordination and cooperation? ●

For more information on building safety, visit the Building Safety Hub at www.womblebonddickinson.com/uk/insights/hubs/building-safety.

‘We have got to get the PD role understood better’

APS member Paul Bussey, senior technical consultant at architect Allford Hall Monaghan Morris, has been at the forefront of designing for safety for many years. He talks to **Denise Chevin** about his career

Paul Bussey is a practising architect with 40 years’ major project experience at RHWL, Scott Brownrigg and AHMM architects, with a specialisation in fire safety and CDM procedures.

Bussey is one of the RIBA’s senior technical experts on fire safety and has provided invaluable insight to the RIBA as it has worked with government and the rest of the construction industry to reform fire safety regulation and industry practice while raising levels of professional competence. He regularly speaks on industry webinars, including those of APS.

Since July 2017, Bussey has been a member of the RIBA Expert Advisory Group on Fire Safety, formed immediately after the Grenfell Tower fire.

He regularly produces vital guidance and learning materials, giving talks and working with government on behalf of the RIBA on several government-commissioned research programmes that have helped determine reforms to building regulations, new legislation in the Building Safety Act and associated guidance in relation to fire safety.

He also chairs the Health and Safety Committee of the Construction Industry Council and the Keeping Pace with Change group, a sub-group of CONIAC (the Construction Industry Advisory Committee) – the pan-industry safety group led by the HSE’s chief inspector for construction.

Bussey combines his now part-time technical consultant role at AHMM with teaching architects at universities across the UK. These include Cambridge, UCL Bartlett, Edinburgh, Cardiff, Manchester and Sheffield.

> **We need to start thinking about the fact that the CDM function and the building safety function can both be within one organisation**
> **Paul Bussey, AHMM**

What drew you to a more technical role?
Before studying architecture at Liverpool I took a year out working for an architectural practice and got an A-level in construction – the only person I have ever known who knew there was such a thing. In a way that has led me to where I currently am, because there was quite a lot about building regulations in my studies.

By the time the CDM regulations came into force in 1994, I decided that I wasn't very good at computer-aided design, but I did love drawing – hand drawing and painting. And that was what really brought me to architecture. However, sitting around with a mouse all day drawing on a computer screen didn't appeal much. So I moved into a more technical role with a major influence on design.

I've now been ploughing this technical furrow for some 25 years as an architect. In a way that has led me to dealing with the CDM and joining APS and realising that was a good source of shared knowledge and shared professionalism. I am currently involved in the newly formed branch for the south and south east.

What regulation-shaping activities are you active in now?
At the RIBA we have been actively campaigning for second staircases in high-rise and we were successful in this when in July government confirmed they will adopt an 18m height threshold for second staircases in all new residential buildings, albeit with a significant transition period.

We did a lot of research into the need for this, because the fire brigade are in the main staircase fighting the fire and therefore making the one staircase unusable for occupants.

I am also completing a piece of work updating the RIBA Plan of Work for Fire Safety. The RIBA Plan of Work is the definitive model for the design and construction process of buildings and is used universally across construction. This overlay will ensure those following it can easily comply with the new building safety regulations and legislation.

In my work as chair of CONIAC's Keeping Pace with Change group, one of the things I'm focusing on is how we can put an end to the misinterpretation of the implementation of CDM regulations so people use them in the correct way.

What do you see as the issue with interpretation of the CDM regulations?
The CDM principal designer (PD) role has morphed into a third-party health and safety adviser, rather than being the designer leading the design.

It is not just about planning, managing and monitoring health and safety. It's about planning, managing, monitoring the whole design process, and then including coordinating health and safety. That is the exact wording in the CDM regs but it has been misleadingly paraphrased in various documents, including legal documents.

It's about design and then protecting people by design. And the design-led aspect of it is fundamental to getting that right. My concern – and this causes contention across the design profession – is that health and safety specialists do not always understand design enough to be telling us how we should be designing buildings.

To do that work takes a lot more time, energy and, consequently, fees. PDs who are just health and safety specialists can charge a lower fee, but they are not necessarily doing the whole job, even though they are perceived to be so doing by some clients. Architects did not want to take on the role either – it was perceived as having too much liability.

How might the Building Safety Act change things?
We have really got to get the PD role understood better. And I think the new Building Safety Act does that because it reinforces the idea that it has to be a designer in control of the design phase.

Architects did not take it on, because there was a perceived huge liability risk – and because it has been interpreted as a health and safety role. But that was never the intention.

The PD does not have to be an expert in health and safety. Nor is it intended to be carried out by an expert in building regs under the new regime. It is about orchestrating the team of people to build safely for the construction phase and safely for occupation. So it is about having all the rest of the attributes, knowing a bit about structural engineering, services, design, landscape design and health and safety and putting the team together.

We need to start thinking about the fact that the CDM function and the building safety function can both be within one organisation. But to change the culture we need people to start becoming more competent.

What do you do outside work?
I love looking after my granddaughter. And I do a lot of gardening. During lockdown I built my own home office. It's been a sanctuary because I can keep all my legislation work out of the house.

I can be in the garden for the whole day thinking about some of these issues going on in my head, while pruning, digging, cutting, whatever it might be.

I'm also very keen on cricket. I spent 15 years coaching cricket at Upminster Cricket Club, having played for many years, including when I had a spell working in Africa. In cricket coaching you learn how to teach a skill in a visually demonstrated way, because you cannot write how you play cricket. So that very much helped me to understand how to train architects.

Do you have any career highlights?
After I did my Part 2 in architecture, I went to Africa to work for three years, in a small practice and for a builder, and that was a highlight of my life. It gave me so much experience and I had a great time playing cricket for Zambia and in the East African Quadrangular tournament in Dar es Salaam, Tanzania, which we won. It was fantastic. ●

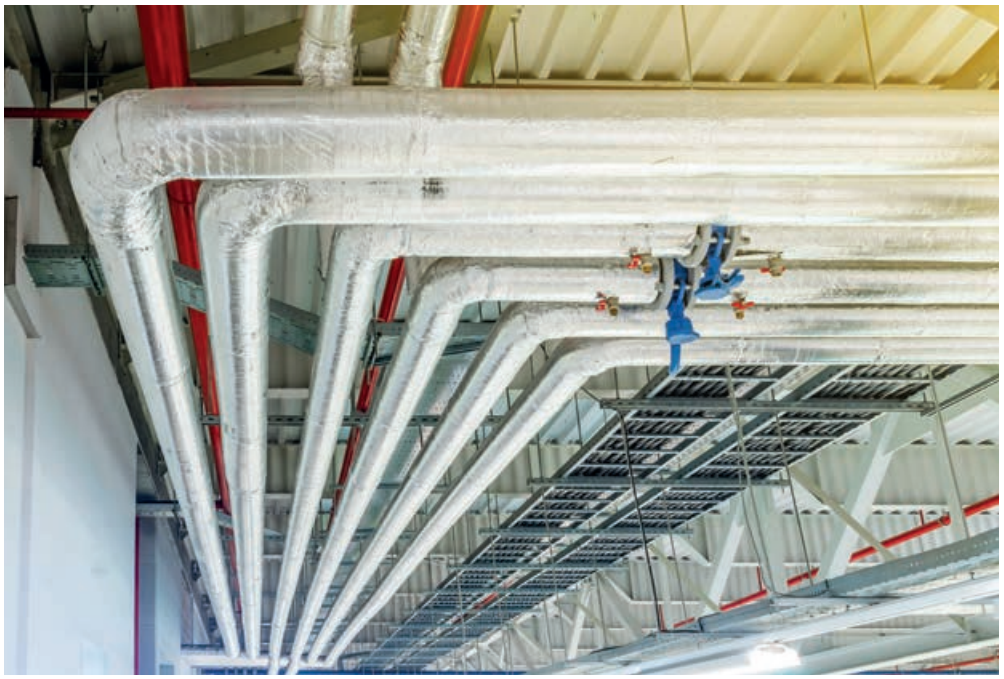
CV: Paul Bussey

- **2015 to present: Senior technical consultant, Allford Hall Monaghan Morris**
- **2005-Oct 2015: Technical associate, Scott Brownrigg**
- **1982-85: Diploma in Architecture and RIBA Part 3, London Metropolitan University**
- **1976-79: BA in Architecture, Liverpool University School of Architecture**

Thermal insulating materials for pipes

This CPD, in association with Rockwool, examines the British Standard that sets out how to establish and specify minimum thermal insulation requirements for pipework and other equipment

Suitable HVAC and building services insulation solutions are used in structures of all shapes and sizes



BS 5422 offers guidance for specifying thermal insulation on piping

BS 5422 provides a method for specifying thermal insulating materials needed on pipes, tanks, vessels, ductwork and equipment for certain defined applications and conditions within the temperature range -40°C to +700°C in domestic, non-domestic and commercial buildings.

As part of this, the standard specifies requirements for the insulating materials. It is meant to work as guidance for designers, specifiers, contractors and manufacturers of thermal insulation in the building services sector, supporting Approved Document L as the reference point to determine the minimum thickness of insulation required to limit heat losses and gains from building services.

The applications covered by BS 5422 include:

- conservation of energy, for both cooled and heated systems;
- slow freezing of contents;
- control of condensation on cold surfaces;
- protection of personnel from exposure to extremes of surface temperature;
- control of process or service temperatures; and
- limiting effects of system on indoor building temperature.

BS 5422:2023 took effect from 30 June 2023, at which point the 2009 version was withdrawn. Regulatory guidance refers to BS 5422 dynamically. As such, BS 5422:2023 will apply to new projects, including those for which planning permission has been achieved. However, where tender documentation had already been issued to potential installers, or a contract awarded, BS 5422:2009 would continue to apply.

2023 update overview

While BS 5422:2023, the first update since 2009, requires the same base level performances as the previous version, it introduces a number of important practical changes and additions:

- Thermal performance data relating to materials that are rare or no longer supplied has been removed, instead focusing on the most commonly used insulation materials at the time of revision.
- Pipe diameters are now referenced as 'less than or equal to', leading to the removal of two tables specific to copper pipes.
- Legacy 'National Class' reaction-to-fire ratings have been replaced by Euroclass ratings in line with current building regulations. According to the British Standards Institution, Euroclass Reaction to Fire gives a more comprehensive and clear definition of the behaviour of materials exposed to fire than the more limited legacy BS 476.

> **BS 5422:2023, the first update since 2009, introduces a number of important practical changes and additions**

The more stringent Energy Technology List/Capital Allowance/NES Y-50 targets have been adopted as an optional 'enhanced performance' set of B-series tables, which for the first time provides guidance to specifiers who would like to exceed the standard performance.

District heating tables for secondary systems have been added as Tables 19C and 20C. Plastic pipes (single wall) are now treated as having no insulative value of their own.

In the case of energy conservation, BS 5422:2023 seeks to strike a balance between economic considerations and CO_2 savings. Applying an enhanced level performance standard to a building project can bring considerable long-term advantages for the building owners and operators, mostly reflected in lower operating costs and lower heat loss. The reduction in energy needed to run the building also has environmental benefits.

Specifiers and designers have to consider a number of factors when planning the insulation for building services systems according to BS 5422:2023.

Thermal performance

- **Thermal conductivity**

Also referred to as a k-value, or lambda (λ), the thermal conductivity of a material is a number that describes how readily it transmits heat. Values are expressed in watts per metre per kelvin (W/mK) and as such are independent of thickness.

Lower thermal conductivity values indicate a better, more efficient thermal performance. The thermal conductivity of insulation increases with temperature, meaning higher service temperatures require thicker insulation to achieve a given thermal resistance. ►

Case study: Minerva Primary Academy, Bristol

Thermal, noise-reducing and non-combustible insulation solutions were specified for a two-storey school extension project

The Minerva Primary Academy in Bristol undertook a two-storey extension project to increase its capacity from 300 to 420 pupils. The £7.5m facility also includes a multi-use hall, additional classrooms and learning spaces, as well as offices and additional staff areas.

Rockwool DuoDuct slab and Ductwrap were specified as thermal, noise reducing and non-combustible insulation solutions for the building's ventilation system in line with the requirements of Building Bulletin 101 (BB101) *Guidelines on Ventilation, Thermal Comfort and Indoor Air Quality in Schools* and Building Bulletin 93 (BB93) *Acoustic Design of Schools*.

The Minerva Primary Academy's ventilation system incorporates an extensive ductwork system featuring both internal circular and external rectangular sections.

To ensure optimum performance for the system, external ductwork sections require effective insulation to protect them from changes in the ambient temperature.

The acoustically absorbent and A1 non-combustible qualities of Rockwool DuoDuct slab and Ductwrap ensured that all the relevant project requirements were achieved.

Thermal conductivity values in the new BS 5422 are based on the most commonly used insulation materials at present. Note that the thermal performance of some insulation materials deteriorates over time. As such, an aged thermal performance is declared, which typically takes the form of a 'time averaged' lambda value over 25 years.

Other materials, such as stone wool, have a thermal performance that does not change with time, according to recent testing at the Danish Technological Institute. This is important for specifiers and installers to keep in mind when deciding which material to use, based on the expected lifespan of the building services or HVAC installation.

● **Thermal bridging**

Pipe support and fixtures are an important part of any building services system but often overlooked when it comes to insulation calculation. Here thermal bridging can become a problem. The standard states that load-bearing insulation should be used between the pipes and any support or fittings to avoid a gap in the insulation caused by compression of the material. Other structural elements – for example, stiffening rings – should be insulated externally to stop thermal bridging.

Traditional pipe supports have often included wooden blocks to prevent the insulation from being damaged and creating a thermal bridge. While successfully supporting the pipes and protecting the insulation, wooden supports can present a fire risk and provide minimal thermal benefit. More recently, pipe supports made from non-combustible material have been introduced, therefore safeguarding that the fire classification of the system will not be reduced.

> **Any material used in the construction and insulation of building services and HVAC systems could have an impact on the potential fire spread and fire load in the building**

● **Service temperature**

BS 5422:2023 covers applications ranging from -40°C to +700°C. It is imperative that the service temperature rating of the chosen insulation product conforms with its intended application. This information should be readily available on the product's Declaration of Performance.

● **Surface emissivity**

Surface emissivity is the ratio of the energy radiated from a material's surface to that of a perfect black body emitter. It is a dimensionless number ranging from 0 (perfect reflector) to 1 (perfect emitter). The emissivity of a surface depends not only on the material but also on the nature of the surface. A clean and polished metal surface will have a lower emissivity, whereas a rough and oxidised metal surface will have a higher emissivity. When aiming to limit heat transfer to a fixed value, or achieve a given surface temperature, emissivity impacts the required thickness of insulation.

Fire performance

Building services and HVAC systems are found on all levels in most buildings. Any material used in the construction and insulation of building services and HVAC systems could have an impact on the potential fire spread and fire load in the building. Therefore, it needs to be carefully considered at the design stage.

● **Reaction to fire**

The reaction to fire of insulation products is classified through BS EN 13501-1 (Euroclass), which considers results from the following tests:

- ignitability;
- rate of flame spread across the surface;
- amount of heat released during combustion;

- rate and level of smoke release; and
- character changes, such as release of flaming droplets.

Products are assigned a rating from A1 (best) to F (worst), with products achieving A1 and A2-s1,d0 typically defined as non-combustible. With the exception of A1, ratings are appended with 's' and 'd' to respectively indicate emitted levels of smoke and flaming droplets.

● Smoke and toxic gases

According to Home Office statistics, 'gas or smoke' was listed as the cause of just over half of all UK fire fatalities between 2019 and 2022. Smoke consists of particles, vapours and toxic gases, all of which can be harmful to human health. In addition, smoke impairs vision, making it more difficult for occupants and rescue services to navigate a building.

Stone wool insulation has a Euroclass reaction-to-fire rating of A1 or A2-s1,d0 – meaning it is non-combustible and as such will not contribute to any significant toxic smoke.

Compartmentation

It must be ensured that the fire resistance of compartment walls and floors is not compromised when penetrated by building services and HVAC systems. Insulation systems on pipework or ductwork traversing a fire-resisting division shall maintain the level of fire resistance of the wall, floor or cavity barrier through which they pass.

With BS 5422:2023 the insulation requirements for building services and HVAC systems have been aligned closely with building regulations. The tables and guidance make it easier to choose the best and safest material for each project. Applied correctly, the updated standard will make building services and HVAC installation safer, more efficient and more sustainable.

Rockwool DuoDuct and Ductwrap

Rockwool DuoDuct is a non-combustible stone wool slab which provides thermal insulation to external ducts carrying warm air, chilled air or dual-purpose duct systems. The insulation is designed for use with rectangular external ducts and is made using Rockwool Dual Density technology. This consists of a heavier density outer and a lower density inner layer.

The high-density outer layer offers greater impact resistance over a single-density stone wool product. This makes it ideal for areas where the duct may be susceptible to damage in confined spaces, high-traffic areas and external spaces (see case study, p24).

Rockwool Ductwrap is a lightweight and flexible thermal insulation roll faced with reinforced aluminium foil used as a solution to insulate internal ductwork. Like DuoDuct, it is acoustically absorbent and A1 non-combustible. ●

Further information about BS 5422 can be found at: knowledge.bsigroup.com.

BS 5422:2023 applies to new projects from 30 June 2023 including those for which planning permission has been achieved

> **"With BS 5422:2023 the insulation requirements for building services and HVAC systems have been aligned closely with building regulations**

CPD Questions

1) What is the temperature range covered in BS 5422?
a) -40°C to +700°C
b) 0°C to +500°C
c) -100°C to +250°C
d) -25°C to +1,000°C

2) Thermal performance data relating to which materials has been removed in the 2023 update?
a) PVC
b) Copper
c) No longer supplied and rare materials
d) Materials sold before 2023

3) BS 5422 applies to which projects?
a) Only non-domestic and commercial buildings
b) Domestic, non-domestic and commercial buildings
c) Only high-rise buildings
d) Only domestic buildings

4) Which Euroclass ratings indicate a non-combustible material?
a) A1 and A2-s1,d0 **b) C and F**
c) D and E **d) B and F**

5) Which building regulation is BS 5422 designed to support?
a) Approved Document B
b) Approved Document E
c) Approved Document H
d) Approved Document L

To test yourself on the questions and collect CPD points, go to: projectsafetyjournal.com

HSE data shows need to tackle the dangers of dust

Each year thousands of construction workers suffer from irreversible lung diseases as a result of working on site

In early summer this year the HSE launched its Dust Kills campaign, aimed at preventing life-threatening diseases caused by dust at work.

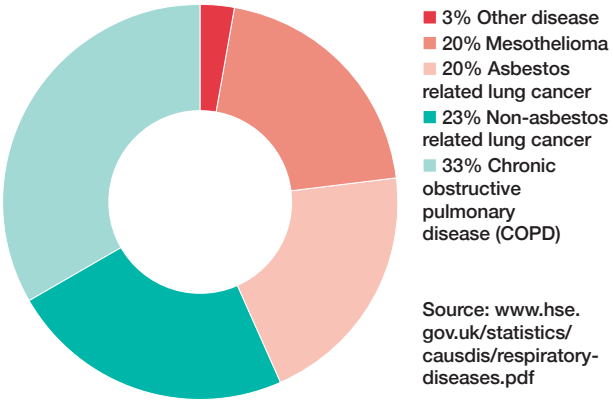
At the heart of the campaign was a series of visits by HSE inspectors to construction sites across Great Britain, aimed at raising awareness of the respiratory risks of exposure to dust and highlighting the control measures required to prevent such exposure.

Over the past months, inspectors have been checking the control measures in place to protect workers from inhaling construction dusts including silica – respirable crystalline silica (RCS) – and wood dust. They have also been checking if asbestos-containing materials have been identified and removed or managed where necessary to prevent or reduce exposure.

Each year in the construction industry there are thousands of preventable cases of irreversible lung disease due to past exposure to dust at work. These diseases often have a life-changing impact and can result in an early death.

Even simple tasks, such as sweeping up indoors without providing suitable face-fit tested respiratory protective equipment (RPE) or damping down to control the dust generated, can cause serious harm to workers.

Occupational lung disease contributing to estimated current annual deaths



Source: www.hse.gov.uk/statistics/causdis/respiratory-diseases.pdf

Occupational asthma, for example, is an allergic reaction some people experience when they are exposed to substances in the workplace such as wood dust. And silicosis, which is an irreversible lung disease that can take years to develop, can enter the bodies of workers who come into contact with high levels of silica dust during certain tasks. These include using high-speed cutting tools for cutting, blasting, drilling and grinding.

Woodworking sectors have been a particular HSE target. Workers in these areas are at potentially higher risk than those in other sectors as they are often exposed to inadequately controlled wood dust in the workplace. This can lead to serious illnesses such as sino-nasal cancer, occupational asthma and dermatitis.

In 2022/23, HSE carried out more than 1,000 woodworking inspections and found 78% of businesses were faling to protect workers from respiratory sensitisers (primarily dust from hardwoods, softwoods and composite materials such as MDF).

This resulted in 402 enforcement actions taken by HSE, highlighting particular areas of concern around provision and use of suitable respiratory protective equipment (RPE) and local exhaust ventilation (LEV), as well as the administration of health surveillance.

Deaths from lung diseases

HSE's head of manufacturing, David Butter, says: "Around 12,000 workers died last year from lung diseases linked to past exposure from work and there are an estimated 19,000 new cases of breathing and lung problems each year, where individuals regarded their condition as being caused or made worse by work.

"Wood dust can cause serious health problems. It can cause asthma, which carpenters and joiners are four times more likely to get compared with other UK workers, as well as sino-nasal cancer."

HSE chief inspector of construction Michael Thomas, added: "Every year we see construction workers die from diseases caused or made worse by their work. This is unacceptable in the 21st century, when occupational lung disease is preventable."

Over 500 construction workers are believed to die from exposure to silica dust alone every year. The amounts needed to cause this damage are tiny. The largest amount of silica someone should be breathing in a day after using the right controls can be seen from the comparison at the top of p27. ●

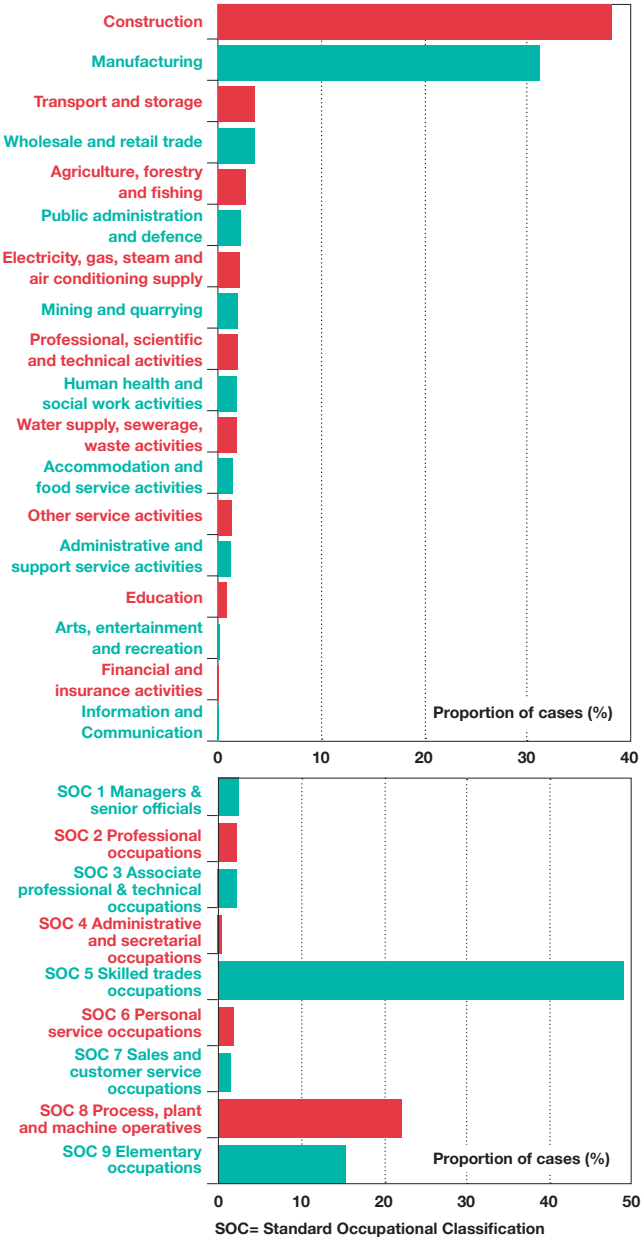
www.hse.gov.uk/pubns/cis36.pdf

The maximum daily silica exposure is tiny when compared to a penny

Source: www.hse.gov.uk/pubns/cis36.pdf

Respiratory lung diseases by sector

The HSE's construction statistics for 2022 reference the Health and Occupation Research (THOR) network, based at Manchester University, which monitors the incidence of work-related ill health in the UK and Ireland. THOR is the only UK-wide surveillance system collecting medically diagnosed case reports of work-related ill health, with more than 100,000 reports collected since 1989. Among other data, it compares the incidence of respiratory lung diseases across different sectors. Graphs are taken from the THOR network report https://documents.manchester.ac.uk/display.aspx?DocID=53182.



SOC= Standard Occupational Classification

In the dock

Recent prosecutions for health and safety breaches

Tarmac Aggregates fined £1.3m after man crushed to death in quarry

Luke Branston, from Leicester, died in June 2017 after becoming trapped between a conveyor and a feed hopper.

The labourer, working on behalf of Branston Site Services, was part of a nightshift maintenance team repairing a feed hopper at the Loughborough quarry operated by Tarmac Aggregates.

An HSE investigation found Tarmac Aggregates had failed to ensure the feed hopper was properly isolated before the repair work commenced.

Tarmac Aggregates, of Trinity Park, Birmingham, pleaded guilty to breaching Section 2(1) and Section 3(1) of the Health and Safety at Work etc Act 1974.

The company was fined £1,275,000 and was ordered to pay £200,000 in costs at Leicester Crown Court on 27 September 2023.

Two contractors fined £46,000 after labourer fractures skull in fall

In March 2021 a labourer working for Total Brickwork (UK) at a housing site run by Challenger Building Services on Okell Street, Runcorn, fell through the first floor of one of the properties. The man (unnamed in court reporting) badly injured himself.

The HSE found the principal contractor, Challenger Building Services and Total Brickwork (UK) had failed to plan, manage and monitor work at the site to ensure it could be carried out safely.

Challenger Building Services of Bolton pleaded guilty to breaching Regulation 13(1) of the Construction (Design & Management) Regulation 2015. It was fined £30,000 and ordered to pay £1,991.32 in costs.

Total Brickwork UK of Runcorn pleaded guilty to breaching Regulation 15(2) of the Construction (Design & Management) Regulation 2015. It was fined £16,000 and ordered to pay £1,991.32 in costs.

£120,000 fines after groundworker hit by falling pipes

Anthony Pennell, an employee of R O Donnell Plant & Civil, was working at a site in Fradley Park, Lichfield, in September 2019 when a load of pipes, each weighing around 160kg, fell off the forks of a telehandler onto him.

He sustained severe injuries and has been unable to resume his job as a groundworker.

An HSE investigation found that both Pennell's employer and the principal contractor, Readie Construction, failed to ensure that the operation was properly planned, appropriately supervised and carried out in a safe manner.

R O Donnell Plant & Civil, of Brigg, Lincolnshire, pleaded guilty to breaching 8(1) of the Lifting Operations and Lifting Equipment Regulations 1998 and was fined £80,000. It was also ordered to pay costs of £3,784.

Readie Construction, of Romford, Essex, pleaded guilty to breaching 8(1) of the Lifting Operations and Lifting Equipment Regulations 1998 and was fined £40,000 and ordered to pay costs of £3,784.

Norfolk firm fined for failing to control exposure to wood dust

The HSE inspected The Joinery Yard at Sweet Briar Road industrial estate, Norwich, in November 2019 and identified failings in the company's control measures to prevent exposure of its employees to wood dust.

Enforcement action was taken as a result. But a further inspection in July 2022 found the company had failed to maintain standards and enforcement action was taken again.

The Joinery Yard pleaded guilty to breaching the Health and Safety at Work Act 1974, Section 2(1) at a hearing at Norwich Magistrates Court on 4 October 2023. It was fined £25,000 and ordered to pay costs of £2,681.77.

Regional focus: Northern Ireland

In the second of **Project Safety Journal's** new regional spotlights, we catch up with John Murray and Paul Cheyne, the two APS regional representatives for Northern Ireland

Uncertainty might be the one word to sum up the state of play for APS members in Northern Ireland (NI). There are question marks over the economy, the legislative programme – as Stormont continues to be suspended – and what might be in store regarding changes to regulations around building safety.

On a positive note, in the first half of 2023 the construction economy cantered along nicely, leading to an overall output for 2023 up 5.8% on the previous year. The top 10 projects in the pipeline in the province total around £5bn, including, according to Barbour ABI, the £1bn Children's Hospital development in Belfast and road projects worth £800m.

In February a revision to the Northern Ireland Protocol, known as the Windsor Framework, was agreed, easing the long-running Brexit saga.

But the clouds have been gathering for the NI economy, with the construction sector recording a sharp decline in September as new orders fell for the fourth month in a row.

APS regional representatives Paul Cheyne and John Murray point to this uncertain landscape – with, in Cheyne's case, workloads being very up and down. Inflation is having an impact too. "We were appointed by one council to work on four new community centres in different towns. But they came back to us and said, with the same pot of money we're now only able to deliver two," he says.

> **"New legislation in Northern Ireland always runs slightly behind what is happening in the UK. The implications of the Building Safety Act have started to come more onto our radar**
> **John Murray, NMRG representative**

The rate of construction cost inflation in Belfast outstripped other major UK cities to hit 11% last year, according to a report in June 2023 from global professional services firm Turner & Townsend.

Cheyne is a director of Hasco Europe, based just outside Belfast, which specialises in principal designer and CDM services.

Murray is an associate H&S practitioner in McAdam, a multi-disciplinary consultancy in Belfast, and has done various CDM/H&S professional roles for over 24 years.

When the APS went through its governance restructure, Cheyne and Murray were elected as the two representatives to the National Members Representative Group (NMRG), which discusses issues around the regions and reports upwards through a dedicated seat on the APS Board.

"New legislation in Northern Ireland always runs slightly behind what is happening in the UK. The implications of the Building Safety Act have started to come more onto our radar and the Central Procurement Delivery Unit, which is responsible for public procurement policy in Northern Ireland, recently held a seminar and other professional organisations are doing the same," explains Murray.

There are other obvious differences – building control is carried out by local authorities in NI, rather than a mixture of local authorities and approved inspectors as in Great Britain. There is not such a prevalence of high-rise buildings either.

Fortunately, the issue with RAAC has not hit the headlines as it has in Great Britain. Murray says: "At this stage, it is about keeping an eye on it until we know what changes and the impact they will have."

John Murray
NMRG

Paul Cheyne
NMRG

He adds: "The material does not appear to have been so widely used – though schools and other public bodies are investigating whether it is present in their buildings. We shall not have a full picture of the problem until surveys are completed and results made public."

Murray and Cheyne have both been APS members for nearly 20 years and were committee members of the NI region. They are keen to see a revival of the networking and informal knowledge exchange they enjoyed under the former regime.

They are asking that at least five APS NI members come together and submit a request to a NMRG representative to set up a new NI branch, to create or support local events and to meet and discuss issues around legislative and technical challenges affecting NI.

The NMRG representatives support development of a new branch and are keen to hear from local members. ● **Members who are interested should contact Paul Cheyne at paul@hasco-europe.com or John Murray at jmurray@mcadamdesign.co.uk.**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There's plenty more in '24

APS is looking to surpass 2023 with more and better exclusive association events next year

This year was a very busy one for APS members. In 2023 you booked almost 8,000 times for the association's programme of inclusive events – a testament to how much you get for your money with APS.

Most of what we produce is part of what you get as a member – and it's open, for a small charge, to non-members too. All the more reason to think about joining!

There is only something extra to pay for our two special conferences. Both were online this year but that's something that is changing next year. Look out for more details soon.

The Spring Conference, Progress and Prevention, delved into what happens when things go wrong in the construction industry. It provided insights into preventing future accidents and featured expert voices addressing injury prevention.

The autumn Annual Conference, Challenges and Opportunities, explored the myriad challenges faced in the built environment. We had sessions directly addressing your concerns, ranging from recruitment and mental health to competence, navigating legislation and regulations.

There will be more In 2024, tackling these issues head-on, so you can make the most of the opportunities out there.

Our two seasons of webinars covered a diverse range of topics. The Essential Knowledge series featured subjects like working from height, demolition, mould and condensation and design risk management. In the autumn season, attention turned to Safely Does It, addressing topics such as zoonosis, slips and trips, radon risks and employee retention. There's lots more and it's all yours on **www.aps.org.uk**.

APS also tried something new this year and piloted two dedicated week-long events. The first considered the challenges of tackling the energy crisis and highlighted sustainability in the construction industry. The second centred on helping you grow your business skills. A focus on professional development, emphasising the need to evolve constantly and improve in our ever-changing industry, was aimed at helping people get more out of their careers.

And APS was there to help you maintain your technical skills too. CPD focused on crucial topics like demolition and noise and vibration in construction, ensuring members stay up to date with industry knowledge.

Our unique Building Safety Act updates and seminars proved extremely popular throughout the year, keeping members – and our partners at CIAT – ahead of the curve with updates as the regulations started taking shape.

APS is coming to you in 2024

Looking ahead, APS is excited about what the new year holds. You will still receive your CPD and webinars online. But the exciting news is that face-to-face events are making a return – and they will be closer to you than ever before, with sessions around the country.

APS is coming to you. The association is thrilled to announce a rolling conference programme reaching out across the year to members in all six APS regions. These events will let you get together as well as offering an excellent opportunity to share insights and collaborate one-to-one.

We're keeping the details under wraps for now but stay tuned. Keep an eye on the APS website and follow us on our social media channels to be the first to sign up to hear where we'll be, what we'll be doing and to get ahead of an exciting year filled with knowledge-sharing, networking and opportunities designed just for you. ●

Visit www.aps.org.uk.

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Synergie Training specialises in the **APS Accredited Principal Designer** course which we provide as both onsite closed company courses and as public courses throughout the UK. We have successfully accredited over 2,000 individual Principal Designers with a 95% pass rate. We now also provide the **APS CDM Awareness, APS Accredited CDM Client** and **APS Accredited CDM Principal Contractor** courses along with Customsied CDM Training.

VIRTUAL TRAINING

We are currently still running the majority of our CDM courses virtually via live trainers. These courses have been a great success having trained over 1000 delegates on our virtual APS CDM PD course.

Upcoming Dates include:

7 Dec	***VIRTUAL* – APS Accredited – CDM Client**	Online - Remote	£295
15 Jan - 16 Jan	***VIRTUAL* – APS Accredited – The role of the Principal Designer under CDM 2015 (2 Day)**	Online - Remote	£595
22 Jan	***VIRTUAL* – CDM 2015 Overview**	Online - Remote	£225
23 Jan - 24 Jan	***VIRTUAL* – APS Accredited – The role of the Principal Designer under CDM 2015 (2 Day)**	Online - Remote	£595
23 Jan	***VIRTUAL* – APS Accredited – CDM 2015 for Principal Contractors**	Online - Remote	£250
29 Jan - 30 Jan	**APS Accredited – The role of the Principal Designer under CDM 2015 (2 Day)**	London	£595
5 Feb	***VIRTUAL* – APS Accredited – CDM Awareness**	Online - Remote	£250
6 Feb	***VIRTUAL* – APS Accredited – CDM 2015 for Principal Contractors**	Online - Remote	£250
12 Feb - 13 Feb	***VIRTUAL* – APS Accredited – The role of the Principal Designer under CDM 2015 (2 Day)**	Online - Remote	£595
19 Feb	***VIRTUAL* – APS Accredited – CDM Client**	Online - Remote	£295
26 Feb - 27 Feb	**APS Accredited – The role of the Principal Designer under CDM 2015 (2 Day)**	Manchester	£595
28 Feb - 29 Feb	***VIRTUAL* – APS Accredited – The role of the Principal Designer under CDM 2015 (2 Day)**	Online - Remote	£595
4 Mar - 5 Mar	**APS Accredited – The role of the Principal Designer under CDM 2015 (2 Day)**	Glasgow	£595

Please quote APS-NOV for a 10% discount on any of the above public courses.
Please visit: www.synergietraining.co.uk/course-schedule to view additional public course dates.

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