BIM4Housing's Expert's Recommendations on Mitigating Risk to Smoke Control Dampers, while Strengthening the Golden Thread

(In their own words with edits)

Second Edition

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And the experts listed in Appendix 6

Below are recommendations that we, as BIM4Housing, are putting forward as the findings of our subject matter experts. We do not claim these findings to be definitive, but we would hope that they would provide 'accountable' and 'responsible' persons with some of the detail they would require to ensure that risks are mitigated.

Format

The structure of this set of information is designed to be consumed in various ways by different stakeholder groups doing different things. Therefore, information mentioned in one section may be repeated in another, so they can be applied to a particular activity.

Also, we have sought to organize the information to make it more machine-readable so, although the lists could be reduced by combining similar items, this would make them less easily used in applications.

Despite the need to edit and contextualise, we have tried to retain the authentic voice of our experts throughout. This is especially so in the Appendices, where no colloquialism is left unturned.

Terms of use

This document is not intended as an end-result, but as a snapshot of a dynamic, on-going piece of work being developed by Subject Matter Experts who represent the different interest groups.

We hope it is helpful, but it should not be used in isolation, since, as we have learned from our collaboration, no one knows everything- and experts often disagree. It should therefore be used to supplement other sources of information, all of which should be validated by a responsible person applying it to a project.

Comments and additional contributions are welcome, and a panel of volunteer experts will review suggestions to assess/validate them and augment our recommendations as required.

This document can be viewed, downloaded and commented upon at https://bim4housing-blackbox.com/publications/

INTRODUCTION

BIM4Housing Structure

We have six Working Groups of experts who understand the individual Stakeholder needs of Development, Design, Construction, Manufacturing, Operations, and the specialist Advisors who support the whole process. Each Working Group determines the problems they are experiencing that could be alleviated by better information, often from a different Stakeholder group and they collectively establish Workstreams to collaborate and share knowledge to come up with practical solutions.

They have established Workstreams for MMC, Data Standardisation, Sustainability and Fire Safety and the latter has, in turn, established Round Table workshops that bring together SMEs who really understand specific asset types.

(See Appendix 1 for Structure Diagram)

Fire Safety Methodology

In 2021 it was determined to take individual fire-critical assets and examine impacts and influences through their lifecycle. A series of online discussions were held, along with one-on-one calls and an email gathering of views and inputs. In 2022 this consultation culminated in a series of Roundtable discussions, each with a clear focus and targeted output. BIM4Housing's expert team was enhanced by guests from the GTI, along with other fire safety specialists throughout the process.

Phase 1 defined the over-arching questions that need to be answered, for each asset type, to deliver the BIM-plus solution necessary to the effective functioning of the Golden Thread in terms of Fire Safety.

The questions defined are:

- What risks does the asset mitigate?
- To what risks is the asset, itself, susceptible?
- What information is needed about an asset, to ensure it performs as required?
- What tasks/method statements/procedures are required to ensure the asset is installed, commissioned, inspected, and maintained properly?
- What level of competency/training needs to be in place?
- How should product changes be recorded?

Phase 2 sought to answer those questions, offering a set of recommendations to mitigate risk and to help to deliver The Golden Thread, through the effective management of required information.

Phase 3 saw the Recommendations published on the BIM4Housing Blackbox web site enabling further comment and input to enhance the document.

Phase 4 saw a second tranche of roundtables, which sought to update the Recommendations in the light of the Fire and Building Safety Acts and other industry changes. This Second Edition is the result.

BIM HOUSING
Round Tables

Dampers Methodology

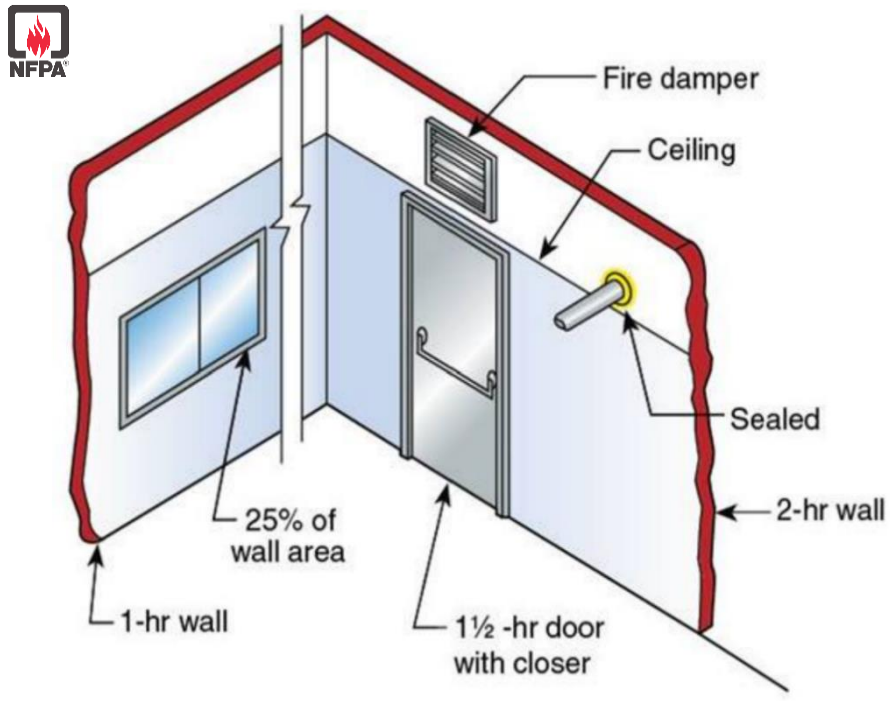
The output from a Roundtables (3rd and 13th September 2021) was collated and contextualized and combined with further subject matter expert input. Significant participant engagement was achieved prior to the events. The resulting report was then peer-reviewed.

Now, eighteen months on, we are reviewing the Recommendations in light of recent legislation and any change in industry practice.

What are Smoke Control Dampers?

Smoke control dampers (SCDs) are passive fire protection products used in smoke control systems for the safe evacuation of smoke and heat from the fire zone to outside.

A smoke control damper has two functions in smoke control systems. Firstly to allow a free path for extract of smoke and hot gases and a free path for makeup air, it is tested to remain open. Its second function is to close in other areas where compartmentation is to be maintained (branches, other zones etc.) and it is also tested to show this. SCDs have drive open/drive close actuators, as it is not known where a fire will start, and a "cause and effect" schedule is required. They have no fusible links. They cannot be substituted by ES classified smoke control dampers by simple replacement of the spring return actuator with a drive open/drive close actuator and the removal of the fusible link, they have to be tested.



Fire and Smoke Damper Installation

Need two more drawings – stair and basement

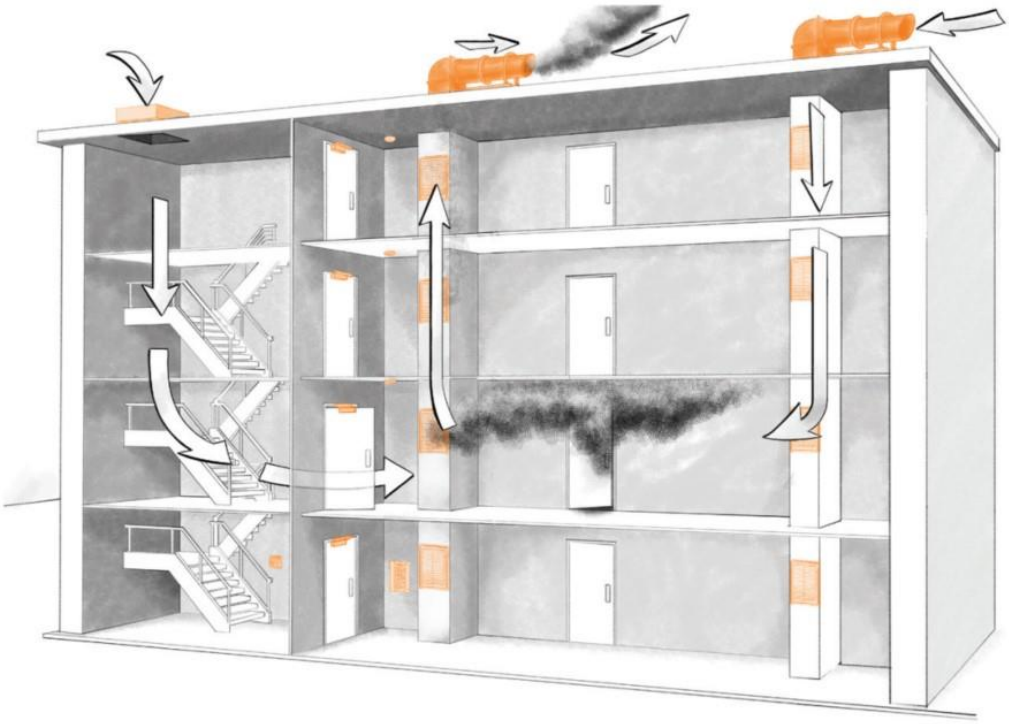


Figure 1: A sketch illustrating the application of a smoke-control system to extend the time available to evacuate a building safely in the event of a fire. This uses mechanical smoke shafts that provide substantial space-saving benefits compared with natural systems, and can be implemented in buildings with longer escape-route corridors

FINDINGS

It was determined to look to 'codify' risks to enable teams to coalesce around tackling a problem, run scenarios to simulate what might happen and how collaboration can reduce the risk of them happening.

Clearly, it is not desirable for the 'Accountable Person' to be absolved of responsibility for not anticipating a risk, simply because it was not on this list of suggested risks- which should be considered a 'steer' not an absolute. However, without a list, it becomes impossible to define and deliver the information needed.

Q1a. What risks do smoke control dampers mitigate?

a) Risk of smoke build-up
b) Risk of heat build-up
c) Risk to fire-fighter's access, visibility, and toxicity
d) The risk of the spread of fire and products of fire (fire, smoke, heat) via cavities in external and internal walls, along with other concealed cavities (such a roof and ceiling voids)
e) Risk of spread of fire, smoke, and heat between building compartmentations
f) Risk of speed of fire and smoke spread
g) Risk of number of uncontained areas
h) Risk of inhibiting safe exit from the building
i) Risk of fire brigade not having enough time to attend before fire spread
j) Risk of Injury/harm/loss of life to residents/occupants
k) Risk of smoke damage and subsequence
l) Risk of damage to property, building or structure

(See Appendix 2 for Additional Participant Input)

Q1b. What compromises smoke control dampers' ability to perform as required?

a) The wall/duct is not adequate to support the SCD
b) Risk of incorrect wall grouping. i.e., A, B or C as tested

Incorrect installation of the SCD which may include 1 or more of the following:

- Risk of incorrect vertical seal depth
- Risk of incorrect seal depth through the wall
- Risk of incorrect layers of aperture framing
- Risk of incorrect distances between other services within the wall to meet the fire test data of the wall
- Risk of incorrect wall seal material e.g., different seal material manufacturer without direct test evidence or a different density of material
- Risk of incorrect wall deflection head details
- Risk of the use of incorrectly applied penetration seals not following the SCD manufacturer's recommendations

- Risk of additional items having been placed into an escape route (such as a sofa), not having been considered at design stage, could provide fuel for a fire, and have the potential to counteract the AOV/smoke extraction system
- Risk of incorrect replacement components having been installed
- Risk of supports not following the SCD manufacturer's installation instructions

c) Risk of the use of fire dampers instead of smoke control dampers
d) Risk of human intervention on ancillary assets, such as smoke detectors, impacting on asset performance
e) Risk of information on an individual asset being incomplete, inaccurate, or absent
f) Risk of information on an individual asset not being supplied in both digital and physical format
g) Risk that the asset has not been tested against the 'Cause and Effect' document
h) Risk of other trades and employees not appreciating the asset's function and so compromising its performance
i) Risk of non-appreciation of the differences between performance of assets in compartmentalised areas versus performance of assets in shared circulation areas
j) Risk of vandalism or simply misuse
k) Risk of damage by contractors or occupants

Materials

a) Building movement / shrinkage
b) Some Laboratory testing not covering real-life scenarios

Installation

a) Failure to install properly due to lack of skill and knowledge
b) Incorrect installation of service penetrations:
   - insufficient spacing of services (too close together)
   - not installed to manufacturers recommendations (e.g., dampers and ducts)
   - incomplete base material (e.g., no lintels in solid walls, openings in partitions not framed and lined)
   - insufficient service supports (too wide spacing, non-fire classified materials, unsuitable anchor fixings into soffit (non-fire classified, not designed for support in fire)
   - non fire classified service supports

c) In service damage/disturbance to SCD through maintenance, replacement of services, pipe leakage etc also has an effect on SCD efficacy

d) Incorrect installation of builder's work holes (service openings)

e) Wrong damper for application and /or orientation

f) Incorrect builders frame to permit connection to building element

g) Damper not installed following the manufacturer's instructions

h) Damper not supported independently back to structure (e.g., supported by adjacent ductwork to which its attached)

i) No expansion sleeves at connections to mitigate duct expansion and thrust in event of fire causing displacement of damper from opening

j) No breakaway joints to allow duct to detach in fire

k) Installation checks not carried out (e.g., transit tape still in place locking shutter mechanism)

l) Insufficient base material preparation (e.g., no lintels in solid walls, unframed and lined openings in partition walls)

m) Inadequate and unsuitable damper and duct supports

n) Damper installed in same opening as pipes and cables

o) No maintenance programs

p) No annual testing and reset

q) Refurbishments and upgrades

r) Dampers not secured with tie rods etc thus distorting and affecting surrounding structure in a fire event

s) Inappropriate fixings- threaded rods holding up fire classified dampers with plastic washers would not be shown within the manufacturer's guidelines

t) Incorrect aperture size will not replicate the tested product and rating

Q2. What information is needed about smoke control dampers to ensure they perform as required?

It is important to understand how the information will be used and how the context will vary what information is required. Initially, this was the subject of quite a lot of debate – largely driven by a worry about 'information overload'. However, with a truly cross disciplinary team of SMEs, it was possible to drill down to understand the detail of why a role would need certain information.

The aim was to collect all the information all stakeholders need against all products and leave it to each role to configure their software applications to see only the information they need for that individual task.

a) Base material
b) Type
c) Movement of structure and services
d) Environment exposure
e) Service maintenance
f) Location (both space(s) and x, y, z coordinates)
g) Resistance required
h) Intended use inputs on selection of type
i) What has been installed, by whom and when
j) Other requirements:
    - Acoustics
    - Durability/long term resistance
    - Airtightness
    - Mold resistance
    - Paintability
k) Test evidence of compliance to match the intended use i.e., size of opening closure of opening when it's a flexible wall(drywall) and be suitable for the type of services penetrating the wall or floor
l) Can damper be positioned to allow access for maintenance?
m) What damper accessories needed for compliant installation (e.g., which type of external frame/ installation method)
n) What supports are needed for continuous support during fire (e.g., fire classified channel, supports, anchors)
o) What approvals for dampers (Note CE marking will be mandatory)
p) Is design approach for damper holistic? E.g., has whole penetration been considered for restraint, differential movement in fire, deflection etc.
q) Damper manufacturer approval for use in mixed penetration
r) Identification of use (acoustic, fire, integrity, or insulation)
s) Areas needed to be accessible for inspections
t) Limitations
u) Lifespan
v) Maintenance requirements

w) Timescales for likely upgrades or replacement

x) Presence of local security, so they cannot be tampered with or misused

y) Planned works in the building

z) As built / O&M manuals to show the locations of the fire stopping that have been installed

aa) Levels of protection 30/60/90/120

bb) Means of application. i.e., brick or block, around plastic pipes or within plasterboard construction

cc) A true cause and effect of all active systems that are interlinked

dd) Position, access from both sides (inspection and duct cleaning)

ee) Check installation seals around the outside

BIM HOUSING
Round Tables

Q3. What tasks are required to ensure smoke control dampers are installed, commissioned, inspected, and maintained properly?

It should be a given that any work on fire safety critical assets should always be undertaken by competent people, probably 3rd party accredited. However, that person must be supported with any information that they might need to reduce the risk of an important step being missed and to provide an auditable record of what tasks were completed. This is common practice in M&E maintenance, where the industry has developed a significant library of standard procedures and tasks lists, along with roles/competency required.

A smoke control system is maintained by an accredited and competent smoke specialist contractor, but the engineer is also issued with a check list for them to record what was done.

A similar industry-wide check list for installation, commissioning, handover, maintenance, and recycling could be agreed.

a) Ongoing checking of the selected materials should be made to ensure resilience of chose FSDC solution with any maintenance/inspection procedures and regimes written into the O&M

b) Check installers of damper and ducts are competent and accredited

c) Check base material has been constructed properly and in accordance with wall manufacturers guidelines and also the damper manufacturers guidelines and requirements

d) Check manufacturer has sufficient technical details and method statements to aide installation

e) Check manufacturer has method statement for commissioning and that there is a sign off procedure

f) Identify a suitable standard of testing, which may not be in line with current standards which may be too onerous or detrimental to the system design

g) Check what is the due diligence if something to assist in the installation is ignored

h) Check labelling

i) Ensure any trade that comes to your building is offered the fire strategy drawings and they mark the areas that they have worked on onto the drawing

j) Check that smoke control dampers are installed, commissioned, and maintained by an organisation with relevant accreditation such as IFCs UKAS accredited SDI19 scheme for smoke control systems

BIM HOUSING Round Tables

Industry-standard maintenance instructions – extract from BESA's SFG20.

Smoke Control Dampers (SCD) (ES (EIS) classification) tested as part of a smoke control system

INTERVAL	TASK	NOTES	RECORD	RISK	Who
Daily	Check for faults and incorrect indications at the Smoke Control Panel	Corrective Action (CA) Action taken to prevent recurrence (ATTPR)	Keep records by asset number	Advise of risk	Local competent person
Weekly	Simulate alarms and confirm smoke control damper actions and confirm "cause and effects"	CA ATTPR	Keep records by asset number	Advise of risk	Local competent person
Three monthly	As above all zones tested separately	CA ATTPR	Keep records by asset number	Advise of risk	Local competent person
Annually For each smoke control damper asset	1. Confirm asset list of smoke control dampers	Check for changes	Add, remove asset numbers as required		Third party competent person
	2. Confirm installation method against manufacturer's instructions	Confirm against original install/commissioning information or careful comparison with manufacturer's instructions	If installation is incorrect or cannot be confirmed, then the smoke control damper may not function in maintaining the compartmentation system Provide photographic evidence all round and from both sides	Confirm Or If not confirmed advise of risk	
	3. Confirm state of penetration seal and its integrity	Any imperfections or concerns must be reported	If this is incomplete then the smoke control damper may not function in maintaining the compartmentation system Provide photographic evidence all round and form both sides	Confirm penetration seal complete Or Advise repair necessary Advise of risk if incomplete and unrepaired	
	4. Ensure each damper can be accessed from both sides.	This means being able to open and gain access to the ductwork to see the inside of the smoke control damper from both sides with the ability to operate the damper, observe full open and closure, and clean the unit	Add to record If this is not possible, then advise that access is required Provide photographic evidence all round and form both sides	Confirm adequate access Or Advise access needed Advise of risk as smoke control damper is unchecked and uncleaned	
	5. Estimate adjacent duct cleanliness	Dirty ductwork is also a smoke control risk	Provide photographic evidence		
	6. Verify that the damper can be operated by a smoke control alarm signal, control panel, or heat/smoke detector, in accordance with the system design – prove full system "cause and effect".	Confirm the full cause and effect for the damper when responding to alarms in different sectors. (If the alarm is on a different floor, try tripping an alarm on the SCD floor to see if it opens)	Add to record Check prior record, to see if anything has changed Have previous Corrective Actions been completed?	Pass/fail Advise risk if there are continuing issues	
	7. Examine the condition of all associated wiring and terminations.	Verify	Add to record Check prior record, to see if anything has changed Have previous Corrective Actions been completed?	Pass/fail Advise risk if there are continuing issues	
	8. Operate the damper to move to the closed position	Verify that the damper physically closes completely and that any lights/indications on the control panel also indicate this correctly	Add to record Check prior record, to see if anything has changed Have previous Corrective Actions been completed?	Pass/fail Advise risk if there are continuing issues	

	9. Operate the damper to move to the open position	Verify that the damper physically opens completely and that any lights/indications on the control panel also indicate this correctly	Add to record Check prior record, to see if anything has changed Have previous Corrective Actions been completed?	Pass/fail Advise risk if there are continuing issues	
	10. Inspect any connection mechanisms and the actuator	Confirm that all mechanisms are complete, and that the actuator is securely fixed to the smoke control damper. Note SCDs do not have fusible links and have drive open drive closed actuators. If the SCDs have fusible links and spring return actuators then this is a risk	Provide photographic evidence Add to record Check prior record, to see if anything has changed Have previous Corrective Actions been completed?	Pass/fail Advise risk if there are continuing issues	
	11. Remove any dirt, dust or debris from within damper assembly.	Confirm that the smoke control damper has nothing that can interrupt its operation	-	-	
	12. Clean the damper in accordance with the manufacturer's recommendations.	Confirm that the damper has been cleaned	Provide photographic evidence Add to record Check prior record, to see if anything has changed	Done/ Not done Advise risk if there are continuing issues	
	13. Report any severe corrosion to the client.	If the smoke control damper is not opening and closing very easily this would be unacceptable	Provide photographic evidence Add to record Check prior record, to see if anything has changed	Advise risk	
	14. Where lubrication is required, the damper manufacturer's specific instructions should be followed	Preferably the smoke control damper should just be left in the cleaned state	If the smoke control damper has been lubricated add this to the record	-	
	15. Check and ensure security of all access doors and gaskets. Check for air leaks.	Confirm	-	-	

Q4. What level of competency/training needs to be in place?

Industry training courses are critical, but they must be complemented by additional knowledge-transfer from people with many years real experience.

Individual manufacturers have product-specific training which complements the more general training. Such training resources need to be provided in all cases where a product is used – both for new build but also as part of the long-term H&S/O&M information, ideally held as machine-readable data in the Asset information model to ensure maintenance teams have easy access to critical information.

a) Follow latest Best Practice guidance for openings within fire classified systems
b) Use accredited installers for damper/duct installation (they must be competent to assess suitability of base material and how to support and restrain damper)
c) Use test data to determine spacings of services (including separation of duct/dampers from other service penetrants)
d) Employ 3PA accredited contractors, when using CE/UKCA/3PA products for firestop installation
e) Ensure manufacturer competency in providing
   - Product training
   - Technical support
   - Engineering design to overcome non-standard applications
f) Damper manufacturer must have technical competency to provide technical support for amendments/changes that may be required by site conditions
g) The person undertaking the work should be competent, but they should be supported with check lists for installation, commissioning, inspection/maintenance, decommissioning/replacement

(See Appendix 4 for Additional Participant Input)

Q5. How are the changes from one product to another recorded?

Robust Change Management requires an information baseline against which the different states – current, proposed, final and ongoing change – can be measured and reported.

The baseline information should contain the required performance in a machine-readable/actionable form and the Change Management process should enable that to be compared with:

a) the actual performance of the designed solution (probably generic)
b) the performance of the chosen product against the generic
c) the performance of an alternative (value engineered?) product
d) the record of what was actually used/installed.

Requirements and Suggestions

a) A schedule of safety critical elements for the building, to include products specified

b) This schedule would be "Locked" at a specific design stage, after which changes to products specified should not occur except for exceptional reasons

c) Baseline against which to compare proposed alternative products (Some designers have expressed reluctance to propose (not specify) a specific manufactured product that will satisfy their design due to liability, procurement rules and fees)

d) A formal change management system is required to ensure that any unavoidable changes are validated by a 'responsible' person e.g., original designer and/or fire engineer

e) There is a well-established change management process in construction called Technical Submissions in which requested changes from the specifications/recommendations, that were created by the designers (and selected manufacturers), need to be formally reviewed and approved. Design-and-Build procurement has affected that process and it should be reestablished in a way that the performance of a proposed product, and its constituent components, is easily compared with the proposed alternative and, if agreed, it is recorded as a Technical Deviation

f) Validation of changes would include verifying that the new product met all the requirements for the application with no detriment to the overall design, the details of which should be recorded (Changes in the product may be made between design and procurement, procurement and installation, handover, and ongoing maintenance)

g) More onus needs to be on the client during the collation of Information Requirements and the updating of design models into 'as installed' content suitable for Asset/Facilities Management

h) Full Disclosure of the product is needed at handover so that after Work Stage 7, if a manufacturer goes out of business or products change the record is there in perpetuity

i) Asset database must be kept up to date with core data for new installs. Installation documents should be held in a centralised digital location. Once BIM/COBie level data is manageable within the asset management system then this will be used as the main source of data

j) BIM, CAFM, Asset and Housing management systems must inform the change management process

k) H&S files for each building (cradle to grave) must be supplied, recorded, and be updated with notification of changes and the implications

l) Warranty information of the existing and the proposed products should be provided to allow proper consideration to be made on the selection of an alternative or replacement. If a product has a shorter life than another, this information should be available to inform selection. Given some of the products will be in locations that are difficult to locate, the longevity of a product could have safety implications

m) Compliance systems should be informed with the information from the AIM

n) Asset tagging (barcode) systems and processes should be considered as forming part of the change management process

o) Procurement should be included in the process, recording what was purchased and feeding that into the BIM process to locate where they were installed, or which products they are replacing

p) Specification or design brief for the business (performance and or product) should be recorded in a machine-readable format to enable validation against the Golden Thread

q) Record the compatibility and compliance of any ancillaries and confirm they comply with the test data? (Ironmongery, door access control systems, vision panels, vents)

r) Any adjustment, repair, addition to / removal of product, ironmongery or fittings must be recorded and should only be undertaken by a licensed / accredited contractor (this includes and modification to an existing asset)

s) The asset information needs to enable comparison but the original performance spec of the AOV and the related information such as Fire Strategy and Cause and Effect should form part of that Technical Deviation process. The FMs must be able to update the Asset Information Model with machine-readable data of the newly installed product

t) Recording who has worked on/replaced the component and their entitlement/competence to do so

u) Evidence that the component's performance in relation to the part it plays in the system has been considered and is warranted

v) Manufacturers must provide a component list (e.g., ironmongery on a door) so if anything breaks, a direct replacement can be used

w) Removal of certain products/materials must be undertaken by people who are on an approved list, certified by an accreditation body and should require advance notice to all certification holders, with signoff to ensure traceability

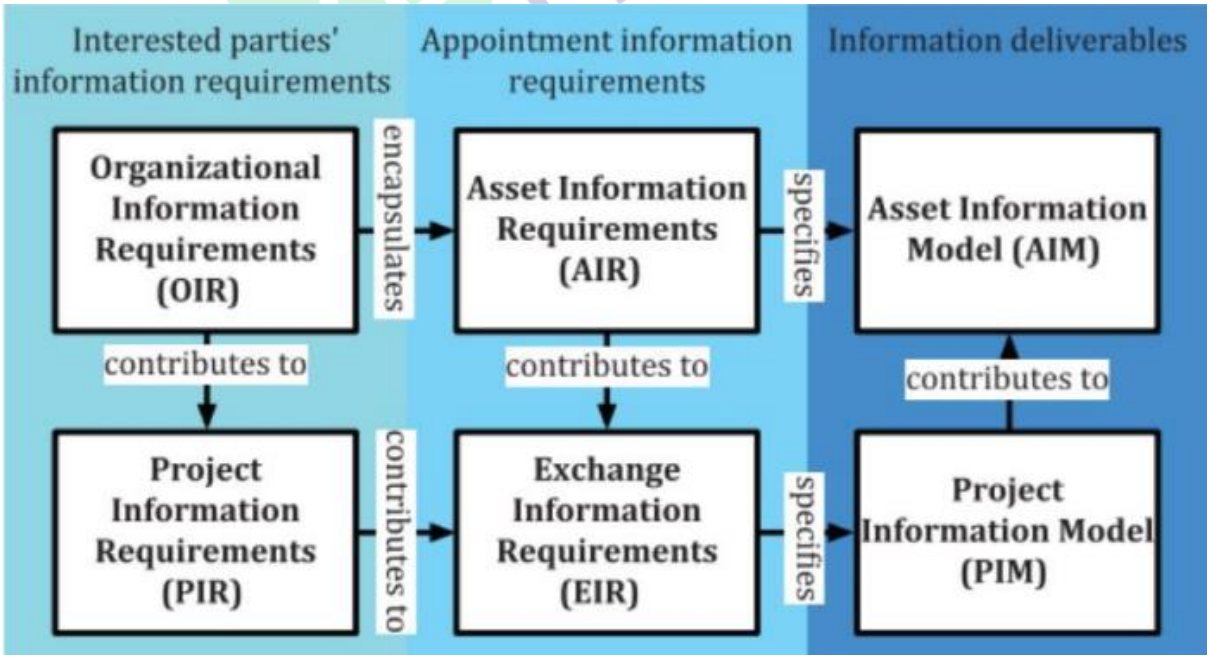
Robust Change Management requires an information baseline against which the different states – current, proposed, final and ongoing change – can be measured and reported including PIM's and AIM's (Project Information Models and Asset Information Models)

The baseline information should contain the required performance in a machine-readable/actionable form and the Change Management process should enable that to be compared with:

- the actual performance of the designed solution (probably generic)
- the performance of the chosen product against the generic
- the performance of an alternative (value engineered?) product
- the record of what was actually used/installed

a) Approval needs to be sought before work commences and where any changes to specification is to be made. Design and specification of FSDC is vital as not all firestopping performs the same despite appearing similar
b) Pre-approval for change of specification before installation
c) Checking that product to be used match specification
d) Digital recording of dampers being used (photo, coding, labelling)
e) Commissioning and maintenance manuals provided and part of O&M manuals
f) Robust design control process, with detail review and change authorisation, should be within ISO 9001 process control
g) BIM models and data storage such as Fire Emergency Files need to complete in its entirety not just 'what is available'. This could be on a local files or IT software solution or possibly on a central system. Key element is that 5/10/15/20 years down the line the relevant information is available
h) Need to audit the information to confirm that the correct holes, infill, products etc have been used
i) Product should be agreed as part of the overall design and never put as a contractor design portion. Equal and approved by the principal designer

This ISO 19650 diagram is informative.



(See Appendix 5 for Additional Participant Input)

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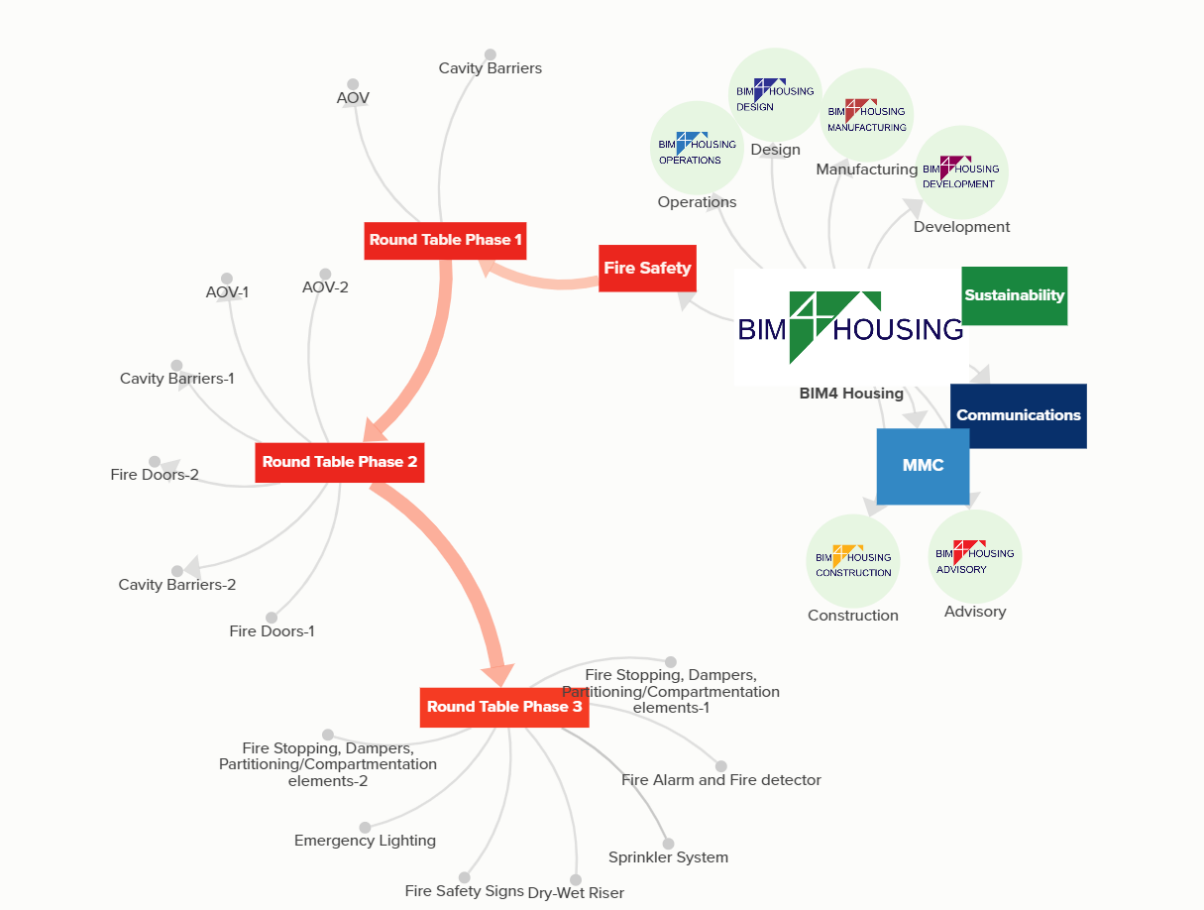
APPENDIX 1

BIM4Housing Structure



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APPENDIX 2

Additional Participant Input Question 1a

The list below is not a complete list and I know some of the later standard numbers have changed i.e., chimneys.

- EN 1363-1: General requirements (tests)
- EN 1366-1: Fire Ducts
- EN 1366-2: Fire dampers
- EN 1366-3: Penetration seals
- EN 1366-4: Linear joint seals
- EN 1366-5: Service ducts and shafts
- EN 1366-6: Raised access floors and hollow floors.
- EN 1366-8: Smoke extraction ducts
- EN 1366-9: Smoke extraction ducts single compartment
- EN 1366-11: Fire Cable Systems and Components
- EN 1366-10: Smoke control dampers
- EN 1366-19: Chimneys
- EN 1364-1: Fire resistance tests for nonloadbearing Elements
- EN 1364-2: Ceilings
- EN 1364-4: Curtain walling

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APPENDIX 3

Additional Participant Input Question 3

Industry-standard testing & maintenance instructions – example extract from BESA's SFG20.

Testing and reporting procedure

Testing should include but is not limited to the following steps:

1. An inventory of all dampers to be tested.
2. All fire/smoke dampers will be manually released to ensure the integrity of the spring-loaded shutter.
3. The fusible link should be inspected for any deformity or damage.
4. The fire/smoke damper will be cleaned and lubricated within the closed position.
5. The fire/smoke damper shall then be opened and re-set.
6. Any severe corrosion found shall be reported to the client.

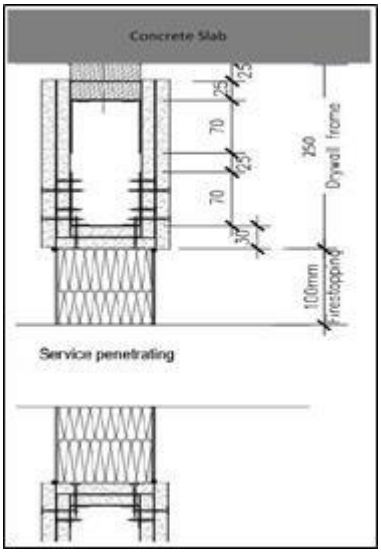
Reports should include but are not limited to the following items:

a) Test results with client information including position within the building/system, date, and name of operative shall be recorded and any comments noted if further action is required.
b) Asset register to include damper location and ID number.
c) Inspection results including details of failed damper operation.
d) If drawings are provided, update and annotate details.
e) Digital photographic evidence of damper condition prior to and after testing procedures unless otherwise specified by client.
f) Explanation of failed operation and recommended corrective or remedial action.

1	Volume control dampers	Visual check on condition.
		Check position and ease of movement and security of locking devices
2	Linkages on motorised dampers	Visual check on condition.
		Check for wear and lubricate if appropriate.
3	Controls	Check condition and operation.
4	Electrical	Check for damage to flexible conduits.
		Tighten all terminal connections.
		Isolate control panel and inspect for signs of overheating.
		Check for damage to flexible conduits.
		Check integrity of electrical insulation.

Testing

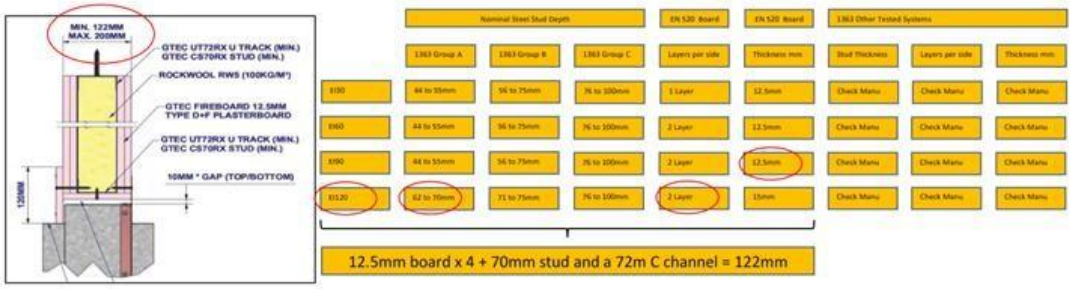
An example of a fire damper tested in detail and the reliance on the wall depth, thickness



Building Deflection is the way a structural element moves under load from above. There are various types of loads that can be applied from above and these can result in the standard supporting construction required fire safe deflection heads in excess of 250mm.

Wall Types, Standard Supporting Constructions

BS EN 1366 gives advice on the supporting constructions. The references always lead back to what has been tested via the test methods in in BS EN 1363-1.



Due to the installation method, the wall needs to be 122mm. Regardless of the rating that is required.

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APPENDIX 4

Additional Participant Input Question 4

- There is no benchmark for any qualifications or third-party certification schemes and no regulatory controls on passive fire.
- Inspection is the first step of maintenance - so fire assets need inspection therefore they are assets - QED- you must monitor its condition and check to see if it has been disturbed.
- It is easy to keep an eye on assets that are visible - passive is generally hidden in building fabric but still needs to be viewed.

it is important to have basic fire behaviour science understanding, so it gives the installer / checker and understanding of when to raise a red flag.

Competency / Training
Specific Actors such as Designers, Constructors, Installers, Manufacturers etc each have specific training and competencies that they need.
This section needs to identify the different Actors and the competencies needed. The focus is predominantly on Manufacturers and Installers where other Actors needs should also be addressed.

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APPENDIX 5

Additional Participant Input Question 5

The Golden Thread does not mean everything about a building and its history needs to be kept and updated from inception to disposal. The objective of the golden thread is building safety and therefore if information is no longer relevant to building safety, it does not need to be kept. Models reflect both Design and Construction models with ownership and therefore liability associated with Changes made in each. Mechanism for updating models may impact on a model owners' liability. A Designer may refuse to change a model to reflect as built as they will not take liability for a Constructor installed product. Change management along with ownership and liability needs to be reflected.

Accountable person under the new Building Safety Act
The performance of the penetration seal for trays/pipes/trunking, fire dampers, FR ducts, SE ducts, chimneys(flues) in terms of their classification is required to be verified against the classification of the wall and the requirement of the specific requirements for the purpose of the system to which they are installed. Then any change can be judged from them

Many existing buildings have been modified so that the original compliant smoke control system can no longer work and original design is invalid.

For Consideration
In common areas you will have smoke control dampers, which are different to what has been called a fire and smoke damper. They have different standards and requirements, and this is badly understood at the moment. They are not well addressed in ADB BS9991 etc yet, but will be in the next incarnations, I hope – I am working there too.
There are some applications that use fire doors as smoke vents and these need defining a lot better too – again often just the leaf is provided/considered, not the whole thing and not fitted by a proper certificated installer.

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APPENDIX 6

Participants

Antonio De Sousa	Hydro-X
Colin White	Smoke Control Dampers Limited
Daniel England	PRP
Dave Broomfield	Tower Hamlets Homes
David Peacock	TÜV SÜD
David Poat	Notting Hill Genesis
Emma Murphy	Thrive Homes
George Stevenson	ActivePlan
Gerrald Cassell	Hackney Council
Ian Doncaster	Fire And Smoke Solutions Ltd
Josephine Bakulyowa	PRP
Martin Milner	Milner Associates
Mike Smith	Bailey Partnership
Mustafa Alhashimi	Clarion
Nick Haughton	Sapphire Balconies Ltd
Paul McSoley	Mace
Paul Oakley	ActivePlan
Paul White	Ventilation Fire Smoke Ltd
Phil Finch	Belimo
Scott Fenton	Mace Group
Seren Walker	The Barnet Group Ltd
Stephen Gore	Swegon Air Management Ltd
Sue Wilbraham	Metropolitan Thames Valley