

Forensics in focus



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Introduction - Professor James Lygate

IFIC
FORENSICS

Welcome to the last edition of Forensics in Focus for 2014. I would like to take the opportunity to say thank you for your support over the past year. I hope you continue to enjoy this newsletter and we are pleased to introduce a new regular feature to provide you helpful hints and tips in relation to different scene investigation scenarios to help mitigate unnecessary losses – See page 6 for the first instalment.

As an investigator we are often taken overseas for work, but my latest trip to the states was not for a case; rather I was lucky enough to attend and speak at the Pacific Admiralty Conference in San Francisco, California. The conference provided invaluable insights into recent developments in maritime law, as well as the effects of ongoing developments in various areas of the maritime industry across the navigable waters of the United States.

The wide range of speakers and engaging panel debates also covered a variety of topics including handling of the criminal aspects of on-board investigations from both the government and vessel's perspective as well as trends in the Maritime economy such as obtaining security for claims, economic sanctions and colliding perspectives in bankruptcy. All of which we can learn from and bring new found insights into this coming year.

It was then my time to take to the podium and deliver my speech, reflecting on the lessons learned when managing marine investigations. It is these lessons of the past which if forgotten, impact on your all-important bottom line. To learn more turn to page 2 for speech summary.

Back to the UK and I am delighted to welcome Gareth Williams and Mike Wisekal to our growing team. Both Gareth and Mike bring with them a wealth of experience in fire and

arson investigation. Go to page 3 to read more about Gareth and Mike respectively, their backgrounds and the expertise they bring to IFIC Forensics.

Whilst attending this year's Fire Protection Association Summit and Forensic Exposition, I gained information on the challenges we are currently facing in the industry. These include the Regulation of Fire Investigation and Regulation of Private Investigators. This would be a good starting point to set ourselves goals for the year ahead.

2015 is shaping up to be a year of change as the government looks to introduce its revised Code of Practice for investigators and we will keep you updated as these occur along with advice on how to meet the challenges and process changes this may bring. We will also continue to look for new and innovative ways to expand on our market leading position. As the industry develops, we will maintain our dedication to identifying new trends and developments in order to keep you as informed as possible.

Finally, after a fantastic 2014, I would like to wish you all a Merry Christmas and a Happy New Year. May all our success this year continue into 2015 and I hope you enjoy your new 2015 calendar and having a read of our new brochure.



Lessons of the Past – Marine Claims

Taking inspiration from Trevor Kletz's book "Lessons from disasters", this article identifies the key lessons organisations should not forget from the past, when managing large marine claims?

Having had the good fortune to investigate some of the largest marine casualties of the 20th and 21st centuries, I pose the question of what can the industry do to mitigate losses in marine claims?

The cases of Maritime Maisie and MSC Flaminia highlight **Lesson 1: Port states are reluctant to admit casualties to their waters** and also **Lesson 2: It always takes longer and costs more than you think!** International relations, economic and financials all impact the ability to get a ship into a port of refuge to start the timely process of offloading cargo, repairing and re-instating a vessel. Maritime Maisie spent four months at sea under tow before being permitted to berth in Korea, and MSC Flaminia has only just re-entered service - two years after the fire. Litigation proceedings are now underway, but will take years to be completed. One case I worked took 12 years to complete – so be prepared to be patient.

Determining who is in charge is a first priority. **Lesson 3: The person in control is the one willing to take responsibility.** This may be the Ships' Master, Designated Person Ashore (DPA), Salvor, Owner or Fire Expert. It is imperative to quickly establish this to ensure the claim is controlled and managed efficiently. Nation states generally regard the owner as in control, and expect them to work with a salvor to provide assurances and indemnities before entry to a port of refuge may be granted. Fire experts may also be required to make risk assessments at this time to warrant that the fire is out and poses no further threat.

Investigations now require a multidisciplinary approach. The days of all-in-one experts are gone. Cases require fire experts, cargo specialists, metallurgists, marine engineers, chemists, the list goes on. **So Lesson 4: Large incidents need large teams of experts.** With casts of thousands involved, what, when and how access and information is shared requires careful management. As an investigator, maintaining control and ensuring you see what everyone else has seen is crucial. Withholding of information is not uncommon.

Lesson 5: The earlier you appoint a Solicitor the better. Customarily, once appointed, the solicitor will lead the investigation, or this can be done by an experienced Claims Manager in the P&I Club. The importance of understanding

and communicating different jurisdictional issues cannot be underestimated – hence the importance of a solicitor leading the team. They can guide investigators on the requirements of the jurisdiction in which the case is likely to be heard.

Witnesses are vital, but often English will be a second language and so do not undervalue the usefulness of having an independent translator on hand. Alternatively record all interviews on a smartphone. When I first started I carried a mobile phone, camera, dictaphone, video camera, laptop and mobile printer! Now all the foregoing are encapsulated in the smartphone, leading to quicker/real time client reporting from the scene.

Lesson 6: Relates to crew training and response – Marine Safety relies on crew training. On cruise ships, fire losses could be mitigated by ensuring the fire teams on board are drawn from both hotel and engineering staff who are appropriately trained and familiar with the ships layout. Fire Patrols and fire drills by the fire team on any ship should not be underestimated or considered replaced by modern technology.

Lesson 7: Know what you are carrying and speed is of the essence! Understanding cargo content is vital and should be declared and verified. There is always a steady stream of ship fires which could have been prevented if the cargo had been accurately declared. The Shipper, freight forwarder and carrier should all hold these details. In the event of a fire, identifying all parties involved is paramount to managing any claim.

The last lesson of the day: Fire suppression systems should be used as a first resort not the last. There is a direct correlation between the severity of damage caused and the speed of deployment of fire suppression systems such as CO². The majority of CO² systems are designed to be used as soon as a fire is discovered and the space is clear of people. I pity the poor Master however who has to decide between the safety of his vessel and an individual trapped in the engine room.

In conclusion, **Rely on your P&I Club to guide you.** They are experienced in such matters and will help put together the right team to assist you. The early appointment of fire expert maximises information gathering and sharing, establishing an early understanding of events to improve decision making and management of the claim. Their success on your behalf will help keep costs down.



Gareth Williams

Gareth has joined our IFIC Forensics team as an Investigator, bringing with him many years of expertise in Arson Investigation, Post Blast Investigation, Counter Terrorism and Improvised Explosive Device design and current trends. Through his role at IFIC Forensics, Gareth will be involved in a wide variety of fire investigation cases, where he will be able to utilise his previous expertise as well as learn new insights and skills across other specialisms from our range of experts in the field.

Gareth worked with the Australian Federal Police (AFP) as a Crime Scene Investigator for twelve years. This included the investigation of thousands of crime scenes, including numerous fires, explosions and even murders. During this time, Gareth also took on the role of Bomb Scene Manager and was responsible for the training of AFP personnel in post-blast investigation. He has also worked and delivered training across the globe, including The Solomon Islands, Philippines, Thailand, Bali, Tonga and Fiji to name just a few!

Due to his experience and knowledge, Gareth has been called upon on many occasions to provide expert evidence in Court both in Australia and overseas. Prior to joining IFIC Forensics, Gareth was a Strategic Advisor for Abu Dhabi Police leading the development of their Post Blast Investigation Team, which included writing Standard Operating Procedures, designing and delivering training courses, policy formulation, strategic planning, budget oversight, and equipment and resources planning.

Gareth has always had a passion for forensic science and whilst gaining experience in investigation at a variety of crime scenes, he found those involving fire and explosions to be the most interesting, challenging and rewarding all at the same time! His interest stems from the uncertainty of what the day is going to have in store and the fact that no fire investigation is ever routine. This along with the sense of satisfaction you gain when you complete a thorough investigation which required you to draw on all your experience to determine the cause of a complex case, can never be beaten.

Gareth continues to expand on his knowledge and has to date gained an impressive list of qualifications: Bachelor of Biotechnology Degree with Honours, Diploma of Forensic Investigation, Graduate Certificate in Fire Investigation and Certificate IV in Training and Assessment. In addition, he has completed numerous courses such as Advanced Fire Investigation, Advanced Post-blast Investigation, Forensic Incident Management, Disaster Victim Identification, Blood-spatter, Fingerprinting, Tool-marks, DNA and Forensic Photography.

When asked about the biggest changes he has seen to fire investigation in his career, Gareth believed the far more common use of appropriate scientific methods and techniques along with a shift in how investigators opinions on cause and origin are scrutinised more carefully and peer review more thoroughly has advanced. In terms of what the future holds, Gareth is keen that investment in training delivered to the Fire Service to educate them in areas such as evidence preservation continues – as this is key to a successful investigation. He also believes there will be continual development in the understanding and application of fire dynamics, fire engineering, laboratory testing techniques and new equipment.

In his spare time, Gareth enjoys playing football, golf, travelling to new places and finding time to get lost in a good book. He also has a passion for extreme sports and has jumped out of a perfectly good plane more than 50 times!

If Gareth weren't a fire investigator he would be involved in sports journalism assuming a player or manager for Liverpool FC is out of the question!



Mike Wisekal

IFIC Forensics are delighted to welcome Mike Wisekal to join the team as a Senior Fire Investigator. Mike has a proven track record of Fire and Arson Investigation in addition to invaluable expertise in the support and development of his colleagues. Mike will play a key role in the further development of IFIC Forensics' fire scene examination as well as developing his own skills even further.

Mike joins us from the Lothian & Borders Fire & Rescue Service where he has served in different roles for nearly eighteen years. Like many investigators, Mike started his fire career on the front line as a firefighter – spending over ten years providing emergency service support to the public at Lothian & Borders Fire & Rescue Service before discovering his passion and interest for investigating the cause and origin of a fire, not just putting them out. His position as Fire Investigation Officer saw him take on a wide range of roles responsibilities included determining origin, cause and ignition sequence for level 1,2 and 3 fire investigations, giving expert evidence testimony to both civil and criminal Courts, fire scene reconstruction, interpreting fire damage and fire patterns. Prior to this, Mike worked as an Operational Manager where he developed his skills in analytical risk assessment and management, which continues to be invaluable in his daily tasks. When asked what he would be doing if he weren't a Fire Investigator, Mike said that he would still be on the front line fighting fires!

Mike enjoyed an active role in the Fire Service campaigning for fire safety and the continued improvement of Fire Investigation. This included delivering training and lectures to station based firefighters and officers at the Scottish Police College on methods and techniques of fire investigation to help preserve the scene as well as visiting schools to raise awareness of the ever important fire safety protocol.

Mike's dedication to Fire Scene Investigation is further shown by his impressive qualifications. Mike achieved his MSc in Fire Scene

Investigation from the University of Central Lancashire and also gained his Certified Fire Investigator status with the International Association of Arson Investigators. In addition, he demonstrates his levels of discipline and dedication from being a Certified Professional Coach and a graduate of the United States Army Military Police School.

For Mike, the most rewarding part of his role is the opportunity to use his analytical and problem solving skills to the highest degree in order to get a fire investigation spot on! His years of experience have given him the insight and knowledge to further enhance the process of Fire Examination. He dedicates his new role into bringing Fire Investigation forward by developing existing expertise as well as new methodology and techniques.

Mike's passion for Fire Investigation leads into his spare time. He frequently researches and keeps up-to-date with the ever-growing industry and is constantly on the look-out for new ideas and concepts.

When he is not researching, Mike likes to spend as much time with his family as possible including taking trips and holidays together. He can also often be found taking some time to himself with a spot of fly fishing.

Also don't forget to ask him about how he did at ten pin bowling at The White House!

Electronic Cigarettes

The electronic cigarette was invented by Chinese pharmacist Hon Lik in 2003. Numerous companies are now selling e-cigarettes to customers around the world, electronic cigarettes are an increasingly popular way for people to reduce the amount of tobacco they smoke or to stop smoking altogether.



E-cigarettes have three main parts:

- Rechargeable lithium ion battery (powers the atomizer, normally 3.7volts)
- Vaporization chamber (atomizer) this heats the fluid to a fine vapour
- Cartridge (contains the e-liquid)

The lithium ion battery powers the e-cigarette and can be charged using a charger similar to those used for mobile telephones, games consoles and tablets.

E-cigarettes have a battery-operated heating coil that gently heats nicotine liquid from a cartridge or re-fillable tank.

The rechargeable lithium ion battery have been known to catch fire if they are overcharged, defective or damaged. Any internal defect may cause a short circuit during the charging process in which 'thermal runaway' may result.

When failure of the lithium ion battery has occurred, the battery components (copper foil) have been known to be projected up to a distance of 2 metres from the location of where the battery was on charge.

To alleviate this some manufacturer's claim to have inbuilt protective circuitry or 'chip' installed which would prevent the battery from becoming overcharged.

Lithium batteries should also have a safety vent in order to vent rather than explode if the internal components of the cell become overheated and the internal pressure exceeds a safe limit. If the battery does vent the battery material normally ignites immediately.

Charging

Suppliers of e-cigarettes often supply a 'USB' connection with the e-cigarette and then inform the buyer that it can be plugged into any type of charger that they have in their possession. The issues with this advice are:

- An incorrect charger may be used
- The USB may be connected into a non-approved mains power transformer
- The USB connector may be used in conjunction of a forged charger which may bring upon its own problems

In an incident attended by IFIC Forensics, the occupier stated that the e-cigarette battery had been connected to the 'USB' connector supplied with the e-cigarette and that all seemed well.

The occupant placed the battery on charge at 1100 hours and left the property. When she returned 25 minutes later she became aware of the fire in the living room.

Known Failures

In April 2014 in Richmond, North Yorkshire a barmaid was working behind the bar when an e-cigarette battery exploded whilst being charged.



The e-cigarette was placed on charge to the top right of the image, It can be seen in the left of the image that the hot lithium ion battery components of the e-cigarette have been ejected some distance when failure has occurred. Sparks are also observed.

The hot ejected lithium ion battery material could ignite combustible materials upon which it falls.



The images above are taken from two separate sources and both indicate the identical mode of failure of the e-cigarette battery resulting in overheating and ejection of the lithium ion battery material.

A number of Fire and Rescue Services have begun to show an interest in e-cigarettes as a possible cause of ignition and there is growing concern that, in common with any other consumer product, there may be an unregulated illegal supply and some charging mechanisms may not comply with UK standards.

Please contact us for more information and articles on electronic cigarettes.

The Scientific Method

The scientific method is a principle used in the physical sciences for the gathering of information and evaluation to form a hypothesis. This step by step method is recommended for application to the investigation of fire scenes and the determination of cause and origin.

The Guide for Fire and Explosion Investigations from the National Fire Protection Association (NFPA 921) defines the scientific method as:

“The systematic pursuit of knowledge involving the recognition and definition of a problem; the collection of data through observation and experimentation; analysis of the data; the formulation, evaluation and testing of a hypothesis; and, when possible, the selection of a final hypothesis.”

The basic concepts of the scientific method are to observe, hypothesise, test and conclude.

There is a requirement for an analytical approach to investigation which can be applied to any investigation regardless of the complexity. This requirement involves understanding how a fire burns, what factors control its behaviour and that all fires don't necessarily burn in the same manner. Prejudgement of the cause of the fire is dangerous but use of the scientific method can eliminate this.

1. Recognise the Need (Identify the Problem)

The investigator is required to identify the problem that has occurred i.e. the fire/explosion. They must determine the resources required. Perhaps the assistance of a second investigator, an expert in a particular aspect e.g. electrical expert would be useful. They should determine the person(s) in authority at the incident scene which may identify that Fire and Rescue or Police Services need to undertake an investigation which before access to the scene is allowed. Any safety issues which require consideration should be established e.g. is there potential for collapse of a building?

2. Define the Problem

In this step the investigator needs to determine how to solve the identified problem. An investigative plan should be established. This should include plans:

- To establish the authority at the scene
- How to protect the scene prior to the examination occurring
- To gather the necessary resources
- To identify persons relevant e.g. required for interviews

3. Collect Data

The collection of data is the next step in the investigation. Facts and information should be gathered and recorded in the appropriate manner. Methods of collecting and recording data include through observation, interview, experimentation, research, experience. Data collected at this stage needs to be verifiable or is known to be true.

4. Analyse the Data

The essential step of analysing the data needs to be undertaken prior to formulation of any hypotheses. The analysis is based on knowledge, training, experience and expertise. At this step assistance may be required by the investigator from a person with more knowledge in a specific subject area e.g. fire engineers, analytical scientists, fire scenario modelling, arc mapping.

5. Develop an Hypothesis (Inductive Reasoning)

A Hypothesis should be developed based on scene observation, physical evidence and witness testimony. The use of inductive reasoning is important at this stage.

Multiple hypotheses can be developed for different aspects of the investigation which can be considered and evaluated together or separately.

Inductive Reasoning is defined in NFPA 921 as:

“The process by which a person starts from a particular experience and proceeds to generalizations. The process by which hypotheses are developed based upon observable or known facts and the training, experience, knowledge, and expertise of the observer.”

6. Test the Hypothesis (Deductive Reasoning)

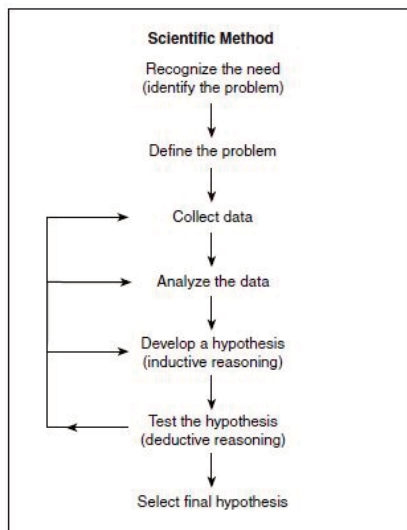
The investigator must compare the hypotheses to know facts and scientific knowledge by using physical and “thought” experiments. Investigators can use research previously

undertaken to inform the investigation. Deductive reasoning is used in this step. It should be identified if new/additional data needs to be collected (e.g. by witness interview or scientific testing). Steps 4, 5 and 6 should be repeated until there are no discrepancies which can be investigated.

Deductive Reasoning is defined in NFPA 921 as
“The process by which conclusions are drawn by logical inference from given premises.”

7. Select Final Hypothesis

Alternative hypotheses should be tested and if possible eliminated to identify the final hypothesis. In fire and explosion investigation it is rarely possible to recreate an event to fully test the final hypothesis. Therefore the final hypothesis identified is the one uniquely consistent with the facts. If more than one hypothesis fits the facts then the investigation must be considered undetermined.





Fire Scene Awareness

This series, written by IFIC Senior Investigator David Townsend, is intended to inform and sometimes entertain. Loss adjusters are the first insurance agencies on site and need to make informed decisions in regard to further action and commitment of resources. Initial observations, information and photography may be key to those actions. We hope to provide some hints and pointers to assist.

Incident: Fire – Total Loss

Sometimes we are confronted with a scene at which the first reaction may be “Where do I even start?” A fire of apparent total destruction over a wide area is not readily going to provide any initial reliable indicator of fire origin. The assessment is going to rely heavily on witness accounts, documentary and other evidence.

The key evidence is there somewhere and can be found but we need to narrow down the field of interest or “Radius of Error” as investigators often say.



CCTV is arguably the greatest gift in these large destruction cases. It allows the fire experts to eliminate vast areas from detailed scrutiny.

Find out what kind of system and how and where it is monitored. Formal viewing or copying permissions may delay procedures but while the site is fresh and persons are still in the mind set of finding out how it happened it may be possible to get a quick viewing of the CCTV.

Not all CCTV is particularly sophisticated; Be prepared to find cameras out of service or the view not covering our area of interest. Check the time setting of the camera and system for accuracy. Most have an automatic re-record period loop so do not delay in finding and securing any footage. Web cameras generally do not permanently record but there may be a site follower who did record or observe.

Initial site images are not going to give a good account if they are all taken at ground level. Find a high vantage point. If the Fire Service is still on site they will often facilitate a lift on an aerial platform. Nearby buildings can be used. Digital camera resolution is so good now that enlargements of distant images still produce good definition.

Drone and mast photography services costs can be as much as £1500 plus travel and vat but there may be local companies or enthusiasts charging as little as £300. It is worth checking, but bear in mind there are strict controls on where and how drones can be used.

Documentation, including the fire risk assessment, is often declared to have been destroyed in the building. To be fair this is often true, but ask around of all of the management staff (not all MDs have their fingers fully on the pulse). Key records may be stored elsewhere or held digitally by key personnel.

Security of any building or site must be checked as soon as possible and before anyone has thought to check (and adjust) after the event.

Staff and visitor booking in and out logs should be photographed. Some buildings have personalised key entry/exit systems that may assist with any timeline and may corroborate, or otherwise, witness accounts.

Factors

There are many factors that contribute to the severity of any loss and a high loss is usually the result of otherwise small factors coinciding into a ‘Perfect Storm’ such as the Kings Cross Underground fire but let’s look at one factor that is sometimes overlooked and often treated with care:



FRS Response:

Probably the most critical factor in firefighting after prevention and first aid is Fire and Rescue Services (FRS) response. They are well regulated and controlled in the UK. Speed and weight of extinguishment can be critical.

The ultimate provision is that of aircraft firefighting which is categorised into 10 divisions, the highest of which requires a minimum of three fire appliances to be permanently available and to hit the scene in three minutes! That will never be the case elsewhere where attendance times can vary from four minutes (city centre or high risk) to 20 minutes (remote rural) although every brigade area sets its own response standards based on its own assessment of risk

Whatever the provision should have been at that time, it is the actual time of arrival that is important including delay. Delay in firefighting action also arises for operational reasons such as poor water supplies and failed appliances. A significant element of firefighting tactics that affects the degree of financial loss is the tactical mode.

From FRS Manual 2008:

Offensive mode is “Where the operation is being tackled from within the perceived hazard area. The Incident Commander (IC) will have established that potential benefits outweigh the risks, so the IC will be committing crews into a hazardous area, supported by appropriate equipment, procedures and training. Greater levels of control and additional control measures may be required. Offensive mode is the normal mode of operation used at, for example house fires, road traffic collisions and industrial premises to fight the fire, effect rescues or close down plant etc.”

Defensive mode is “where the operation is being fought with a defensive position. In defensive mode, the identified risks outweighs the potential benefits, so no matter how many additional control measures are put into place the risks are too great” The IC would ensure for example that firefighting is conducted with ground monitors and aerial jets and protect exposure risks and adjoining property without committing crews into the hazard area. This could also include standing by awaiting specialist advice or equipment.

What does all of this mean?

It means that FRS lives are not put at risk where it is assessed that there is no reasonable prospect of the saving of life, structure or environment from fire. However, the consequence for property loss is enormous and has significantly impacted on major loss statistics over the years.

FRS Statistics:

Department of Communities and Local Government fire statistics provide a general purpose description of all fires and false alarms attended by UK Fire Brigades based on information collected from fire reports. Data collected about serious reportable fires includes:

- Time and date of call
- Brigade or other geographical area
- Type of building or vehicle
- Most likely motive (accidental or malicious)
- Cause of fire (chip or fat pan fires, electrical, etc.)
- Source of ignition (cigarettes, cookers, etc.)
- Materials (furniture, etc.)
- The spread of fire (beyond room of origin, etc.)
- The nature of fire casualties
- Rescue information and method of extinction
- The effectiveness of automatic smoke detectors

This has been developed for brigade personnel, researchers from other government departments and other non-specialist users of fire statistics to access such data.

A reportable fire is an event of uncontrolled burning involving flames, heat or smoke attended by a UK Fire Brigade. Reportable fires are classified for data collection purposes by the Department of Communities and Local Government and by Fire Brigades into two main categories, the more serious primary fires for which data are collected about fires individually and secondary fires for which aggregate data are collected. Limited information about chimney fires is also collected.

FRS statistics and Information Recording and Information System (IRIS) inform mostly the FRS and government. It is their measure of performance. For non FRS fire investigators it is useful for general trend analysis. Individual reports will be requested in order to provide accurate timings and general detail but these reports are not the result of a detailed forensic examination.

The information gathered for FRS reports is only that gathered during their attendance on site. There is rarely any follow up if the fire has not been assigned to a FRS specialist investigator.



The Health and Safety Executive (HSE) has published an open letter to all parties involved in the design, specification, procurement and construction of timber frame structures.

After a spate of high-profile incidents, with the University of Nottingham chemistry laboratory fire being the most widely reported, the HSE's letter outlines its expectations in relation to the management of fire risks prior to and during the construction of timber frame structures, which fall within its remit. The statement requests that 'those making design and procurement decisions that significantly affect fire risk should consider and reduce the risk and consequences of fire during the construction phase through design and failure so to do may constitute a material breach.'

Responding to the open letter, FPA Technical Director, Dr Jim Glockling said: 'The call for sustainability in construction has seen an increase in timber frame construction fires, characterised by rapid fire spread, enormous radiated heat and the large spread of embers, frequently causing secondary fires in adjacent and neighbouring properties. Such fires pose a major risk to those working on the site, the occupants of surrounding buildings and the firefighters who have to tackle a fire, because of early collapse.'

A plethora of guidance is now available for those working with timber frame and other modern methods of construction due to the serious fire risk such buildings pose during their construction phase. This includes the HSE's Fire Safety in Construction Guidance and the FPA's Joint Code of Practice for Fire Prevention on Construction Sites, which specifically addresses the issue of timber frame.

However, Dr Glockling continues by advocating the need for the timber frame industry and contractors to engage more with the insurance industry. He adds: 'Insurers have a wealth of information and risk management advice to offer to their customers, so it is essential that contractors consult with their insurers at every stage of the design and build. Insurer guidance on loss mitigation has been developed over many decades by understanding how building systems and materials perform in fire and this is where we are with timber frame.'

You can view the HSE's letter at <http://tiny.cc/smyjox>

*Merry Christmas and a Happy New Year
from all at IFIC Forensics.*



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