Exploring the potential for a Certification Scheme for Fire-Stopping

Scottish Government
Riaghaltas na h-Alba
gov.scot

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Contents

Tables

Executive Summary

Fire is a key concern for human and building safety. Prominent building failures in Scotland as well as the Grenfell Tower fire tragedy in England, and their subsequent inquiries have brought a keen and highly justified focus on fire safety and effective fire-stopping measures.

The Scottish Government commissioned a series of independent inquiries and reviews into building safety and the effectiveness of the Scottish Building Standards system. In addition, in 2019, a new "Building Standards Futures Board" was established. Its role is to strategically advise and direct a broad programme of work aimed at improving the performance, expertise, resilience and sustainability of the Scottish building standards framework and services across Scotland.

A key discussion point of the Futures Board was the introduction of a certification scheme for fire-stopping. Whilst 'fire-stopping' is a term well known in the passive fire industry sector to control fire spread via service penetrations or gaps in or around doors, walls, floors, services etc., the term has been used more widely in this report to describe all active and passive fire safety measures in a building designed to inhibit fire growth. The purpose of this study is to investigate the appetite and demand for a new certification scheme covering both active and passive fire safety measures commonly found in a building. Active fire safety systems include items such as fire detection and alarm systems, automatic fire suppression systems, while passive fire safety measures involve the build and materials of walls, floors, doors, structural frames, beams, columns etc. designed to prevent the spread of fires and premature building collapse.

At present, there are four voluntary certification schemes in operation. These consist of two schemes focusing on Design (Building Structure and Energy) -domestic and non-domestic, and two for Construction (Drainage, Heating and Plumbing as well as Electrical Installations). To be certified under such a scheme, competent individuals can be appointed as Approved Certifiers of Design or Approved Certifiers of construction. This gives them the authority to certify the work they undertake, as part of a building warrant, is compliant with building regulations. Once certified, Approved Certifiers complete regular competence audits, which are managed via approved Scheme Providers.

This research investigated the appetite amongst a sample of stakeholders, Local Authorities, contractors and insurers for such a certification scheme as well as related practical considerations including scope, potential benefits, and possible challenges to the implementation of a scheme.

For this purpose, fifteen stakeholders including fire safety experts, certification providers and contractors as well as eight local authorities, fifteen contractors involved with fire safety and five insurers were interviewed.

The research reveals that a certification scheme in fire-stopping is seen as potentially beneficial for public safety, consistency and customer confidence. Stakeholders such as scheme providers were supportive of a fire-stopping certification scheme's introduction.

There is consensus among the research participants that building failures in Scotland and the Grenfell Tower fire tragedy have reinvigorated awareness of the importance of fire safety. In addition, they are in agreement that a certification scheme can improve fire safety and installation thereby promoting public safety and potentially saving lives.

A scheme would require the setting of consistent guidelines for active and passive fire safety measures, with the ensuing benefit of building compliance and due diligence.

While there is agreement on the benefits for public safety, research participants were divided on potential commercial/financial benefits. Local authorities were uncertain whether a fire-stopping certification scheme would relieve pressure/reduce workload related to building inspections, thereby freeing up resources for other tasks. Local Authorities agreed that a certification scheme would not reduce the statutory obligations of Local Authorities for inspection and verification.

There is also uncertainty how a scheme could work in practice, what its scope might be and what impact it may have on commercial factors.

Insurers are skeptical as to whether being certified under a new scheme may lead to reduced Professional Indemnity Insurance (PII) premiums, as some contractors have hoped. While there may be the possibility for reduced premiums on a case by case basis, in general PII premiums are based on the entire UK construction industry. Related risk calculations are equally based on nationwide considerations and work involving cladding and fire safety has been deemed high risk by insurers following the Grenfell tragedy. Premiums have therefore increased in recent years and, we were told, are unlikely to decrease in the medium term.

Some contractors are also concerned about increased bureaucracy and costs as a result of an introduction of a certification scheme.

In terms of fire safety knowledge, there is no overall consensus on the quality and extent of current, relevant training and qualifications. Local Authorities were largely in agreement that current training lacks practical focus and needs to be improved for a fire-stopping certification scheme. Some stakeholders go further and call for a

general overhaul of the current qualifications, including relevant NVQs which are deemed insufficient to ensure competence in fire-stopping. Contractors, on the other hand, feel that the construction certification process provides sufficient training for fire-stopping through a range of different bodies. Nevertheless, there is broad agreement that enhanced or expanded qualifications would be beneficial and that fire safety knowledge could be increased as a result.

The potential scope of a scheme was also subject to much discussion. No clear consensus emerged whether the scheme should cover either design and/or construction phases, or if the scheme should be made mandatory. Although not in discussion for the purposes of this research, a mandatory scheme (all existing certification schemes are optional) is regarded as hard to enforce but in the long term the best approach.

Overall, there is agreement that the introduction of a scheme will require a suitable scheme provider, a solid commercial basis, for instance through fees, and that a transition period will be effective in helping to set up the certification infrastructure and to create an established pool of certified professionals.

Based on these results, this research report forwards the following key recommendations:

1. To introduce a certification scheme on fire-stopping to cover active and passive fire safety measures.

2. If introduced, it should be phased in gradually and be supported by a solid commercial basis, preferably through a fee-paying system. In this context, financial assistance may be considered necessary to promote the opportunity of upskilling in fire-stopping and fire safety.

3. A fire-stopping certification should remain voluntary to ensure consistency with the four existing (voluntary) certification schemes;

4. In terms of scope, the certification scheme should focus on construction as the concerns voiced by research participants (including qualifications and training) are primarily related to construction work;

5. Existing qualifications and training relevant to fire-stopping would benefit from a review.

6. This leaves final questions not answered through this research but for initial consideration:

7.1.   If introduced, should such a scheme ultimately remain voluntary, there was some support for a mandatory scheme?

7.2.   Is the amendment or enhancement of existing certification schemes, through enhancement in the Technical Handbooks the sections on fire-stopping, a viable alternative?

7.3.   One immediate first step might be to focus activities on improving and reinforcing all the training and qualifications related to fire-safety.

Overview

1.1 Introduction

This research was commissioned by the Building Standards Division (BSD) of the Scottish Government in order to inform the potential creation of a certification scheme for fire safety measures in accordance with Section 7(1) or 7(2) of the Building (Scotland) Act 2003. These sections make provision for Scottish Ministers to appoint persons as certifiers, or approved certification schemes (for a fixed period).

In Scotland, certification operates under The Building (Scotland) Act 2003. It allows suitably qualified and experienced building professionals to act as Approved Certifiers of Design or Approved Certifiers of Construction. They are employed by an Approved Body and take responsibility for ensuring that specified elements of the design or construction work on the project comply with building regulations in force at that time.

Certification within the Building (Scotland) Act 2003 was introduced with the intention of:

- encouraging high professional standards within the construction sector;

- providing reassurance to the public using the certification service, and

- verifiers accepting certificates. In other words, Approved Certifiers carry out the checks to show that the work complies with the building standards leaving Local Authority verifiers able to accept the certificate in lieu of undertaking checks themselves (if the customer has chosen to follow this route).

To date there are four certification schemes approved. There are two schemes in existence for Design (Building Structure and Energy) and two for Construction (Drainage, Heating and Plumbing as well as Electrical Installations).

Certification sits alongside the role of the Local Authority as "verifier" for building warrant and completion certificate processes and only applies to works that are subject to the building warrant process.

Certification provides confirmation that the work carried out meets the applicable standards and requires that a suitably qualified and experienced building professional or tradesperson are responsible for ensuring that specified elements of the design or construction works comply with the building regulations.

If an Approved Certifier is used, a check of this element of the project will not be required by the verifier (Local Authority). Certification currently is an optional service albeit customers are strongly advised or recommended to use the services of an Approved Certifier. This service is not mandatory for building owners, the use of certification is, therefore, currently optional.

The Scottish Government Building Standards Division manages the Certification Register, which is used by clients and Local Authorities. It is the only means to source Approved Certifiers and Approved Bodies. The latter is a firm, public body, or other organisation that is a member of the scheme, employing at least one Approved Certifier and which adopts suitable professional practices including procedures to check compliance with the Building (Scotland) Regulations 2004[1].

At present in Scotland, although fire safety installations are most certainly important to building design and construction, such installations are not covered by a dedicated certification scheme.

'Fire safety measures' (the design, installation and use of active and passive fire protection systems) plays a major role in preventing fires from spreading. The passive systems (walls, floors, doors, structural frames, beams, columns etc.) do this by creating contained fire-resistant compartments within buildings. Service penetrations and gaps in the construction are normally fire-stopped using approved fire resisting materials or intumescent type products that are designed to expand and seal the gap or protect the structural frame. Active fire protection measures – such as fire detection and alarm systems provide early warning of fire to the building occupants. Extinguishers, sprinkler systems designed to fight fires, can be designed into buildings or installed as additional security after construction. Sprinkler systems can be for life safety or property protection.

The term 'fire-stopping' is used throughout the report for ease. While the term is used and well known throughout the industry, it should be understood that fire-stopping refers to active and passive fire protection systems (as explained above). This was also clarified in discussions with the research participants.

1.2 Background

Fire is an ever-present danger in any building. Faulty electrics, faulty appliances, misused heating appliances, smoking-related accidents – all these and more can create life-threatening incidents. While excellence in design can mitigate the risks to some extent, the ongoing possibility of mechanical, electrical or human failure is always present. They constitute a danger which cannot ever be totally eradicated, a fact that has been underlined by some tragic events over the past few years which have brought the issue of active and passive fire safety measures into much greater

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[1] Certification Handbook 2012

focus. For example, inadequate and non-compliant fire safety measures played a key role in the Grenfell Tower tragedy (14th June 2017).

Building failures in Scotland and England in recent years (for example, Oxgangs Primary School in Edinburgh, the DG One Complex in Dumfries and Galloway, and the Grenfell Tower fire in London) have revealed significant deficiencies in building standards and a lack of compliance with building and fire safety regulations. Further details of these are provided in Appendix 1.

The role of certification has been recognised by a Ministerial Working Group Review Panel as being pivotal for the future strategy on improving building standards. The Review Panel on Building and Fire Safety was set up following these high-profile building failures, including Grenfell Tower and the wall collapse at Oxgangs Primary School in Edinburgh.

The panel was convened to consider the issues of compliance and enforcement within the building standards process. The panel, chaired by Professor John Cole, consisting of industry and public sector representatives, made a series of recommendations including the certification of fire-stopping[2].

Subsequently a second review panel[3] was also convened to focus specifically on fire issues. This panel identified that a better mechanism is required for the verification of fire safety engineering solutions for complex buildings.

A national 'hub' to verify applications for complex buildings has been suggested. This is being looked at under a separate piece of work commissioned by the Scottish Government under the Delivery Model work stream.

The Building Standards Futures Board[4] was created to tackle issues of compliance and enforcement within building standards in order to improve the overall service and its work comprises seven key work streams.

As the role of certification (i.e. that ultimate assurance of compliance) is regarded as being pivotal to improving building standards in Scotland; a 'Certification Strategy' is one of the Board's key work streams.

Pye Tait Consulting was subsequently commissioned by the Building Standards Division to research and advise upon the optimum ways in which the existing systems for active and passive fire measures might be improved through the introduction of a certification scheme[5].

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[2] https://www.gov.scot/publications/building-standards-compliance-and-enforcement-review-panel-minutes-index/

[3] https://www.gov.scot/publications/report-review-panel-building-standards-fire-safety-scotland

[4] The Building Standards Futures Board was set up at the beginning of 2019 to provide guidance and direction on the development and implementation of recommendations made by the Review Panels on Compliance and Enforcement and Fire Safety. The Board's remit is to strategically advise and direct a broad programme of work aimed at improving the performance, expertise, resilience and sustainability of the Scottish building standards framework and services across Scotland. https://www.gov.scot/groups/building-standards-futures-board/

[5] To be considered as optional at this stage

1.3 Project Aims and objectives

The formal aim of the research is to take forward this proposal from the final report from the Review Panel on Building Standards Compliance and Enforcement and **identify if there is a demand for a certification scheme for fire-stopping within the current Scottish building warrant process.**

The research is designed to consider whether or not a scheme for active and passive fire safety measures could be developed under section 7(2) of the Building (Scotland) Act 2003.

Building Standards Division required that the work:

- Establish if there is an appetite within the construction sector to develop and deliver a certification scheme or service for active and passive fire measures and the installation of fire safety measures (see section 3.1);

- Establish the technical scope of such a scheme (see section 3.4);

- If there is a demand for a certification scheme, consider the flexibility to certify some or all of the measures defined within the technical scope of the certification scheme (see section 3.5);

- Identify if the technical skills and capacity exist within the industry upon which a certification scheme for fire safety measures could be developed (see section 3.2 and 3.5) and identify training for fire safety installers (see section 2.6.1 and Appendix 5);

- Identify the benefits of a certification service including the impact in insurance premiums which were set out in the 'Phase 2' section of the original project brief (see section 3.7).

1.4 Research Approach[6]

Active and passive fire safety measures are relatively well-understood although, as with all other such topics, the science, technologies and techniques are constantly being improved and new approaches developed.

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[6] Details of the research methodology are provided in Appendix 1.

With the approval of BSD, we segmented the research into five distinct and iterative phases, to enable the provision of responses to the research questions listed above.

The objective was to build a firm and mutually supportive body of understanding and knowledge using, where feasible, expert technical input prior to considering ways forward.

These research phases are as follows:

Phase 1	Literature review and desk-based research
Phase 2	Stakeholder workshop and stakeholder supplementary interviews (15 total participants)
Phase 3	Depth interviews with 8 local authority verifiers (2 city-based, 3 urban, 3 rural)
Phase 4	Depth interviews with 15 contractors working in relation to fire safety
Phase 5	Depth interviews with 5 insurance/brokers[7]

The findings from the participants to the research are presented in section 3 under agreed headings.

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[7] Please note the interviews of insurance brokers took place just after the start of the outbreak in the UK of Covid-19 (March 2020) and we experienced some difficulties in achieving full discussions on this subject.

The Fire-stopping landscape in Scotland

This chapter sets out details of recent literature regarding various fire tragedies and building failures in Scotland and England, reports on potential fire safety and prevention measures as well as the legislation, training and associations involved with fire safety in Scotland.

2.1 Existing certification schemes in Scotland

Certification is an optional measure for the application of building regulations in Scotland and is a system operated by the Scottish Government Building Standards Division (BSD). Scottish Ministers have the power to approve certification schemes, appoint verifiers and approve certifiers as either Approved Certifiers of Design or Approved Certifiers of Construction. Certification schemes are based on the fundamental principle that suitably qualified and experienced building professionals and tradespeople take responsibility for ensuring that specified elements of the design or construction on any given project comply with all building regulations in force at that time.

Building professionals and tradespeople must be qualified to carry out certification tasks and need to demonstrate they have the required experience. They must also be employed by a reputable company. Utilising an Approved Certifier removes the need for verifiers to heavily scrutinise designs or carry out inspections[8]. Certification only applies to works that are subject to the building warrant process and certification is carefully monitored through regular audits of scheme members. Scottish Ministers have powers to authorise a certification scheme.

Developers applying for building warrants have the option to include certificates from Approved Certifiers of Design as part of the application process and from Approved Certifiers of Construction as part of the completion certificate process. These certificates highlight to the verifier that the work carried out complies with the building regulations in force at the time and therefore the verifier checks required are minimal.

In order to become an Approved Certifier, applicants must demonstrate their level competency through:

- Qualifications
- Experience

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[8] Certification Handbook 2012, Third Edition. https://w w w .gov.scot/publications/certification-handbook-building-standards/

- Understanding of the role of Approved Certifier to certify that specified aspects of design or construction comply with the Building (Scotland) Regulations 2004.

The Certification Register, an online register held by the Scottish Government, is the definitive list of qualified professionals who can certify work in Scotland. The register contains membership details for the four certification schemes and identifies 'Approved Certifiers', both individuals and firms, who work across Scotland and approved to carry out certification services.

The certification register allows:

Members of the public to:

- identify certification schemes;
- find an Approved Body; or
- check the registration of a firm that they know.

Local authority verifiers to:

- check validity of a certificate of design;
- check notice of intent to use an Approved Certifier of Construction; or
- check validity of a certificate of construction.

The four certification schemes currently in existence are:

- Certification of Design (Building Structures);
- Approved Certifiers of Design (ACD) Scheme – energy for domestic (housing) and non-domestic (commercial) buildings in Scotland;
- Certificate of Construction (Electrical Installations);
- Approved Certifiers of Construction Scheme – drainage, heating, plumbing.

The details of each of these schemes and their scheme providers are outlined in Appendix 3.

New scheme creation

For a new scheme to be approved it must be relevant to the certification of Building (Scotland) Regulations. It is required to meet specific criteria defined in the legislation and is approved at the discretion of the Scottish Ministers. The scheme will then be delivered by an organisation or body referenced as the 'scheme provider'. Criteria for membership of the scheme depends greatly on the scope of work being certified and criteria is set out by the scheme provider and then approved by BSD.[9]

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[9] Certification Handbook 2012

2.2 Fire safety installation issues and failings

A series of building failures in Scotland and England in recent years (for example, Oxgangs Primary School in Edinburgh, the DG One Complex in Dumfries and Galloway, and the Grenfell Tower fire in London) have revealed significant deficiencies in building standards and a lack of compliance with building and fire safety regulations. Legal consideration of the Grenfell Tower tragedy is ongoing, but the Scottish Government acted promptly and in parallel established reviews into the overall impacts of, and potential resolutions to, incidents in Scotland and including as much as was known of the causes of the Grenfell fire.

Oxgangs Primary School, Edinburgh

In January 2016, an outer brick wall at Oxgangs Primary School in Edinburgh collapsed. The collapse triggered investigations into the structural integrity of other schools around Edinburgh which in turn led to the discovery of similar defects in a further 16 schools, all built around the same time as the Oxgangs School. The discovery forced Edinburgh council to close the schools.

In response to these discoveries, the City of Edinburgh Council commissioned a study undertaken by Professor John Cole, which concluded that the wall collapse at Oxgangs was caused by incorrect and insufficient use of wall ties, which was the result of poor workmanship and site supervision. In addition to inadequate masonry, the Inquiry into Edinburgh Schools also drew attention to the widespread defective installation of fire-stopping measures which had been discovered across the 16 schools. Professor Cole's report concluded that, while most of the issues related to failures of the construction industry, they also showed widespread non-compliance with Scottish Building Standards.[10]

The report also identified underlying systemic issues with the quality of supervision of the building work by the council and the Schools Partnership. The report said:

> 'There was an over-reliance on the part of the council, without adequate evidence, that others in the project structure, including those building the schools would comprehensively fulfil this essential role.'[11]

DG One Leisure Centre

Similar building defects and failures to comply with regulations were also discovered in the long-running DG One Leisure Centre. The swimming pool in the brand-new centre was shut for repairs only two weeks after it opened and the scale of

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[10] Report of the Independent Inquiry into the Construction of Edinburgh Schools (2017)
https://policy.ciob.org/resources/report-of-the-independent-inquiry-into-the-construction-of-edinburgh-schools
[11] Ibid.

necessary remedial work to the building as a whole has increased over the years until the cost of them will more than equal the original cost of the building. The building was closed in 2014 and will not reopen to the citizens of Dumfries until at least the end of 2020.

In June 2011, deficiencies in fire-stopping were discovered in the complex. These discoveries came shortly after the identification of extensive defects in the construction and tiling of the swimming pools and other facilities.

The Independent Inquiry into the Construction of the DG One, commissioned by Dumfries and Galloway Council in July 2017, and carried out by Professor Cole, highlighted – among many other things – the severity of the scale of inadequate attention to fire-stopping in the construction of the leisure complex.

> 'This Inquiry would particularly wish to bring attention to the extensive failures in regard to the omissions and inadequate installation of fire-stopping discovered throughout the DG One building. The scale of these omissions served to completely compromise the fire safety strategy for the building.'[12]

Like the Inquiry into Edinburgh Schools, the inquiry into DG One also highlighted systemic problems in the skills and knowledge of construction contractors and in the effectiveness of training schemes in Scotland, as well as deficiencies in the level of scrutiny by councils of construction projects.

Grenfell Tower Fire, London

The Grenfell Tower fire in June 2017 revealed systemic problems in compliance with fire regulations in multi-occupancy higher risk residential buildings (HRRBs) in England. The scale of the tragedy and the implications of its failures are of central importance to authorities in all nations of the UK.

In the aftermath of the Grenfell Tower fire, the UK government commissioned an independent review of building regulations and fire safety, to be led by Dame Judith Hackitt. The resulting report called for a 'radical rethink of the whole system and how it works', Hackitt drew attention to the inadequacy of fire safety mechanisms in high-rise residential buildings. The report made numerous recommendations about improving fire safety in England, including:

- The need for a 'clear and identifiable duty-holder' who is responsible for the building standards and fire safety of the whole building.

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[12] Report of the Independent Inquiry into the Construction of the DG One Complex in Dumfries (2018). https://www.dumgal.gov.uk/media/20076/Report-DG-One-inquiry/pdf/DG_One_Inquiry_Report_Bookmarks.pdf?m=636607638701200000

- Greater involvement of tenants in fire prevention procedures. The duty-holder must make all tenants aware of fire safety regulations and develop a 'resident engagement strategy' which makes information about fire safety procedures clear and transparent.

- Tenants must also be given a voice in the system: tenants should be allowed more involvement in decision making, through the support of residents' associations and tenant panels, and should be offered a no-risk route to escalate concerns on fire safety.

- Tenants must also be given 'clearer rights and obligations' in the maintenance of fire safety of individual dwellings. Tenants are to be expected to work with the duty-holder to manage the risk across the whole building.[13]

Action in Scotland

Two review panels were established in Scotland after Grenfell, one that looks into Building Standards (Fire Safety) and one for compliance and enforcement of building standards.[14,15]

Enquiries into building failures revealed systemic failures with the installation of appropriate fire-stopping measures and compliance with fire regulations. The incidents in Scotland also revealed significant deficiencies in standards in the construction industry and a lack of effectiveness of training schemes, together with inadequacies of scrutiny of the building works by the relevant local councils.

The panel which looked at Building Standards concluded that, while the current structure of mandatory functional standards supported with performance-based or prescriptive guidance in the Technical Handbooks works, other improvements can be made to fire-safety regulations, especially for multi-occupancy residential buildings. These include changes to simple guidance on the following;

- External cladding.
- Escape systems.
- Automatic fire suppression systems.
- A better mechanism for the verification of fire safety engineering solutions.

[13] Judith Hackitt, Building a Safer Future: Independent Review of Building Regulations and Fire Safety (2018); https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/707785/Building_a_Safer_Future_-_web.pdf

[14] The Scottish Government (2018) Report of the Review Panel on Building Standards Compliance and Enforcement. https://w w w .gov.scot/publications/building-standards-compliance-and-enforcement-review -panel-minutes-index/

[15] The Scottish Government (2018) Report on the Review Panel on Building Standards (Fire Safety) in Scotland https://w www.gov.scot/publications/report-review-panel-building-standards-fire-safety-scotland/

The panel which looked at the enforcement of building standards concluded that, although they consider the Scottish system of building standards as not being "broken", there is a clear need to strengthen compliance. The panel concluded that in Scottish Building Standards, there is too much focus on approval of the building at the design stage and not enough to ensure that buildings comply with standards as they are being constructed.[16]

The latter panel recommended that this imbalance should be redressed. That is, greater focus should be applied to ensuring that buildings comply with the regulations as they are being built. The panel expressed concern that staffing levels may be inadequate and that there may also be a deficiency in skills at the contractor and at local government level to ensure that all new buildings comply with regulations.[17]

Key issues that were highlighted by the panel were:

- Deficiencies in the installation of fire-stopping methods.

- Lack of responsibility for building safety and maintaining fire and structural safety of the whole building.

- Too much focus on delivering approval at the design stage and not enough focus on ensuring that buildings are actually built in compliance with the regulations.

- Deficiencies in the level of scrutiny by local authorities.

- Lack of resource at local authority level to undertake that scrutiny.

- Systematic problems in skills and knowledge of construction contractors.

- Ineffectiveness of training schemes.

The following recommendations were made by the panel:

- The need for a more robust approach to verification when dealing with risk and complex buildings;

- The need to strengthen skills and provide access to training for local authority building standards teams;

- Ensuring that there are clear roles and responsibilities for everyone involved in building projects;

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[16] The Scottish Government (2018) *Report of the Review Panel on Building Standards Compliance and Enforcement*

[17] The Scottish Government (2018) *Report of the Review Panel on Building Standards Compliance and Enforcement*

- Certification of fire-stopping, a safety related failing identified throughout the Edinburgh Schools and DG One Inquiries.

In line with the objectives of making fire-stopping improvements and raising standards the idea of a centralised hub for fire-stopping was assessed in the Report on The Feasibility of a Centralised Hub for Verification of Complex Fire Engineered Solutions in Scotland[18].

The report suggested that members for this centralised fire engineering "hub" could be taken from statutory bodies or alternatively be privately contracted fire engineers. There was general agreement across most groups that a hub can be a reasonable short-term step along the way toward developing a certification scheme for fire engineering, which seems a reasonable long-term goal (several years away). While it was largely recognised that the Scottish system for Building Standards Verification is working well, elements could be improved.

As an outcome of the report it was recommended that the Scottish Government investigate:

- Developing guidelines for complex and high-risk buildings in relation to fire engineering design.

- Addressing the issues of qualifications and competency.

- Developing a fire engineering verification method to assist engineers and verifiers with 'simple' deviations from the Technical Handbooks.

The report established that further consultation with stakeholders on the topic of a hub is required. The overall verification model is currently being reviewed of which fire-engineering's contribution to the process is a key part.

2.3 Fire-stopping

Fire-stopping is defined as the prevention of any form of fire including smoke and heat from spreading throughout a building. Fire can be contained through the creation of fire-resistant compartments, 'compartmentation' which divide buildings vertically and horizontally. It must be ensured that all openings and gaps are fire stopped in order to restrict both the lateral and vertical spread of fire. This is known as a passive fire- stopping method (further detail included in this section). Active fire safety measures systems include items such as smoke alarms and sprinklers (further detail included in this section). Effective passive fire-stopping and active fire

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[18] Meacham Associates Report on The Feasibility of a Centralised Hub for Verification of Complex Fire Engineered Solutions in Scotland (2018)

safety measures also require good awareness of technical literature and standards, and effective inspection of works on site.

Fundamentally, the selection and correct installation of active and passive fire safety measures can potentially save lives, therefore selecting the right product and ensuring it is installed properly is critical. As all buildings are different, it is important they adapt a method to inhibit fire and smoke spread and provide warning of the outbreak of fire. There are important considerations for fire safety measures: the required product, the environment, the situation as the fire safety measures utilised in one building may not be suitable for another. In order to fully safeguard against a fire, a functional and holistic fire safety system must be used which may mean a combination of products are used and are working together. If one product fails, the whole fireproofing system could fail.[19]

The Association for Specialist Fire Protection states that

''ideally fire-stopping should only be carried out by 'competent persons' i.e. those working for a third-party certificated contractor or those who have had their competency checked by a scheme run by a third-party certification body. This is recommended in the Building Regulations in the UK and Ireland. If you are not classed as a competent person, it is recommended an appropriate scheme is joined in order to indicate that you have expertise in reducing fire-related liability. If fire-stopping is only an ancillary function to your main profession e.g. plumber, electrician, dry-liner, then an acceptable alternative is to achieve an NVQ level 2 qualification in fire-stopping''.[20]

The Scottish Technical Handbooks (2019) state:

"Fire-stopping may be necessary to close an imperfection of fit or design tolerances between construction elements and components, service openings and ventilation ducts. Propriety fire-stopping products, including intumescent products, should be tested to demonstrate their ability to maintain the appropriate fire resistance duration under the conditions appropriate to their end use."

And as stated in the same handbooks (clause 2.0.10), ''the performance of a system, product, component or structure is dependent upon satisfactory site installation, testing and maintenance, independent schemes of certification and accreditation of installers and maintenance firms of such will provide confidence in the appropriate standard of workmanship being provided.

''Third party accreditation of installers of systems, materials, products or structures provides a means of ensuring that installations have been conducted by

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[19] https://www.walraven.com/en/fire-stopping-guide/

[20] https://www.lfsfire.co.uk/wp-content/uploads/2016/09/On-site-Guide-to-Installing-Fire-Stopping.pdf

knowledgeable contractors to appropriate standards, thereby increasing the reliability of the anticipated performance in fire.''

2.3.1 Active measures

The Health and Safety Executive [21] defines Active Fire Protection (AFP) as a group of systems that require some amount of action or motion in order to work efficiently in the event of a fire. Actions may be manually operated, like a fire extinguisher or automatic, like a sprinkler, but either way they require some amount of action.

AFP includes[22]:

- fire/smoke alarm systems – used to detect when there is a fire or smoke in a building;

- sprinkler systems – used to help slow the growth of fire;

- fire extinguishers – used to help put the fire out altogether;

- actual firefighters who must tackle the fire – used to help put the fire out altogether.

2.3.2 Passive measures

Passive Fire Protection (PFP) is a group of systems that compartmentalise a building through the use of fire-resistance rated walls/floors, doors and gap filling measures. Compartmentalising the building, breaks it up into smaller sections helps to slow or prevent the spread of fire and/or smoke from one room to the next. In this way, passive fire protection methods limit the amount of damage done to buildings meaning there is greater time to evacuate.

PFP includes[23]:

- fire/smoke dampers – used to prevent the spread of fire/smoke throughout the building through its duct work;

- fire doors – help to compartmentalise a building;

- fire walls/floors – help to separate the building into compartments.

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[21] https://w w w .hse.gov.uk/comah/sragtech/techmeasfire.htm

[22] https://w w w .checkmatefire.com/passive-vs-active-fire-protection/

[23] https://w w w .checkmatefire.com/passive-vs-active-fire-protection/

2.4 Regulatory and technical requirements

The Principle Control of Fire Spread and limitation of damage is principally achieved through compartmentation of a building.

These compartments are bounded by fire resisting elements:

- Walls
- Floors
- Ceilings

Fire resisting elements are often breached to permit access for services or functional joints:

- Cables
- Pipes
- Ventilation systems
- Gaps between fire resisting elements and around the penetrations must be sealed so that the fire integrity of the fire – resisting element is maintained.

The key requirements governing the installation of active and passive fire prevention schemes in Scotland are set out as follows:

Building (Scotland) Regulations 2004

Fire prevention is referenced in sections 2, 3 and 4 of the Building (Scotland) Regulations 2004.

Passive systems are included in sub-sections of Section 2 designed to prevent premature collapse of the building in a fire, inhibit fire growth within the building, fire spread on the external wall and fire spread to and from adjacent buildings. 'Compartmentation' (Standard 2.1) is described in a sub section and is concerned with ensuring that buildings are designed and constructed in a way that will inhibit the spread of fire and smoke beyond the area of the fire source, although it should be noted that this sub-section does not apply to domestic buildings the same principle applies under standard 2.2 separation.

Other sub sections including 'structural protection' (Standard 2.3) 'cavities' (Standard 2.4) , 'internal linings' (Standard 2.5), 'spread to neighbouring buildings' (Standard 2.6) 'spread on external walls' (Standard 2.7) and 'spread from neighbouring buildings' (Standard 2.8) are similarly concerned with structural means to inhibit fire spreading. Active systems are included in the following sub-sections: 'Escape lighting' (Standard 2.10), 'Automatic fire detection and alarm systems' are covered in the guidance to Standard 2.11 (Communication) Fire service access' (Standard

2.12), 'fire service water supply (Standard 2.13)' and 'fire service facilities' (Standard 2.14) and 'automatic fire suppression systems' (Standard 2.15). There are, however, restrictions on the types of buildings to which this standard applies.

Section 3 documents information referencing 'preventing the spread of fire' and includes information regarding 'protection of oil storage from fire'. Section 4 includes information regarding 'electrical installations not becoming a source of fire', and 'prevention of fire spreading to liquefied petroleum gas storage'.

Most of the references to the prevention of the spread of fire are implicit rather than explicit and relate to specifics like cavities and active fire suppression systems. There is no reference to the prevention of spread within 'domestic' buildings although both active and passive fire safety measures are required to satisfy the regulations.

Building Standards Technical Handbooks 2019 Domestic and Non-Domestic

These technical handbooks are designed to support the application of the regulations. They contain information and assistance in a variety of forms.

In both handbooks sub-sections covering 'preventing the spread of fire' are headed similarly to the Building (Scotland) Regulations 2004 which are listed above together with an annex (Annex A) defining terms used in the Standards. Those related to fire-stopping are also listed in Annex A.

The handbooks also contain discussions and specifications regarding a number of topics and terms related to fire-stopping:

Fire resistance duration

The handbooks specify 'short', medium' and 'long' fire resistance duration for building components. Annex 2.D defines these durations in a table (reproduced in Table 2 below), and states that:

> 'The designer is free to choose materials or products which satisfy either the British Standard Tests or the Harmonised European Tests.'

Standards

The handbooks' Appendix B lists standards under the headings: Construction Products Regulation, British Standards, Codes of Practice (British Standards), European Standards and Drafts for Development (European Standards). These include:

British Standards:

- PD 7974-2: 2019 - Application of fire safety engineering principles to the design of buildings. Spread of smoke and toxic gases within and beyond the enclosure of origin; and

- BS 5306: Part 0: 1986 - Fire extinguishing installations and equipment on premises. Guide for the selection of installed systems and other fire equipment.

Other British Standards listed include those covering fire tests on building materials and structures.

European Standards - BS EN 1634-1: 2008 Fire resistance and smoke control tests for door and shutter assemblies - openable windows and elements of building hardware.

2.5   New legislation

Scotland already has stringent smoke and fire alarm standards in place. The highest standard is currently in place for new build housing and private rented housing, but these are set to be extended to all existing homes.

A consultation on Fire and Smoke Alarms in Scottish homes[24,25] conducted in late 2017, aimed to understand the views of the key groups on potential amendments to fire and smoke alarm standards in domestic properties. The following groups responded to the consultation: Housing Association, Local Authorities, Lettings, residential lettings, property management, Residents associations/tenant participation, Fire risk/Safety consultants, other (e.g. charities/health/professional organisations/manufacturers).

The following key themes arose during from the research:

- The need for the same high standard across all housing sectors regardless of tenure. While there is support for the standards currently applied in the private rented sector (PRS) and new build domestic properties, there are some concerns that there should be a higher standard than this, particularly for vulnerable groups of people or for individuals living in buildings with a higher risk factor.

- The need for fire risk assessments for all high-rise domestic buildings or risk assessments to identify residents at a greater risk of fire.

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[24] Consultation on Fire and smoke alarms in Scottish homes consultation: analysis of responses, 2018

[25] https://consult.gov.scot/housing-regeneration-and-welfare/fire-and-smoke-alarms-in-scottish-homes/

- The need for careful consideration of the timescales (including planning, procurement and implementation) and costs of compliance. These are particularly important for: social landlords who may have a large number of properties and who would want to align installation and maintenance with their regular maintenance cycles; owner occupiers who may be elderly, vulnerable or living on low incomes; other vulnerable groups such as those in care homes.

- The need to consider financial incentives such as grants, loans or subsidies.

- The difficulties in monitoring and enforcing a new minimum standard in the owner-occupied sector.

- The need for education / advertising campaigns to help raise awareness of issues in relation to fire safety.

Following the Scottish Government consultation on fire and smoke alarms[26], the long-standing legislation relating to smoke detection in the home changed with the result that all domestic properties in Scotland, regardless of tenure, should now have the same levels of fire detection. The same level of protection is introduced for people whether they own or rent property and for however short a time they may rent it. The Order will come into force on the 1st February 2021.

The *Housing (Scotland) Act 1987* is to be amended to reflect the new requirements, following the outcome of the Fire and Smoke Alarms in Scottish homes consultation. These new requirements insist on at least:

- one smoke alarm installed in the room most frequently used for general daytime living purposes;
- one smoke alarm in every circulation space on each storey, such as hallways and landings;
- one heat alarm installed in every kitchen.

There is also the requirement that:

- all alarms should be ceiling mounted; and
- all alarms should be interlinked.

The following changes to this standard, all supported by the responses to the consultation, are also proposed:

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[26] https://consult.gov.scot/housing-regeneration-and-welfare/fire-and-smoke-alarms-in-scottish-homes/

- specified types of sealed long-life battery alarms as well as mains-wired alarms - reflecting the availability of appropriate technology and encourage compliance, and
- carbon monoxide detectors in all homes.

The Minister for Housing Kevin Stewart highlighted the tragic events of the Grenfell Tower fire, the importance of building and fire safety and benefits of the new legislative changes:

"Fires and fatalities from fires are decreasing but even one death is one too many. Scotland already has rigorous standards for smoke and fire alarms developed over time, with the highest standard currently applied to new-build and private rented housing.

"The tragic events at Grenfell Tower last year emphasised how important building and fire safety is, which is why we brought forward our consultation on this issue. Now everyone will benefit from the same level of protection, whether you own your home, or rent from a social or private landlord."

Scottish Fire and Rescue Service (SFRS) Director of Prevention and Protection also commented:

"The presence of working smoke and heat detectors have been proven to significantly reduce casualties and fatalities occurring as a result of fires within the home. SFRS therefore welcome and support the next steps from this consultation which will undoubtedly improve home safety for all residents, regardless of tenure."

Under the Order, all homeowners and landlords and other relevant parties such as, building owners, developers, builders, building warrant applicants, need to be aware of these changes and they must ensure that appropriate measures are put in place to avoid non-compliance.

2.6 Fire safety installers Scotland

An approximation of the number of fire safety installers in Scotland can be achieved using a subscription-basis database that holds 3 million UK and Irish companies, and updated monthly. It includes large and small companies as well as registered and unregistered firms. The database can be searched by specific countries, regions, counties and towns and companies can be searched by SIC (Standard Industrial Classification) and by size.

Unfortunately, at present, fire safety installation does not have its own/unique SIC code. Currently, the installation of fire safety systems falls into:

SIC code F (Construction)

- 43.21 Electrical Installation (which encompasses fire alarm installation);

- 43.22 Plumbing, Heat and Air Conditioning Installation (which encompasses installation of fire sprinklers); or

- 43.29 Other Construction Installation (which encompasses fireproofing).

The database reveals that there are 7,506 companies operating in Scotland under these SIC codes. This number will, however, include a proportion of electrical and plumbing installation companies not offering fire safety services.

Of the 7,506 companies which fall under the listed SIC codes, only twelve have 'fire' in their trade descriptions and only one has 'fire safety' in its trade description.

One noteworthy point is that all official databases – including the UK-wide IDBR[27] tend to under-represent the smallest organisations and particularly those which fall beneath the VAT threshold or that are unincorporated.

A further consideration is that many general building companies and facilities management firms also carry out electrical and plumbing and heating work and may well be involved in the installation or construction of fire-related systems.

While the numbers which the database suggest may, therefore, be only a conservative estimate of the number of companies that directly work in fire safety installation, it is probable that the deduction from this total for companies within the SIC codes that do not offer fire-system services may be partially balanced by the numbers of more general companies which come under other SIC codes but also offer fire-system services.

An estimate of between 5,000 and 7,000 companies involved directly in the design and installation of fire-related systems would not be unreasonable.

2.6.1 Training for fire safety installers

Fire safety installers provide a critical role in fitting fire safety systems, systems that are there to save people's lives and protect their wellbeing. Not only do they fit the fire safety systems, but they ensure they fit the correct system to meet the customer's needs. Technology and fire related systems are ever changing and developing therefore it is paramount that installers upskill and keep up to date with

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[27] Inter-Departmental Business Register – holds details of around 2.4m businesses

the latest building and fire safety standards. Installers must be fully competent to ensure the fire safety measures are properly installed.

Fire safety installers[28] should be third party certified in order to install the specific product or system required. Approved Installers should carry Third Party Accredited Installers Accreditation such as FIRAS, QMARK, BMTRADA or equivalent in order to provide a reasonable assurance of quality.

Fire installers must now hold the IQ Level 2 Certificate in Fire Sprinkler Installation supported by British Automatic Fire Sprinkler Association (BAFSA) and although not mandatory, should be qualified to at least Level 3 on the European Qualifications Framework.

EN 16763 – 'Services for Fire Safety and Security Systems', lays out a Europe-wide benchmark of quality that should be expected and maintained throughout the industry and the minimum levels of competence for technicians. It is aimed at organisations that offer services such as planning, design, installation, verification. It forms an attempt to standardise understanding and responsibility within the industry to make sure services are of a demonstrably high standard.

Four modules are covered and are required to be completed in order to become qualified:

1. Foundation.
2. Health and Safety.
3. Environmental.
4. Advanced Installer.

After passing all four modules the FIA AO Level 3 in Fire Detection & Alarm Installation, Theory & Regulatory certification will be awarded. This qualification is currently the only one recognised nationally.

Other relevant standards for fire safety installers are as follows:

- BS 5839-1:2017 Fire detection and fire alarm systems for buildings. Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises;

- BS 9999:2017 Code of practice for fire safety in the design, management and use of buildings;

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[28] https://www.fia.uk.com/membership/third-party-certification.html

- BS EN 476-20:1987 Fire tests on building materials and structures. Method for determination of the fire resistance of elements of construction (general principles);

- BS EN 13501-1:2018 Fire classification of construction products and building elements. Classification using data from reaction to fire tests;

- BS EN 16034:2014 Pedestrian door sets, industrial, commercial, garage doors and openable windows. Product standard, performance characteristics. Fire resisting and/or smoke control characteristics;

- BS EN 1366-3:2009 Fire resistance tests for service installations. Penetration seals.

Various other fire safety related training exists and supplied by professional providers. Examples of training courses for fire safety installers include but are not limited to the following providers:

Table 1: Training courses (not exhaustive)[29]

Provider	Fire Safety Related Courses
Association for Specialist Fire Protection	Passive fire protection
BAFE	Fire Detection and alarms
BAFSA	Residential sprinklers through FIRAS
BRE Academy	Fire-Stopping and Compartmentation
Fire Protection Association	Fire Protection Association (FPA) Certificate for Institute of Fire Safety Managers (IFSM)
Independent Fire Inspections Ltd.	Fire-Stopping Inspection Diploma
NICEIC	Fire Sprinkler Installation Level 3
NICEIC	Fire detection and fire alarm systems - installation

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[29] More information is provided in Appendix 5.

2.7 Insurance

Certification carries with it an inevitable degree of responsibility and an equivalent element of personal liability for the certifiers. This liability needs to be insured to make sure companies or workers are protected from any losses arising from claims with respect to their work. Public liability insurance and professional indemnity insurance offer this cover with respect to certification. Legislation requires that certifiers carry insurance as part of the appointment process.

Public liability insurance cover includes:

- If someone is injured.

- If property is damaged through work carried out or through the supply of products.

- Legal fees.

- Visits to client premises.

The limits of public liability in most circumstances range from £1m to £5m. Larger companies negotiate bespoke deals with the insurance companies.

Professional Indemnity Insurance (PII) protects professionals in the event of claimants suggesting they have suffered loss as a result of non-performance, breach of contract and/or professional negligence in the services provided. Cover includes:

- The cost of defending a business against allegations of professional negligence.

- Compensation or damages awarded against the business/worker.

The limits of professional indemnity usually range from around £50,000 to £5million for most smaller and medium-sized businesses.

Approved Certifiers are recommended to carry their own PII and not rely on their employers to provide protection. Approved Bodies also require that the appropriate level of insurance cover is in place for carrying out work.

The need and requirements for a new certification scheme for Fire-Stopping

For Phases 2 to 5 the following types of bodies participated in the research:

- o Stakeholders in the industry (including fire safety installers and fire-stopping experts, local authorities and certification bodies).

- o Local Authorities.

- o Contractors.

- o Insurance companies.

The main focus of this phase of the research was to gain insight on the introduction of a scheme for a certification scheme for fire-stopping within the current Scottish building warrant process and to identify the impact it might have on the building standards system.

The views have been collated under the following headings:

- ✓ appetite and demand;

- ✓ knowledge, skills and qualifications requirements;

- ✓ training supply and demand;

- ✓ the technical scope of a new scheme;

- ✓ certification considerations including delivery organisations; and

- ✓ potential impacts and benefits.

All the organisations interviewed for this research volunteered the viewpoint that the Scottish inquiries and review reports and, of course, the Grenfell Tower fire tragedy in 2017 have significantly increased awareness of fire safety and the importance of fire protection.

All views discussed and set out below are from the small sample of interviews conducted as explained in 1.4.

3.1 Appetite and demand

Overall, organisations interviewed are open to the introduction of a potential certification scheme for active and passive fire safety measures.

- In particular, stakeholders and Local Authorities are strongly in support of a scheme that has as its aim to reinforce and enhance quality in active and passive fire safety measures.

- The majority of stakeholders, Local Authorities and some contractors believe a new certification scheme for fire-stopping would lead to improved knowledge and a better quality of fire safety installers as well as related quality assurance on site.

- A scheme, they felt, would improve fire safety and installation, therefore promoting public safety and potentially saving lives. In addition, it would increase customer confidence.

- Plus, an inherent benefit would be the introduction of clear guidelines for fire-stopping and fire safety as well as improved building regulation compliance and due diligence.

- Although this was not on the table for discussion, it was worthy of note that the majority of Local Authorities and contractors commented that they had doubts about the feasibility of introducing a mandatory scheme because of the need to police it effectively. Rather, they felt, a voluntary scheme, consistent with the already existing voluntary certification schemes was seen as more practical.

- One stakeholder remarked that, from an employer's point of view, the appetite for such a scheme is already there, as increasingly employers are asked to put their names against work they have undertaken. A scheme would bring confidence in the work their employees are carrying out.

- Perceived positive outcomes offered by contractors included an increase in customer confidence; improving safety therefore saving lives; improving the quality of workmanship; ensuring higher standards; greater awareness of fire safety and fire transfer and concluding that a building certificate could only be granted until all work has been checked.

- Perceived negative outcomes of introducing a fire-stopping certification scheme include additional costs and further bureaucracy; the need for further education to improve knowledge and unnecessary increase in paperwork, especially for those who already hold other certificates. There are doubts as

to whether having certifier status would ensure all fire-stopping measure are installed as this is something that already exists in the construction certification scheme and therefore should already be adhered to and installed properly.

- There was uncertainty amongst contractors as to the extent that a fire-stopping scheme would overlap with other certification schemes.

- Stakeholders highlighted the opportunity to initiate and increase the new scheme's take-up and buy-in if the scheme was promoted by Scottish Government and cascaded down through the industry, the view was that a top-down approach would work best.

3.2 Knowledge, skills, qualification requirements

There seems to be a general consensus amongst stakeholders and Local Authorities that, in any case fire-safety training provision and related qualifications have to be improved and the construction workforce upskilled in fire safety.

- There is a strong theme across the interviews that expanded training and improved qualifications would be of general benefit to the industry and promote fire safety.

- Local Authorities confirmed that fire safety training lacks a practical focus and will need to be enhanced or expanded for a certification scheme.

- Additionally, stakeholders said that, individuals in the field are simply either not up to the educational attainment of the industry or lack general adequate knowledge of the tasks they are required to perform.

- Contractors, however, were divided on this issue, with several stating that the certification processes offered by SELECT and NICEIC sufficiently covered fire safety training.

- One situation that warrants improvement, via training or other means, is construction site coordination between contractors. There was general agreement that this can be a serious problem. Contractors separate out tasks, often in sequence according to their specialism, but often lack full understanding of the implications of previously completed tasks/jobs, by other contractors, on fire safety. Encouraging the retention of evidence of such instances to share with the verifier should take place by contractors.

- General upskilling in active and passive fire safety knowledge and related awareness raising was therefore seen as a crucial step forward.

- A number of stakeholders explicitly called for an overhaul of existing qualifications.

- Three stakeholders, for example, suggested the need for an overhaul of fire safety qualifications including the Level 2 NVQ Diploma in Associated Industrial Services Occupations (Construction) – Passive Fire Protection (QCF) and the Level 3 NVQ Diploma in Occupational Work Supervision (Construction) (QCF) which are seen as insufficient proof of fire safety competence. Underlying reasons for this are inconsistent links between theoretical and practical training as well as perceived 'misleading proof of competence schemes like the CSCS card'.

- Added to this, training is seen as insufficient in terms of which materials should be used and why.

"The NVQ [alone] is not worth the paper it is printed on."

- A fire safety installer outlined the importance of holding critical knowledge of compartmentation and how this works. Additionally, why certain elements perform in certain ways including:

  o why fire travels,

  o why firestop every twenty metres,

  o why a particular solution is used, and the reasons for not mixing and matching products.

  o the level of protection buildings are required to have e.g. at 30, 60, 120 minutes.

- Several stakeholder/interviewees pointed out that contractors in certain situations are allowed to not complete all modules of the NVQs and still list fire safety as a competence on their CSCS card, which may be misleading to clients and customers.

- Reiterating the need for general upskilling across trades, a dedicated apprenticeship covering active and passive fire safety should also be introduced to provide a clear route of entry to fire-stopping.

- Contractors asked why, when they attend courses to update their knowledge, there is not explicit provision of fire-stopping training within existing courses. Currently, contractors explain that they are able to train their own fire safety installers in-house, so they could not comment on or are not experiencing many related skills gaps in their fire safety installer workforce. Contractors

acknowledge there is a general lack of qualified electricians as well as plumbers and joiners.

"No, we train our own electricians in fire safety and BS5839"

- The necessary skills and experience contractors believe fire safety installers should typically hold, as a minimum, include:

  - qualification in BS5839;
  - experience of conducting risk assessments;
  - awareness of building regulations;
  - understanding how fire spreads from different floors/apartments;
  - understanding building fabrics;
  - knowledge of building exits and escape routes;
  - knowledge of fire extinguishers – testing and using;
  - knowledge of ventilation;
  - knowledge of how to recognise faults;
  - knowledge of where to install alarms and fire barriers;, and
  - general electrical and fire safety knowledge.

Another stakeholder wished to add:

- the rationale of installing specific materials;

- key principles such as robustness of materials, insulation or lifecycle of materials.

3.3 Training supply and demand[30]

Local Authorities and contractors did not specifically address this issue in detail. Many contractors rely on SELECT and NICEIC for any fire safety training, which was generally seen as adequate for current purposes. There were some opposing views however.

- Stakeholders pointed out that, in general, training in the field, taken to be active and passive fire-safety measures, is regarded as 'basic'. Their worries concerned the opportunity for training to be undertaken on-the-job. Fire installers noted that on-the-job training can be inadequate and not a viable way to achieve fire-stopping certification.

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[30] An overview of relevant training and qualifications is outlined in Appendix 5.

- Whilst two contractors believed that the current training provision was sufficient and BS5839 was enough to meet the demands of a new scheme, others felt that the current training provision is insufficient for the demands of a new fire-stopping scheme, more training would be needed to improve knowledge.

- A number of interviewees suggested that short courses and a new fire-stopping syllabus should be created. According to one contractor there is a skills shortage in this area and more experienced installers were needed.

- The availability and quality of training provision could be strengthened through offering online courses and a number of contractors recommended that fire-stopping training should be included in apprenticeship schemes.

"I think it would be good if manufacturers are involved more. In order to get the best out of each of the products, you need to be able to install them properly, and this is something that manufacturers should teach. Also, manufacturers should get more involved with SELECT."

- The opportunity to make use of the growth of digital technology in training was pointed out, for example the use of Augmented and Virtual Reality in order to increase the breadth of knowledge and virtual experience of fires in buildings.

- This research revealed that there are three relevant Modern Apprenticeships (MA) that cover fire safety in some form. These include an MA offered by North Lanarkshire College in cooperation with SELECT in Electronic Fire and Security Systems (see Appendix 5). Other MAs are in Electrical Installation as well as Electronic Security Systems, both of which include basic fire safety training.

- In addition, the BRE academy provides CPD training in fire safety including online seminars and classroom training of between 1 and 7 days up to Level 4.

- At degree level, there is a BEngHons in Fire Engineering at Glasgow Caledonian University, but a stakeholder has suggested that the programme is likely to be discontinued due to low demand.

- These research results seem to confirm a lack of availability of dedicated and specialised training, and the suggestion that training provision and content will have to be expanded to upskill the construction workforce and expand the pool of fire safety specialists. This would be a central requirement for a Certification Scheme in fire-stopping.

3.4 Technical Scope of a new Scheme

All respondents generally found it difficult to know what the technical scope of a new scheme should look like or what it should include. The consensus was that the considerations are too many and too complex for them to be able to map out a scheme.

This included which fire safety related knowledge should be certified and audited. The responses varied depending on the interviewees: be they a contractor, electrical, general construction or industrial/commercial or high rise buildings. A minority suggested that a new scheme was not necessary for domestic property.

- Stakeholders viewed the technical scope for a new certification scheme as a challenge due to the existence of different elements, with specific mentions being given to the variance in, for example, compartment walls and floors products to make them fire protected (such as linear gap heads and wall heads).

- They also noted the difficulty of the content of the scope due to the many different trades and aspects of construction.

- Local Authorities were divided on the question as to whether such a Certification scheme should cover Design and Construction. While some supported this approach, others felt that focusing on construction would be more appropriate and relevant for active and passive fire safety.

- In addition, Local Authorities felt that the new certification scheme should cover all aspects of fire safety measure and risk level, including suitable products and materials, different levels relating to the extent of certifying own work, and the coverage of building complexity.

- They also pointed out that, beyond those technical aspects, the scheme should ensure people have a holistic understanding - the purpose of active and passive fire safety and why it needs to be done correctly.

- Contractors generally believed that the technical scope for a new certification scheme should cover both design and construction as many professionals have design and construction roles. In fact, the majority of contractors felt that a new scheme should cover all buildings' fire safety and risk level wise, however others thought that it should only need to cover high rise commercial and industrial buildings and exclude domestic buildings.

- Stakeholders indicated a willingness for experts to collaborate/assist with the design of such a certification scheme and that there would be definite interest in its delivery. BSD had only to request applications from prospective scheme providers in order to judge interest in that side of it.

3.5 Certification scheme implementation considerations

In terms of scheme implementation, respondents focused on the key themes of legislative changes, scheme provision and funding as well as fire safety inspection practices. In addition, it was repeatedly highlighted that such a scheme would need to be manageable and the operation of such a certification scheme would need to be limited to maximise any overall benefit.

- There was wide support amongst respondents for a single code [standard] for fire-stopping which relates to all trades and areas of construction. This could underpin a certification scheme for active and passive fire safety. From the perspective of contractors and Local Authorities, the scope of a single code and its correlation with existing building regulations would need to be clearly defined, though. In addition, the code would need to be clearly aligned with training, testing regimes and skills tests.

- Contractors and Local Authorities were uncertain if the new legislation for fire and smoke detection that comes into force in February 2021 (see section 2.5) in Scotland would be in scope of the scheme. Many contractors felt that this new legislation would have an impact (positively and negatively) on service demand and workload.

- Across respondent types, they generally confirmed the need of a transition period in which the scheme and related infrastructure could be set up and sufficient professionals completing the certification process.

- Respondents suggested that the new scheme should be financed by certification fees as is done for the existing certification schemes. Stakeholders pointed out that a scheme would need to be economically viable. Initial financial support by the Scottish Government could be considered.

- Inspection was felt to be a key element of implementing the scheme. But respondents were divided as to the likely impact a certification scheme on active and passive fire safety would have on inspections.

- Stakeholders consider inspections to be highly problematic due to skills shortages and with only a limited group of people with relevant and sufficient competence and inspection knowledge.

"The fire-stopping trade is fragmented as different parts are undertaken by different people – electricians, plumbers, contractors. How it all comes together is the issue. It's a jigsaw puzzle. A scheme to look at it holistically would be good."

- Local Authorities felt that the introduction of a scheme would not impact one way or the other on their responsibilities or those of construction professionals.

- In terms of workload, Local Authorities were divided on what kind of impact the introduction of a scheme may have on the volume of inspections carried out and if such a certification scheme would in effect reduce the need for inspections. This was partly due to the view that even if a task had been completed by somebody certified, this would not provide a guarantee that everything had been done appropriately.

3.6 Potential organisations for delivery of Certification in Scotland

Besides the Scottish Government itself, suggestions made by interviewees include the organisations that are already operating in Fire-stopping such as the list below. Other suggestions included manufacturers or a separate body entirely that understands the necessary skills-set.

BAFE[31] - A BAFE scheme is a set of requirements that have been developed to incorporate the high-quality standards and competences for services or products within the fire protection industry. By using a Third Party Certified BAFE registered company, as the Responsible Person (Duty Holder in Scotland) this can assist in providing proof of due diligence in fire safety requirements.

BAFE schemes are assessed through UKAS accredited Certification Bodies so that customers can be assured that BAFE registered companies are of the quality standard that you require when looking for your fire protection needs. UKAS accredited Certification Bodies ensure independent Third-Party Certification for organisations. These organisations are then subject to ongoing surveillance audits to ensure they are complying with the BAFE scheme requirements.

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[31] https://www.bafe.org.uk/schemes/

BMTrada[32] - BM TRADA's certification team of engaged experts provide a wide range of certification to services to a diverse range of industry sectors. Gaining and maintaining certification can help business get better at what it does, lower its costs and win more business. It acts as a 'passport to trade'. They claim their experts have a long history and wealth of experience in the industry.

NICEIC[33] - NICEIC Certification is a brand of Certsure LLP, a leading Certification body accredited by UKAS. Since 1998, NICEIC Certification has provided industry-recognised assessments to the building services sector, including plumbing and heating engineers. They aim to provide the highest levels of service to installer customers through a network of NICEIC approved training and assessment centres across the UK, and they are a scheme provider for Certification in Construction.

SELECT[34] - SELECT is the trade association for the electrical contracting industry in Scotland. SELECT provides a broad range of services and benefits to Members including advice on technical issues, health & safety and employment law. As the authoritative trade association for the electrotechnical industry in Scotland, SELECT helps to shape the market environment. In addition, they are involved in setting and monitoring industry standards and are a scheme provider for Certification in Construction.

3.7 Insurance considerations

Insurance premiums cannot be expected to decline significantly for fire-stopping certified professionals and any discounts in warrant fees and insurance premiums, etc. may be offset by the costs associated with completing the certification process. There was also uncertainty as to how a certification scheme would prompt business opportunities while insurance premiums are expected to remain high.

- Insurers interviewed, while not being able to comment on the technical aspects of fire safety and related qualifications, confirmed that insurance premiums, particularly for professional indemnity, are likely to remain high.

- They also pointed out that PII has a 'claims made' nature. This means that the policy responding to a claim is the one in place at the time the claim is notified to Insurers – not the policy in place when work was carried out. This has particular relevance to legacy risk. For to be covered, the insured must maintain a policy into the future and that policy must continue to provide protection in respect of the services carried out.

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[32] https://www.bmtrada.com/certification-services

[33] http://www.niceic.com/other-services/niceic-certification

[34] https://www.select.org.uk/about-us/

- One other issue they pointed out is that insurers, generally, do not offer products other than UK-wide, instead they tailor their products to specific industries such as 'construction'. Similarly, risks related to insurance are calculated on the basis of the UK construction industry as a whole. In this context, works related to fire safety and cladding are deemed as high risk, especially after the Grenfell Tower fire tragedy. Thus, while confirming that certified professionals may get a premium discount on a case by case basis, this would generally not have an impact on premiums overall, thus contradicting any voiced hopes of contractors that insurance premiums may be reduced as a result of a certification scheme.

"Whilst we recognise it is positive for construction professionals to be certified as meeting a certain standard, given the uncertainty regarding building safety, all enquiries involving cladding and/or fire safety are perceived as very high risk by insurers and are difficult to place in current market conditions."

- One insurer operating specifically in the construction and building standards market explained that, the messages emanating from the various reports (see section 2) combined with insurers' own experiences, are influencing underwriters' perception and appetite, as they question whether they will be left to carry the legacy risk, thus disrupting the insurance and PII market in particular.

3.8 Potential impacts/benefits

There was general acknowledgement that there were benefits to be had of a certification scheme in active and passive fire safety, with the main one focusing on public safety and upskilling. In general, contractors saw fewer immediate benefits to them as a commercial business.

- Respondents generally identified non-monetary benefits for the introduction of the scheme including:

  - raising compliance and provide greater clarity;
  - positive impact on quality, public safety and due diligence;
  - applicant or customer guaranteed that the individual will be qualified and competent in their work;
  - more confidence, control and clarity;
  - consistent approach;
  - upskilling in installation work;
  - improving training provision, and, ultimately,
  - the potential for more certified workers.

- The consensus from stakeholders was that if training and qualifications were improved this would benefit the field enormously as it would raise the standard internally.

- A general upskilling effect was also perceived by contractors and Local Authorities.

- On the other hand, respondents were less certain about immediate financial benefits related to the introduction of a certification scheme for active and passive fire safety, though there were hopes that certification may lead to more business for contractors.

- Similarly, contractors and Local Authorities saw the potential costs associated with getting a certification scheme set-up and implemented as a barrier.

- There was also uncertainty on how the scope of a certification scheme may impact on smaller electrical installations and similar jobs related to fire safety. These included concerns about commercial opportunities still being available to contractors without being certified (e.g. if they already have BS7671 certification) therefore prompting little economic incentive for certification.

- Local Authorities were divided on the potential reduction of workload for inspections by the introduction of a certification scheme for active and passive fire safety. While this was confirmed by some Local Authorities and denied by others, there was a general consensus that the responsibilities for Local Authorities in terms of verification and inspections would not be eased by the introduction of a certification scheme for fire-stopping. This may be a reflection of the current system of certification (of design and of construction), as it is a voluntary route and it has been noted that several scheme providers have noted a downward trend in the number of applications to become an Approved Certifier[35].

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[35] Futures Board meeting 14th May 2019 discussion on Certification'

Conclusions

4.1 Demand for and benefits of a scheme

All groups (stakeholders, Local Authorities and contractors) interviewed highlighted that the building failures in Scotland and the Grenfell Tower fire tragedy, followed by the subsequent inquiries and reviews in Scotland have significantly raised awareness of fire safety.

They were largely in agreement on the potential overarching benefits of a new fire-stopping certification scheme. Stakeholders and Local Authorities were more in favour

This research has revealed, however, that professionals and experts are, at present, divided on other key questions related to the introduction of a fire-stopping certification scheme.

These issues relate to a lack of clarity to the scope of a potential scheme, whether there are widespread skills gaps (in the existing workforce) and skills shortages generally in the industry. There was also disagreement amongst Local Authorities whether a new scheme could potentially result in the benefit of reducing pressure in and having a reduced workload from the introduction of a new certification scheme.

Contractors could see positive and negative outcomes of introducing a fire-stopping certification scheme. The positives being an increase in customer confidence; improving safety therefore saving lives; improving the quality of workmanship; ensuring higher standards; and greater awareness of fire safety. They were wary however of additional costs and further bureaucracy; the need for further education to improve knowledge and unnecessary increase in paperwork, especially for those who already hold other certificates.

Some voiced doubts as to whether having certifier status would ensure all fire-stopping measures are installed as this is something, they pointed out, that already exists in the construction certification scheme and therefore should already be adhered to and installed properly. There were underlying concerns around duplication with other schemes and how this would be managed.

Insurers confirmed that being certified could have a positive impact on insurance premiums on a case by case basis. Nevertheless, they felt that the related impact of a new scheme would be minimal as work related to active and passive fire safety is

regarded generally as high risk for insurers. Insurance products are available across the UK and not split according to schemes or nations. On the other hand, insurance premiums would not be adversely affected, and insurers, naturally, saw the potential public safety benefits of any such scheme. Insurance premiums should not therefore pose a major obstacle to a new scheme. Insurers confirmed that a national UK scheme could have a positive impact on premiums and confidence.

An estimate of between 5,000 and 7,000 companies involved directly in the design and installation of fire-related systems would not be unreasonable.

4.2 Rationale and scope of a fire-stopping certification scheme

- Deficiencies in active and passive fire safety installations have played a key role in a number of high-profile building failures;

  Expert stakeholders, in line with several official reports, believe that much of the responsibility for such deficiencies lies with less-than optimal education and training of management and workforce. On the other hand, Local Authorities and contractors have not voiced strong concerns over current fire safety qualifications and related training provided through existing certification schemes;

- Certification schemes offer many benefits such as; helping develop trust and respect between clients and building professionals, greater flexibility, more efficient design and installation, reduction of risk of errors due to lack of expert knowledge, reduction in the volume and cost of defective or incomplete work issues associated with warrantable work;

- The majority of Stakeholders, Local Authorities and some contractors see value in introducing certification for active and passive fire safety measures and expect related benefits to be increased public safety and customer confidence, improved work quality and competence as well as due diligence;

- Some stakeholders feel that a scheme for fire-stopping should be mandatory. This assumption was not shared by the majority of contractors, who were not sure how such a scheme would be policed. Local authorities were also more in favour of a voluntary scheme, which in their view would be consistent with the existing certification schemes;

- If the scheme becomes mandatory, a registration agency or body would need to be established or the role be given to an existing body;

- Similarly, contractors and Local Authorities were divided on the question if a new scheme should be relevant to design and construction elements of a

project. They were also uncertain about the technical scope of the scheme, and were generally reluctant to specify details.

- In terms of financing the scheme, contractors and LAs were in favour of financing the scheme through fees charged for the certification and auditing process. If the scheme would be applied to smaller domestic work, this would significantly impact contractors. This potential concern was also voiced by several Local Authorities.

4.3 Fire safety qualifications, skills, competence and training

- There is a lack of consensus between contractors and stakeholders on whether there is limited knowledge of fire-stopping and a lack of competence within the industry. For instance, the majority of contractors interviewed felt that the training provided by, for example SELECT, covers this sufficiently but others including the stakeholders made a strong case that there are inconsistencies and a lack of required knowledge. This situation may be an indicator that fire safety is understood differently between industries and that greater knowledge and awareness is required.

- Most Local Authorities felt that the present qualification system does not provide enough practical competence.

- Similarly, several stakeholders highlighted that there are weaknesses in the qualifications currently in place serving as proof of fire safety competence. A stakeholder recommended that the existing qualifications are revised and related systems of proving competence are strengthened.

- The insurers interviewed stated that construction work related to fire safety and risk are generally deemed a risk, due to the recent building failures. They did not, however, explicitly state that skills shortages and/or deficiencies in qualifications and training could be attributed to this risk calculation. Therefore, it is possible that even with reforms of qualifications an outcome leads to decreasing insurance premiums over the next few years. Insurance companies were keen to point out, however, that lower insurance premiums are unlikely and should not be the driver for contractors seeking to become certified in fire-stopping.

Recommendations

5.1 Scope of scheme and promotion

➢ Based on the results of this research, it would appear there is a need and appetite for a new certification scheme for fire-stopping.

➢ However, the implementation of a new scheme for active and passive fire safety will need careful consideration. Decisions on the technical scope are the most challenging. The scope is currently extremely wide due to the many different trades, manufacturers, products, etc. involved in the active and passive fire safety industry;

  ✓ A body of fire safety experts should be convened to help with the design and coverage of a proposed scheme. It may reduce the time this will take if BSD starts that process off and consults on drafts.

➢ To implement a scheme, an appropriate provider would need to be nominated and funding of the scheme would need to be assured. As with the existing schemes and based on comments from contractors and Local Authorities, the scheme provider could charge fees for certification and auditing. The commercial viability of the scheme is necessary and more likely if there was help from the Scottish Government with (financial) support.

  ✓ The introduction of any such scheme should be arranged through an interim or transition phase in order to allow a pipeline of professionals to go through the certification process and, thereby, build up a pool of certified professionals.

➢ Based on the responses of contractors and Local Authorities, there is presently no consensus as to whether a new scheme should be relevant to the design and construction phases or just construction.

  ✓ The issue of construction site coordination between different trades and the responses of Local Authorities as experts of inspection and verification may lend more weight to an initial construction-only scheme;

➢ Insurers have confirmed that insurance premiums are based on the entire UK construction industry and that fire safety and cladding work is seen as high risk. The economics of insurance make it unlikely that a certification scheme in fire-stopping in Scotland would result in significantly reduced insurance fees and costs for contractors in Scotland. The insurance costs are very high and these, alone, would suggest that a UK-wide scheme might be more practicable:

✓ A new certification scheme would make much more business and economic sense in fire-stopping if the reform process and scheme were linked to that in England and Wales with a new approach being rolled-out UK-wide. This could be preceded perhaps by a Scottish pilot scheme with insurance suitably subsidised by the Scottish government.

5.2. Qualifications and training

➢ There are strong views on the need for improving the skills and knowledge of those involved with fire safety whether at the design or construction stages. To help ensure a future pipeline of contractors and professionals involved with building warrant work, holding consistent and up-to-date knowledge, and based on the feedback from the research, we recommend the following activities:

✓ That fire safety knowledge and understanding needs to be enhanced on an urgent basis. To underpin the aims of a certification scheme, a deeper review of the education and training in existence needs to be undertaken to 1) ensure consistency, 2) validate how active and passive fire safety information training is refreshed and upgraded, and 3) check the extent of coverage of specific fire safety elements as highlighted in section 3.2; for example:

➢ understanding how fire spreads from different floors/apartments;
➢ understanding building fabrics;
➢ knowledge of building exits and escape routes/fire extinguishers – testing and using/ventilation/ recognise faults/ where to install alarms and fire barriers; and general electrical and fire safety knowledge.

✓ That the scheme, if it is to remain voluntary, will need strong promotion across the trades to reinforce the need for certification and the general and business benefits.

➢ In addition, existing training would benefit from review and made more comprehensive and perhaps contain, as feedback suggested, more on-site training before anyone can be called a 'professional fire-stopper/installer'. The greater use of technology (AR/VR/BIM etc.) should also form a background to a critical review.

➢ As the CSCS card is recognised UK wide, relevant, completed training and evidence on CSCS cards could be made more transparent to give better information to customers.

This leaves final questions not fully answered through this research. Although discussed there is a question whether such a scheme be voluntary?

A final recommendation is to consider these alternative steps in the first instance:

- Existing certification schemes could be amended/enhanced to include fire-stopping, rather than invest time and money to introduce a new, fifth scheme.

- Improve and reinforce all the training and qualifications related to fire-safety to achieve the result of increased knowledge, awareness and safety.

Appendix 1 - Research methodology

The following research themes and questions were investigated:

Research objective	Line of questions:
Determining the appetite and demand for a new certification scheme for fire-stopping	• How the construction industry and verifiers are responding to high-profile building failures and resulting inquiries • Future developments in the industry regarding the installation of fire safety measures • Views on existing certification schemes in Scotland, strengths, weaknesses, gap regarding fire safety installations • If/how a new certification scheme covering fire safety measures could improve compliance and plug gaps • Appetite/demand for a new certification scheme and justifications
Knowledge, skills and qualification requirements of fire safety installers	• Gaps in the knowledge and skills of fire safety installers • Qualifications and experience requirements of fire safety installers

Training demand and supply, including availability and quality of current provision	• Training demand/supply dynamic for fire safety installers, including:
	    ○ Availability of qualifications and other training courses;
	    ○ Perceived suitability of qualifications and training content;
	    ○ Scale of demand in relation to available supply;
	    ○ Whether demand is increasing/static/declining
	
	• Further details about the content of 'fire prevention' training and professional development modules:
	    ○ whether training is mandatory/optional
	    ○ delivery method (classroom/online/other)
	    ○ frequency that content is reviewed
	
	• Views on how existing training and qualifications provision should be strengthened

Technical scope of a new certification scheme for fire-stopping	• What the technical scope for a new certification scheme should look like, factoring in:
	
	    o fire-stopping
	    o wider passive/active fire safety measures
	    o coverage of domestic/non-domestic buildings
	    o risk level of buildings and how these should be defined and used

Implementation of considerations, including key players to be involved, their skills and capacity;	• Broad exploration of operational considerations associated with setting up and running a certification scheme. • The technical, administrative and audit skills of organisations delivering a new certification scheme for fire-stopping; • Inventory of UK national (and specifically Scotland-based) fire safety organisations • Appetite and capacity of these organisations to deliver such a scheme, either solely or collaboratively • Any implications for delivery if the building standards delivery model were to be re-shaped to create a centralised national hub
Potential impact and benefits	• Applications • Insurance

Appendix 2 - Current definitions

Building Standards Technical Handbooks, 2019

Cavity barrier means any construction provided to seal a cavity against the penetration of fire and smoke, or to restrict its movement within the cavity.

Compartment means a part of a building (which may contain one or more rooms, spaces or storey and includes, where relevant, the space above the top storey of the compartment) constructed so as to prevent the spread of fire to or from another part of the same building; and compartmented and compartmentation should be construed accordingly.

Compartment floor means a floor with the fire resistance required to ensure compartmentation.

Compartment wall means a wall with the fire resistance required to ensure compartmentation.

Fire door means a door which, together with its frame and furniture as installed in a building, is intended, when closed, to resist the passage of fire and, where prescribed, smoke and is capable of meeting specified performance criteria in section 2.

Fire-stop means a seal provided to close an imperfection of fit or design tolerance between elements, components or construction so as to restrict the passage of fire and smoke through that imperfection. Fire-stopping and fire-stopped should be construed accordingly

Protected door means a fire door giving access to:

Protected zone, part of an escape route which is within a building, but not within a room, and to which access is only by way of a protected door and from which there is an exit directly to a place of safety. Includes a protected lobby, a fire-fighting shaft, another compartment or, a place of safety, an unenclosed external escape stair, an open access balcony, or an escape route across a flat roof or access deck.

Protected enclosure in a dwelling means a circulation area constructed to resist fire in adjoining accommodation. It includes a hall, landing or private stair or ramp but not a room.

Protected lobby means a lobby within a protected zone but separated from the remainder of the protected zone so as to resist the movement of smoke from the adjoining accommodation to the remainder of the protected zone.

Table 2: Fire resistance duration for common building elements of components

Construction	Fire resistance duration	British Standards Load bearing capacity (mins)	British Standards Integrity (mins)	British Standards Insulation (mins)	European Standards	Test exposure
1. Structural frame, column or beam	Short	30	None	None	R 30	Faces exposed on the inside
	Medium	60	None	None	R 60	
	Long	120	None	None	R 120	
2. Compartment floor, separating floor or a floor, flat roof or access deck protecting routes of escape (see clause 2.0.6)	Short	30	30	30	REI 30	From the underside
	Medium	60	60	60	REI 60	
	Long	120	120	120	REI 120	
3. Floor, other than a floor in 2	Short	30	None	None	R 30	From the underside
	Medium	60	None	None	R 60	
	Long	120	None	None	R 120	
4. Fire shutter in a compartment floor (see clause 2.1.14)	Short	None	30	None	E 30	From the underside when fitted in frame
	Medium	None	60	None	E 60	
	Long	None	120	None	E 120	

Construction	Fire resistance duration	British Standards Load bearing capacity (mins)	British Standards Integrity (mins)	British Standards Insulation (mins)	European Standards	Test exposure
5. Compartment wall, sub-compartment wall, separating wall, or an internal wall or screen used as a protected route of escape (see clause 2.0.6)	Short	30 [4]	30	30 [5]	REI 30 [4,5]	Each side separately
	Medium	60 [4]	60	60	REI 60 [4]	
	Long	120 [4]	120	120	REI 120 [4]	
6. Load-bearing wall, other than a wall in 5	Short	30	None	None	R 30	Each side separately
	Medium	60	None	None	R 60	
	Long	120	None	None	R 120	
7. Fire door in a wall in 5	Short	None	30 [6]	None	E 30 Sa [6]	Each side separately, when fitted in frame
	Medium	None	60 [6]	None	E 60 Sa [6]	
	Long	None	120 [6, 7]	None	E 120 Sa [6, 7]	
8. Fire shutter in a compartment wall (see clause 2.1.14) or in a wall or screen protecting routes of escape (see clause 2.0.6)	Short	None	30	30 [8]	EI 30 [8]	Each side separately, when fitted in frame [8]
	Medium	None	60	60 [8]	EI 60 [8]	
	Long	None	120	120 [8]	EI 120 [8]	

Construction	Fire resistance duration	British Standards Load bearing capacity (mins)	British Standards Integrity (mins)	British Standards Insulation (mins)	European Standards	Test exposure
9. External wall more than 1 m from a boundary [1, 2]	Short	30 [4]	30	None	RE 30 [4]	From the inside only
	Medium	60 [4]	60	30	RE 60 & I 30 [4]	
10. External wall not more than 1 m from a boundary [1, 2]	Short	30 [4]	30	30	REI 30 [4]	From the inside only
	Medium	60 [4]	60	60	REI 60 [4]	
11. Horizontal cavity barrier	Short	None	30	None	E 30	From the underside
12. Vertical cavity barrier	Short	None	30	None	E 30	Each side separately
13. Ceiling dispensing with a cavity barrier (see clauses)	Short	None	30	30	EI 30	From the underside
14. Roof against an external wall (see annex)	Medium	None	60	60	EI 60	From the inside

Appendix 3 – Certification schemes

Benefits of using Approved Certifiers or membership of a Certification scheme

The Certification Handbook (2012) states the following benefits to applicants of using certification services, provided the right notification and certificates have been submitted at the correct time throughout the process:

Benefits of a Certificate of Design

- a discount in warrant fee(s) except in the case of an amendment to warrant when the estimated value of the additional work does not exceed £5000, and

a reduction in the length of time required to process the building warrant;

BRE[36] list the benefits as the following:

- Use of an Approved Certifier demonstrates and helps develop respect and trust between clients and building professionals.

- Use of an Approved Certifier provides greater flexibility and more efficient design or installation due to their expert knowledge of new technology or the application of new regulations (e.g. Eurocodes, micro-renewables and energy standards).

- Higher standard of work will help reduce the volume and cost of defective or incomplete work issues associated with warrantable work.

- An Approved Certifier's comprehensive knowledge reduces the risk of errors or omissions happening in the design or construction.

- Scheme members are able to differentiate themselves from competitors and gain a commercial advantage over other firms.

- Use of an Approved Certifier offers a higher level of protection to customers through the indemnity insurance cover held by Approved Bodies.

Similarly, the **benefits of a Certificate of Construction** are described as:

- a discount on the warrant fee, and

- a reduction in the length of time required to accept a completion certificate.

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[36] https://www.bregroup.com/services/certification-and-listings/approved-certifiers-of-design-scotland-domestic-and-non-domestic-buildings/

Use of an Approved Certifier offers many other benefits for the construction industry and building owners.

SELECT – the trade association for the electrical contracting industry in Scotland - state that membership of a certification scheme can bring with it many benefits for tradespeople. Some of these benefits are shown below:

- Quicker acceptance of completion certificates by local authorities. Certified installations are not inspected at completion.

- A discount on the building warrant application fee is given if the local authority is notified of the intended use of an Approved Certifier of Construction and a Certificate of Construction is submitted with the completion certificate.

- Approved Certifiers are able to provide a quality service and ensure compliance of work with building regulations.

- Approved Bodies hold adequate insurance cover for any project to be certified.

- Members of a certification scheme have their work audited by the scheme provider.

- Construction professionals and tradespeople must have met high levels of qualifications and experience necessary to be accepted into certification schemes.

- The skills and experience of construction professionals and tradespeople are recognised.

Certification of Design (Building Structures)

This scheme is administered by Structural Engineers Registration Ltd (SER) who were appointed by the Scottish Government Building Standards Division. The scheme was a result of a joint initiative by The Institution of Structural Engineers (IStructE) and The Institution of Civil Engineers (ICE). It was driven by the introduction of the Building (Scotland) Act 2003. The Act encourages the use of Approved Certifiers to certify the structural design of buildings in Scotland, and for the certificate to be included with the building warrant application.

A certificate of design will cover the design of a building, part of a building, services or fittings or equipment certifying compliance against:

- specified building standards in schedule 5 of the Building (Scotland) Regulations 2004; or

- all the standards within one of the seven sections of the Technical Handbooks and in both cases.

The Certification of Design (Building Structures) Scheme related to the design of building structures to building standard 1.1 (Structure) and standard (1.2 (Disproportionate Collapse).

Those who hold Approved Certifier status are responsible for making sure that each specified aspect of design of the works is in accordance with the scope of the relevant scheme. The work they carry out must be compliant but also must not compromise the compliance of other work carried out.

The SER website details how to join the scheme and signposts the Scottish Building Standards Division Certification Register which lists certifiers.[37]

<u>Approved Certifiers of Design (ACD) Schemes – energy for domestic (housing) and non-domestic (commercial) buildings in Scotland</u>

The schemes are administered by BRE[38] and the Royal Incorporation of Architects in Scotland (RIAS). They allow members to assure compliance with the Mandatory Functional Standards of the Building (Scotland) Regulations, Section 6 Energy.

<u>Certificate of Construction (Electrical Installations to BS7671)</u>

This scheme is administered by the Electrical Contractors' Association of Scotland (SELECT) and Certsure (NICEIC). Together they provide a route through which individuals can become approved certifiers as well as allowing enterprises to register with the scheme and become approved bodies.

SELECT and NICEIC ensure that Approved Certifiers hold the necessary qualifications and experience to certify that electrical installation work in Scotland is compliant with the Building Regulation requirements.[39]

<u>Approved Certifiers of Construction Scheme – drainage, heating, plumbing</u>

This Scheme is administered by The Scottish and Northern Ireland Plumbing Employers Federation (SNIPEF). Like SELECT and NICEIC, the Federation provides a route through which individuals can become approved certifiers and through which enterprises can become approved bodies.

Like SELECT and NICEIC, they also ensure that Approved Certifiers hold the necessary qualifications and experience to certify that drainage, heating and plumbing work in Scotland is compliant with the Building Regulation requirements.[40]

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[37] https://www.ser-ltd.com/ser-scotland
[38] The leading building science agency in the UK (built upon the foundations of the Building Research Establishment – founded 1921).
[39] https://www.niceic.com/Niceic/Niceic/media/Schemes/NICEIC-Rules-of-Registration-for-Scottish-Certification-Scheme.pdf
[40] https://www.snipef.org/approved-certifiers.htm

Appendix 4 – Fire safety training & qualifications

NICEIC training

NICEIC offer fire safety and emergency lighting training for contractors in Scotland delivered at a variety of partner colleges. Examples of some of the courses available in Scotland are as follows:

- **Fire detection and fire alarm system – fundamentals. Unit 1**
  A one day course that provides the learner with the understanding of legislation and standards relating to fire detection and fire alarm systems as well as basic fire behaviour principles in accordance with BS 5839.

- **Fire detection and fire alarm systems – design. Unit 2**
  A two-day course that provides the learner with the understanding of the design process of fire detection and fire alarm systems.

- **Fire detection and fire alarm systems – installation. Unit 3**
  A one day course that focusses on the installation of fire detection and fire alarm systems. This course will qualify that the learner complete installations for non-domestic buildings.

- **Fire detection and fire alarm systems – maintenance. Unit 5**
  A one day course that focusses on the maintenance of dire detection and fire alarms systems covering routine inspection and servicing and understanding false alarms.

Other NICEIC courses (not available in Scotland):

- **Fire detection and fire alarm systems – commission. Unit 4**

- **Fire detection and fire alarm systems – domestic. Unit 6**

SELECT training

SELECT offer a number of electrical courses throughout Scotland and courses are approved by the Scottish Qualifications Authority (SQA). All of SELECT's BS 7671 courses will receive a certificate from the SQA and are jointly badged by SELECT and SQA.

The training courses offered across Scotland by SELECT include a range of course for electrical installation, such as:

- **SQA [SELECT] - Tailored Award in Design and Verification of Electrical Installations (208) - SCQF Level 7**
  This three-day course provides learners with knowledge of the wiring regulations and initial verification as well as the design of electrical installations.

- **SQA [SELECT] - Customised Award in Requirements for Electrical Installations (209)**
  This one-day training course (can also be completed as an online course) is aimed at electricians who want to update their skills and knowledge relating to inspection, testing and certification.

- **SQA [SELECT] – Customised Award in Inspection and Testing of Electrical Installations including Period Inspection (214) - SCQF Level 7**
  This two-day course focuses on the practice of inspection and testing of new and existing installations.

- **SQA [SELET] Customised Award in Requirements for Electrical Installations to BS 7671 (218)**
  This short online course combined with one day attendance at a training course is aimed at electricians and others who are responsible for ensuring that electrical installations are installed and commissioned in agreement with the current requirements.

- **Scottish Building Standards – Online (408)**
  This online course providers learners with the required information for Approved Certifiers of Construction to keep up-to-date with Scottish Building Standards Guidance and Legislation.

- **Scottish Building Standards – (216)**
  A one-day course required of electricians who wish to register as an Approved Certifier of Construction.

- **In-service Inspection and Testing (207)**
  A one-day course focussing on the inspection and testing of electrical equipment including portable appliances.

- **Energy Storage Systems (415)**
  A one-day introductory course that focusses on energy storage systems and the design and installation in domestic and commercial settings.

Modern Apprenticeship (MA) in Electronic Fire and Security Systems SCQF 6,[41]

This three-year qualification is provided by North Lanarkshire College and operated by SELECT. Modern Apprenticeships are designed to *'deliver a training package around a minimum standard of competence defined by employers through Sector Skills Councils (SSCs)'.*

To achieve the Modern Apprenticeship Award, learners will have to complete three course areas:

- Personal Development Awards (PDA) – a combination of classroom and distance learning. The 11 units include installation practices, health and safety, fire alarm systems installation, maintenance and signalling to name a few.

- Scottish Vocational Qualification (SVQ) – The SVQ covers the practical elements of the course. Learners will cover units including intruder alarms, fire alarms, CCTV systems and access control systems.

- Log Book Assessments (OneFile) – OneFile is an eportfolio journal for apprenticeships.

Modern Apprenticeships – Electronic Security Systems at SCQF Level 6[42]
This Modern Apprenticeship is managed by Skills for Security and is aimed at those who wish to become security systems installation and maintenance engineers. It covers core skills such as communication, problem solving and numeracy as well as

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[41] https://www.nclanarkshire.ac.uk/courses/apprenticeships-courses/modern-apprenticeships/electrical-electronic/electrical-electronic/electronic-fire-securities

[42] https://www.skillsdevelopmentscotland.co.uk/media/33299/ma-framework-electronic-security-systems-at-scqf-level-6.pdf

introducing the learner to the electronic security systems sector focusing on design, installation and maintenance of electronic security and fire systems.

BRE Academy

BRE Academy offers a variety of fire safety training online and interaction classroom lessons. Courses available include:

- **Fire-stopping and Compartmentation**
  The one-day course covers eight modules that provides the learners with a comprehensive outline of fire-stopping and compartmentation, regulations and conducting an inspection. This course is specifically aimed at those involved with the design, installation and inspection of fire-stopping and compartmentation.

- **Passive Fire Protection – Level 3 Foundation**
  This seven-day foundation course is offered in partnership with the Association of Specialist Fire Protection (ASFP), developed by the ASFP and the Institution of Fire Engineers (IFE).

  The foundation focusses on the understanding of fire science, fire safety and methods of active protection, plus passive fire protection measures. This foundation allows learner to study to obtain a recognised qualification in passive fire protection.

- **Fire Door Inspection – Level 3 Award**
  This one-day course will equip the learner with the competencies in carrying out fire door inspections.

- **Fire Risk Assessor – Level 4 Diploma**
  This is a five-day training course that enables the learner to complete fire risk assessments of complex buildings, as described in the Regulatory Reform (Fire Safety) Order 2005. After completion, learners will be able to progress to a Level 4 qualification in fire risk assessment. This course is aimed at those who are responsible for conducting risk assessments.

Fire Protection Association (FPA)

Certificate in Fire Risk Assessment (C05)
This five-day course, approved by the Institution of Fire Safety Managers (IFSM), is aimed at those who are responsible for conducting or implementing fire risk assessments. Learners will understand fundamental principles of fire prevention and a range of topics concerning fire safety management as well as workplace hazards, risks and the principles of fire risk assessment. Upon completion of this course, the learner receives the level 4 CFPA Europe Fire Risk Assessor.

Independent Fire Inspections Ltd

- **Level NVQ Diploma in Associated Industrial Services Occupations (Construction) – Passive Fire Protection (QCF)**
  This qualification is intended for those who are already in employment. The learner will develop and recognise skills and competence so that they can work in Passive Fire Protection. Learners will gain practical skills in moving, handling and storing resources as well as erecting and dismantling access or working platforms in the workplace plus general health and safety knowledge. Assessment is carried out on site using a range of assessment methods.

BEng (Hons) Fire Risk Engineering, Glasgow Caledonian University[43]

This qualification can be studied part time over three to five years and was developed in partnership with the Fire and Rescue Service. Learners have the opportunity to study abroad or complete an accredited work placement, as well as an optional work placement. During the course of the programme, learners will complete a foundation level in their first year in building design, technology and performance. Following from year one, learners will cover the principles of fire safety analysis and the practice of fire safety design and regulation as well as risk management and an introduction to maths and structure. Learns can expect to find a career within the fire services, the construction industry and local authorities in the UK and abroad.

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[43] https://www.gcu.ac.uk/study/courses/details/index.php/P02899/Fire_Risk_Engineering/#Whatyouwillstudy

Appendix 5 - Fire safety Associations

In the UK there are numerous organisations with fire safety expertise. Below are some key organisations that we have identified within the industry.

Fire Protection Association (FPA)

The Fire Protection Association (FPA) is a fire safety organisation and was founded in 1946. They work to identify and educate people on the dangers of fire and how loss can be kept to a minimum. FPA deliver work and expertise in all aspects of fire including research, consultancy, training, membership, publications, risk surveying and auditing. Their products and services are designed to assist fire, security and safety professionals maintain the highest standards of fire safety. Their training and consultancy services are conducted in accordance with the requirements of the FPA quality management system, assessed and approved by Lloyds Register and certified to BS EN ISO 9001:2015.[44]

FPA training credentials are:

- They are an Institution of Fire Engineers (IFE) Approved Training Centre
- They have approved centre accredited status from the Institute of Fire Safety Managers (IFSM)
- They are an IQ accredited centre
- They are an Educational Associate of the Electrical Contractors' Association (ECA)
- They are a constituent member of the Confederation of European Fire Protection Associations (CFPA Europe)
- They are a NEBOSH Accredited Centre
- They have achieved the Investors in People Award
- The majority of our courses offer CPD points
- Certified **NSI Gold Award for BAFE SP205**

Fire Industry Association

The FIA is the largest fire protection trade association in the UK with 850 plus members. They are a not-for-profit organisation and a major provider of fire safety training. Their aim is to: promote, improve and perfect fire protection methods, devices, services and apparatus and they enable this through representing their

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[44] https://www.thefpa.co.uk//index.cfm?originalUrl=about/&_tkn=5274E457%2D09BB%2D4A67%2D88E30CE619F7EB09

members, providing technical support, guidance and opportunities for professional development via education and regulation. They help promote and share legislation and the professional standards of the fire industry and work closely with the UK government, official bodies and key stakeholders.[45]

Fire Safety Advice Centre

The Fire Safety Advice Centre provides free fire safety and fire prevention advice in the United Kingdom. Its resource library offers fire safety information for homes and businesses.[46]

Association for Specialist Fire Protection (ASFP)

The ASFP is dedicated to the protection of life, property, the environment and their heritage and promotes continuous improvement in all aspects of passive fire protection. Working with Government and international standard setting bodies both directly, and via other sector group associations, the ASFP endeavours to increase the quality of installed fire protection within all forms of construction. The ASFP strives to promote excellence in the design and installation of fire protection products through high quality and technical expertise.

Scottish Fire and Rescue Service (SFRS)

In Scotland the Scottish Fire and Rescue Service (SFRS) works to protect every community not only by responding to incidents, but also by preventing them from happening in the first place. The SFRS explains that across Scotland, every firefighter is trained how to help residents lower the risk of a fire starting and how to raise their chances of escape if the worst does happen. They work with key partners like housing associations, local authorities and the police to help ensure people live in a fire-safe home. The SFRS website also provides links to registers of fire risk assessors, https://www.firescotland.gov.uk/media/1173445/sfrs_advice_on_fire_safety.pdf

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[45] https://www.fia.uk.com/about-us.html

[46] https://www.firesafe.org.uk/

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