

The role of AE in both water and fire safety

Speaking following the day's first presentation, by IHEEM President, Paul Fenton, at an IHEEM online event in June focusing on the important role that Authorising Engineers play in the smooth and safe running of hospitals (see also pages 17-20, and 22-23), IHEEM AE (Water), and renowned water safety system expert, David Harper, discussed some of his experience 'at the sharp end' – including as an expert witness – which he said underlined the value of being an independent IHEEM-registered AE. His webinar address was followed by a look, by the Chair of IHEEM's Fire Safety Technical Platform, and Fire Safety Lead at NHSE/I, Mazin Daoud, at the Institute's recent work to create a register for fire risk assessors.

The presentation by David Harper, who has a reputation as one of the world's leading experts – engineering-wise – on water safety, and transmission of *Legionella* in particular, formed part of the opening session of the IHEEM webinar on 9 June entitled 'The importance of the role of an IHEEM Authorising Engineer'. David Harper spoke immediately following IHEEM's President, Paul Fenton, who, in the opening address, had described a comprehensive review by IHEEM initiated in 2019 of the Terms of Reference for its Technical Platforms, and its AE Boards of Registration. He began: "My contribution over the next 15 or so minutes will be to discuss some of my experience at what I might describe as 'the pointed end' of healthcare water safety. I started out as a hospital engineer, with a grand title in those days of Chief Superintendent Engineer, at a hospital in Middlesex back in 1967. Then, with various subsequent names of senior engineer, hospital engineer, and Estates manager, I landed up at Kingston District General Hospital in Surrey just outside London. The experience we had then was unbelievable, because in July 1979 the first ever UK outbreak of Legionnaires' disease in a hospital occurred – at Kingston District General Hospital. In those early days, I'd never even heard of Legionnaires' disease, but I soon got to grips with it, I can assure you."

Cooling tower source

He continued: "The medical profession knew very little, and from an engineering standpoint, we knew zero. In the first instance it was to do with a cooling tower, and we discovered that the water treatment in it left a lot to be desired. I was asked to get it up and running more professionally, and introduced things like proportional dosing pumps, and bleed valves. We then had another outbreak of Legionnaires' in the hospital in Christmas



(Clockwise from top left): Mazin Daoud, Pete Sellars, David Harper, and Paul Fenton, were among the participants in the IHEEM AE webinar on 9 June.

1979 where three people died, traced back to the hot water system in the main surgical block, now known as Esher Block."

David Harper explained that 'in those early days', hospital engineers used to run the water at about 45°C, to prevent patients being scalded. He said: "We didn't know, but we soon found out, that that was the temperature range that the *Legionella* absolutely love, while the 20°C to 50°C optimal temperature, and 37°C and 60°C range, and all those temperature ranges which are now accepted worldwide, came out of our experiences at Kingston Hospital, as did the pasteurisation temperature – at 70°C. Also, because we were circulating the hot water at 60°C, we were scalding the patients, so I was asked to get the water temperature back down again at the tap outlets." In response, he came up with what is now known as the TMV, or

thermostatic mixing valve. He also, as he put it, 'got going' an anti-stratification pump, which he dubbed 'the shunt pump', pumping the hot water from the top of the hot water calorifier down to the base because they were vertical ones. He said: "Also out of this experience came the 50 mg/L, or 50 parts per million, measure of sodium hypochlorite, for disinfection."

Seconded to PHE

In 1981, he was seconded to what is now Public Health England, where he became an authorised engineer for public health. He also worked alongside the Health and Safety Executive, and by then had the job title of Authorising Engineer. He said: "I was a member of the original Institute of Hospital Engineers, many, many years ago – which of course is now IHEEM. From the Authorised Person standpoint," he continued, "one must remember that

this person must be totally and utterly independent. Many of the AEs out there – and I am talking from my own point of view – are not registered with IHEEM; to coin a phrase: ‘You could be a truck driver on the Friday, and an Authorised Engineer for Water on the Monday morning when you join a particular company’. That is totally wrong; you must have the experience, and the knowledge; there is no substitute.”

No substitute for knowledge

David Harper said this ‘knowledge’ also included elements such as familiarity with the relevant HTMs, ‘and what they represent, and they talk about’, as well as ‘the design side of it’, the hierarchy in a hospital, and who is responsible to who, and who the duty-holder and Authorised Person in the hospital are. Equally, he said, one needed to know the Responsible Person, the Nominated Person, and the Competent Person, and who – ‘down at the bottom’, is the test person or tradesperson. He said: “You not only need to know the HTMs, but also the Health & Safety at Work etc. Act – Section 2, ‘Duty of care’, Section 3, 4, 5 and 6, 15 and 16, which makes the L8 law, and, of course, the Corporate Manslaughter and Corporate Homicide Act 2007, as well as the Approved Code of Practice, L8, which was derived from the paper written by me and published by the Institute, way back, all about the implications of the problems at Kingston District General Hospital Hospital. So, you have to know about the proof of the practices.”

While the L8 ACoP was ‘not law’, per se, David Harper said it ‘was law’ under the Health and Safety Work Act 1974; ‘under Section 15 and 16 you have to comply with equal to, or better, than a code of practice, and you’ve got to prove it.’ There were also the COSHH (Control of Substances Hazardous to Health) Regulations to consider. He said: “Section 6 of these regulations states that any microorganism that creates a hazard to health must have a risk assessment carried out on that risk, which must be undertaken by a competent person fit for purpose to do that job.”

Water Safety Group

He added: “And, of course, from that come all sorts of considerations when you’re involved in a Water Safety Meeting in a hospital – such as the hospital’s water policy, the Water Safety Plan, and who’s responsible for what, where, why, and everything else that goes with it. While the AE is completely independent, from my experience as an Authorising Engineer from an insurance standpoint, they must have public and personal insurance indemnity, normally for up to £1.5 m - £2 m each.” He recounted a recent situation where an AE went into a hospital and maintained that as soon as he did so, the



David Harper, who has a reputation as one of the world’s leading experts – engineering-wise – on water safety, and transmission of *Legionella* in particular.

hospital (automatically, by inference) insured him for his public personal and public indemnity, an assumption that he said was ‘absolutely 100 per cent wrong’. He said: ‘You have to have your own insurance, and – talking with IHEEM’s CEO, Pete Sellars, when the next reviews of the AEs come up, which is every three years, their insurance will come into it. IHEEM does not insure anybody on its register; they must have their own personal insurance. Also,” he continued, “a lot of people call themselves AEs, and unfortunately are not on the register, and some of them that I’ve come across – certainly from the water point of view – leave a lot to be desired.”

New identity badge

To that end, he explained that IHEEM had decided to produce an identity badge, to be worn on a lanyard around the AE’s neck, incorporating the bearer’s photograph, IHEEM membership number, and the expiry date of the three-year insurance term. He said: “On the reverse you can have the IHEEM logo, and and all that type of information.”

In summary, David Harper stressed that the right insurance was most important, while independence was critical. He said: “I’ve known a situation where there’s was an AE for water, who worked for a particular company, and thus could hardly be called ‘independent’; rather he was a ‘servant’ of that company, as the court calls it. The problem there was – in the eyes of the law – that if the hospital suddenly faced a particular issue for which it needed equipment, and this AE recommended a particular system or brand and it might cost £40,000, but he told the Estates Manager that, ‘by the

way’, he could supply it, the AE then simply became ‘a glorified salesperson’.”

Court case’s lessons

Before concluding, David Harper said he wished to briefly discuss a court case he had been involved in. He said: “It concerned a hospital in Great Britain, and a company, which the hospital employed, with an AE, who provided some very incorrect information. Unfortunately, there was some fatalities in the hospital.” He continued: “The case ended up before a Crown Court judge and jury, and as an expert witness, I was asked to attend. I was put in the dock, and faced questions on some of the water safety aspects, and the AE who had caused the problems was also in the dock. I was asked by the barristers to question him on some technicalities to do with water.

“Unfortunately, he didn’t come out of it too well. The hospital was also at fault, because it had not taken steps to ensure that this company, and its AE, were – as the court called it – ‘fit for purpose’. The court found that the hospital had employed this company ‘willy nilly’; basically, the hospital team didn’t go through any insurances, or show any checks that the contractors employed were competent, etc, etc. So, when the jury returned, this company was heavily fined, and the hospital was also found to be at fault. If these people had been on the IHEEM register,” David Harper said in concluding, “there would have been no problem, because to be on the register, whatever discipline, you have to go through a peer review.”

With this he handed back to session chair, Pete Sellars, who thanked him for ‘a helpful and interesting insight into the perils of getting it wrong’.



A former London Fire Brigade firefighter, Mazin Daoud is Chair of IHEEM’s Fire Safety Technical Platform, and was recently appointed Fire Safety Lead at NHSE/I.

NHSE/I Fire Safety Lead

The third and final speaker in this session was Mazin Daoud, the Chair of IHEEM's Fire Safety Technical Platform, and Fire Safety Lead at NHSE/I. He began: "That was really interesting, David. Last year, I was an expert witness in a court case, and some of the comments the judge made were very interesting indeed. One of them which I certainly took to heart was about a fire risk assessment that someone had undertaken, which had been criticised by an expert witness. One of the comments that the judge made was that the fire risk assessor could only work on the information that was provided to him, and that if that was lacking, then really that wasn't his fault, but that of the other party involved."

"As some of you will know," he continued, "I am IHEEM's Fire Safety Technical Platform Chair, and have recently joined NHS England and NHS Improvement as their Fire Officer. I'm going to talk a little bit about the Terms of Reference, look at a couple of them, the HTM, and how IHEEM can help Authorising Engineers in their job. So, first of all, let's look at these new Terms of Reference. The first one is to create a specific IHEEM policy, to advise on relevant developments in the specialist discipline, and to comment on and influence areas of policy and operational practice for the various technical aspects in that field. So, there's quite a bit in there."

Liaison with other bodies

Another aspect of the Terms of Reference, Mazin Daoud explained, was 'to liaise with other relevant national bodies, and international professional bodies and organisations (with some examples given), for the purpose of sharing information, formulation of policy, advice, or guidance on specialist discipline-specific matters'. He said: "So really it's about the Technical Platforms here liaising with other groups, other national and international professionals, for the mutual benefit of them in so far as formulating policy advice or guidance go."

He continued: "Just before the Grenfell Tower fire I was sitting at home, thinking it was a quiet, and that I was not really doing that much in terms of fire safety, and then, all of a sudden, there was a fire on the television. My son's a firefighter, and at the time was based at the fire station only three miles from Grenfell, and attended on the first make-up, i.e., as soon as the first number of fire engines were increased. I thus gained first-hand knowledge from him of how things went. Grenfell was a game-changer. From that time onwards I became very busy and sought-after, as did fire safety specialists generally."

"We now," he added, "have two items of legislation currently going through Parliament as a direct result of Grenfell."



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One of the outcomes of the Grenfell Inquiry, he explained, had been the Competence Steering Group - its function being 'to tackle competence shortcomings' identified in the post-Grenfell Hackitt Review. The Group comprises more than 150 institutions and associations working across the construction industry, built environment, fire safety, and owner-manager sectors.

Interim and final report on Grenfell Tower fire

"Having looked at competence," Mazin Daoud continued, "they came up with an interim report called *Raising the bar*, and then the final report, *Setting the bar*, was published last October. It outlines a new competence regime for building a safer future. One of the things they looked at was the fire risk assessor - in other words, the AP, the Authorised Person for fire. So, what did the report say? The objectives aligned to this aim were: 'to work to raise the fire risk assessor to acceptable competent standards', and 'to develop criteria that better define the level of competence needed for high-risk buildings and more complex fire regulations'." Mazin Daoud said that 'you can't really get much higher risk buildings than a hospital'. He expanded: "Who will we get to do our fire risk assessment? Is it someone on one of the other registers that deal with all sorts of buildings? Well, there are not many buildings where you can't move people inside without the risk of them dying; nor are there many buildings with a helicopter landing pad on the roof. So, these are very specialist circumstances; hospitals and other healthcare facilities are really higher risk buildings, with more complex fire risks than perhaps any other type of building that I can think of, and certainly have more risks than there are in high-rise residential buildings."

Offering reassurance

Other key objectives to come out of report included:

- 'To clarify how reassurance may be offered to those, including the public, using fire risk assessors involving organisations';
- 'To address weaknesses in current practices', and
- 'To indicate how improvement could be achieved with a statutory requirement'.

Mazin Daoud told the audience: "So at the moment, we have people doing fire risk assessments in hospitals, most of whom have no accreditation to do so. There are organisations which you can be accredited under, including UKAS, but they aren't specific to healthcare, while only about 15 per cent of the fire risk assessors doing this work are on any those registers."

Next focusing on what the HTM says about competence, Mazin Daoud noted that David Harper had gone into considerable detail about competence, and how in fact it was the court made the decision as to whether or not somebody was competent. "In the HTM, however," he said, "and in the legislation as well, the 'competent person' here is 'a person recognised as having sufficient technical training, and actual experience or technical knowledge and other qualities, both to understand fully the dangers involved, and to undertake properly the statutory and Firecode provisions referred to in this Health Technical Memorandum'." This definition was, he said, 'straight out of the HTM 05 series'.

Accredited fire risk assessors

The recommendation in *Setting the bar*, Mazin Daoud added, was that 'Accredited third-party certification requires risk assessors, and organisations should be

introduced with registers of persons assessed by organisations accredited by others validated by being part of a Professional Engineering Institution (PEI) licensed by the Engineering Council'. So," he said, "this is what *Setting the bar* and the HTM have said, but are our people out there undertaking fire risk assessments actually meeting either of these criteria?"

Maz Daoud said that the recommendation was 'A statutory requirement to use only fire risk assessors meeting the standards defined in WG4 criteria to conduct assessments of higher-risk buildings and those of complex fire risk'. He said: "That's only a recommendation at the moment; it's not a statutory requirement yet, but is likely to become one soon."

"So," he continued, "looking back at the IHEEM Technical Platform Terms of Reference, IHEEM is in the process of working with NAHFO - the National Association of Healthcare Fire Officers - to develop a process where people can be registered as competent fire risk assessors." This, he said, would be based upon the joint expertise of the two organisations. He elaborated: "So, NAHFO has a wealth of knowledge and experience in fire safety and healthcare, and IHEEM has expertise in Authorising Engineer appointments, and has Engineering Council backing and available resources. It thus makes complete sense that these two groups should work together to produce some sort of register, and that's exactly what we are in the process of doing. This accords with the original idea of IHEEM working with other groups, nationally and internationally."

Helping Authorising Engineers

Answering his own question: 'How is this going to help the Authorising Engineer?', Mazin Daoud put another one: 'So, what is the role of the Authorising Engineer?' He said: "Well, it's defined in the HTM: 'The Authorising Engineer (Fire) will act as an independent professional advisor to the healthcare organisation.' But what is the first thing this individual has to do?; it is to act as assessor for the appointment of the Authorised Person (Fire)."

The Authorised Person (Fire) (also known as the Fire Safety Advisor) meanwhile, states the HTM, 'will be accountable to the Fire Safety Manager for matters of fire safety'. The guidance continues: 'They provide competent fire safety advice, and will be responsible for undertaking recording and reporting fire risk assessments.' Mazin Daoud said: "So the AE (Fire) has to appoint this person, and the first thing on the list for the AP is to complete fire risk assessments."

Expanding on this, he asked: "So - bearing in mind that this individual might not be on a specific premises for a particularly long time - how does the AE know who to appoint? Do they just go to

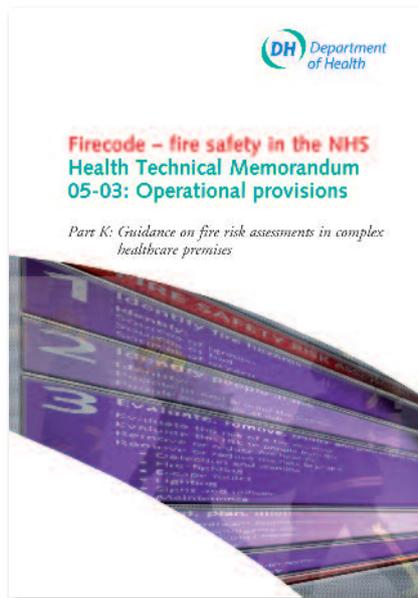


The *Setting the Bar* report.

one of the accredited registers at the moment and say, 'Yes, you can have one of those people'? Or is it some magical process where they talk to a group of people and decide?"

Establishing a registration process

He continued: "So, because there isn't a particular system, we're in the process of setting up a registration process for fire risk assessors, based on three things: the Fire Risk Assessment Competency Council recommendations, *Setting the bar*, and PAS 79. About 10 years ago, the Fire Risk Assessment Competency Council was set up to look at the competencies that anyone completing risk assessments should have. The *Setting the bar* report brought in another list of requirements as



The Department of Health's Health Technical Memorandum, HTM 05-03 Part K, focuses on completing fire risk assessments in 'complex healthcare premises'.

well, and PAS 79 - the British Standards Institute publicly available specification on completing fire risk assessments - incorporates its own list of competencies that people completing this work should have. We thus have three lots of competencies from three different groups, and we are going through all three, picking out all of the relevant parts, and making sure we cover everything. There is an HTM 05-03 Part K on completing fire risk assessments, but there is very little on competency in it currently, and that will need revision as well at some point."

Peer review process

Looking at how the work he had alluded to would be undertaken, Mazin Daoud said: "In the IHEEM AE accreditation they are selected via a peer review process, so we are going to go for that as the most obvious, and perhaps the best way, of doing this. However, our approach will be more formalised, in that we will have specific questions that are asked, and specific answers that we want to get back. It's only going to be for higher-risk healthcare premises where there are at least dependent or very highly dependent patients. Where there are independent people, then we don't think that you need to have this level of knowledge or expertise, and we will consider the specific premises hazards, such as oxygen, medical gas pipeline systems and cylinders, compartmentation and ventilation, with the emphasis and focus on management and training as the most critical aspects of fire safety within perhaps any environment, but certainly within hospitals."

Mazin Daoud said there had been 'instances (that he knew of) of a really fairly new hospital, really well provided for in terms of fire safety, where things would have gone seriously wrong because the staff haven't acted in the appropriate way', and 'other circumstances where perhaps we've had to deviate from the very high standards that are laid down in the HTM for very good reasons'. He said: "But the standard of competence of staff is such that the risk to patients is actually perhaps even reduced, due to their high levels of training and knowledge."

He concluded: "So that's it in a nutshell. IHEEM is helping AEs by setting up a register of competent persons that are competent to do fire risk assessments, so when the AE (Fire) says: 'I'm going to select someone to fulfil this role', they simply have to say: 'We want that person to be on the IHEEM register.' Now, we're still in the process of setting it up, but we're hoping to run the trial this month, and it should be up and running very soon, and we're anticipating quite a good take-up on this." This was the end of both Mazin Daoud's presentation, and of the speaker part of the session, which was followed by a lively 'Q&A' session.