Final Report

Working Group 1 - Engineers

Proposed Safety Management System for HRRBs already in Occupation.

1 Summary

The Hackitt Report, Building a Safer Future, recommends that HRRBs should be subject to a Safety Case Review process under an independent regulator to be known as the JCA, and that all those working on HRRBs in any capacity should be specifically and suitably competent.

This proposal covers the proposed Safety Case Review process as curated by Working Group 1: Engineers. Proposals for the Competence of Engineers working on HRRBs are covered by a separate report.

The intention is to propose a practical and realistic safety management process for HRRBs that can be implemented quickly from existing resources and then developed and improved on a continuous basis.

2 Background

The Steering Group on Competences for Building a Safer Future is a sub-group of the Industry Response Group (IRG) that was set up under the auspices of the Ministry of Housing, Communities & Local Government (MHCLG) in July 2017 in the wake of the Grenfell Tower fire to coordinate action and advice to building owners.

The BSF report recommends a very clear model of risk ownership, with clear responsibilities for the Client, Designer, Contractor and Owner to demonstrate the delivery and maintenance of safe buildings, overseen and held to account by a new Joint Competent Authority (JCA).

BSF Recommendation 3.1 reads:

> a. Government should specify that responsibility for the safety of all parts of a HRRB must be held by a clear, senior **Dutyholder** which should be the building owner or superior landlord.
>
> b. The JCA and residents must be kept notified of the name and UK-based contact information of the Dutyholder (whether that is an entity or a named person).
>
> c. The Dutyholder must nominate a named **'Building Safety Manager'** with relevant skills, knowledge and expertise to be responsible for the day-to-day management of the building and act as a point of contact for residents. The building safety manager's name and contact information must be notified to the JCA and to residents and should be displayed in the building.

BSF 3.31 reads:

> It is proposed that the Dutyholder presents to the **JCA - a safety case**, at regular intervals, which shows that across the whole building the risks are being managed effectively. **The safety case is an evidence-based approach in which the Dutyholder identifies the hazards and risks, describes how risks are controlled, and describes the safety management system in place, including emergency procedures in the event of an incident**. This approach is tailored to each building and is proportionate because the level of detail and amount of information required is determined by the level of risk.

WG1's understanding is that the approval of a Safety Case for an HRRB by the JCA will be effectively a "Licence to Operate". The first Operating Licence would be issued prior to occupation for a new build. For existing buildings there will need to be a start up period both for the Building Owners to be prepared and for the JCA to process the Safety Cases. An application for relicensing will be required when a significant (material) change to the building may in the view of the Dutyholder involve changes to the safety or risk assessment of the building.

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2.1 Engineering competences

In total there are 12 working groups reporting to the steering group. WG1 Engineers, led by the Engineering Council, is working on a contextualised standard for engineering professionals as proposed on p.135, Building a Safer Future:

Proposal: The relevant Professional Engineering Institutions (PEIs) should work with the Engineering Council to develop a contextualised standard for chartered and incorporated engineers working on HRRBs. *(nb, WG1 has expanded the scope to include Engineering Technicians and the term 'engineering professionals' is used to refer to Chartered Engineers, Incorporated Engineers and Engineering Technicians collectively)*

As a first step in this task WG1 considered when and what type of work engineers would be undertaking in HRRBs. The RIBA Plan of Work provided a high-level overview of stages in the building lifecycle but was felt to focus primarily on construction, and possibly major refurbishment work. Consideration of the safety case process was identified as a means to better understand the engineering role in respect of HRRBs already in use. In particular, hazard identification and assessment would point to when a competent engineer would need to be involved in routine, planned and emergency [maintenance] work.

As Safety Case Reviews are new to the UK Construction Industry WG1 has taken advice from various experienced parties including IGEM, IMechE Safety Group, and risk specialists Risktec to understand how a safety case for a HRRB could be constructed. Safety cases are well established in hazardous industries such as Offshore, Nuclear, Hazardous Chemicals, Aerospace, and Railway, and WG1 also sought to learn from these.

In order to develop the process in a practical way, an anonymised learning exercise is being carried out including site visits to existing high-rise buildings and workshops with a number of HRRB owners. We are very grateful for the excellent cooperation we are receiving during this exercise.

In addition to informing WG1s work to develop contextualised competences for engineering professionals, this exercise has led WG1 to make the following report and proposals for the Safety Management Process as it applies to HRRBs.

WG1 noted that following the Grenfell Disaster and the large number of Government notices to building owners covering cladding, LPS Buildings, Fire Doors, and other safety matters, the Building Managers in the London Boroughs with whom WG members had contact were very well informed about the safety situation in the buildings under their control. In the year and a half since Grenfell a lot of remedial work has been undertaken.

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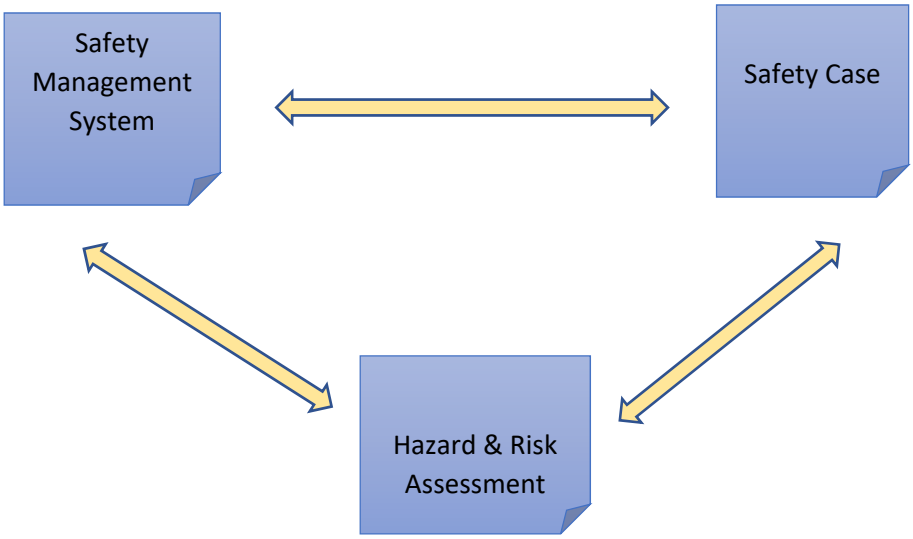
3 What is a Safety Management Process?

A Safety Management Process can be visualised as having three interconnecting parts which interact with each other:



3.1 Safety Management system (SMS)

A safety management system (SMS) is a systematic approach to managing safety, including organisational structures, accountabilities, policies and procedures.

The day to day work of maintaining safety in the HRRB is carried out under the safety management system.

It is desirable that the SMS is structured according to the ISO High Level Structure. This makes it compatible with other management systems that the organisation may already have in place such as ISO 50001 Asset Management System, ISO 450001 Health and Safety System, ISO 9001 Quality system etc.

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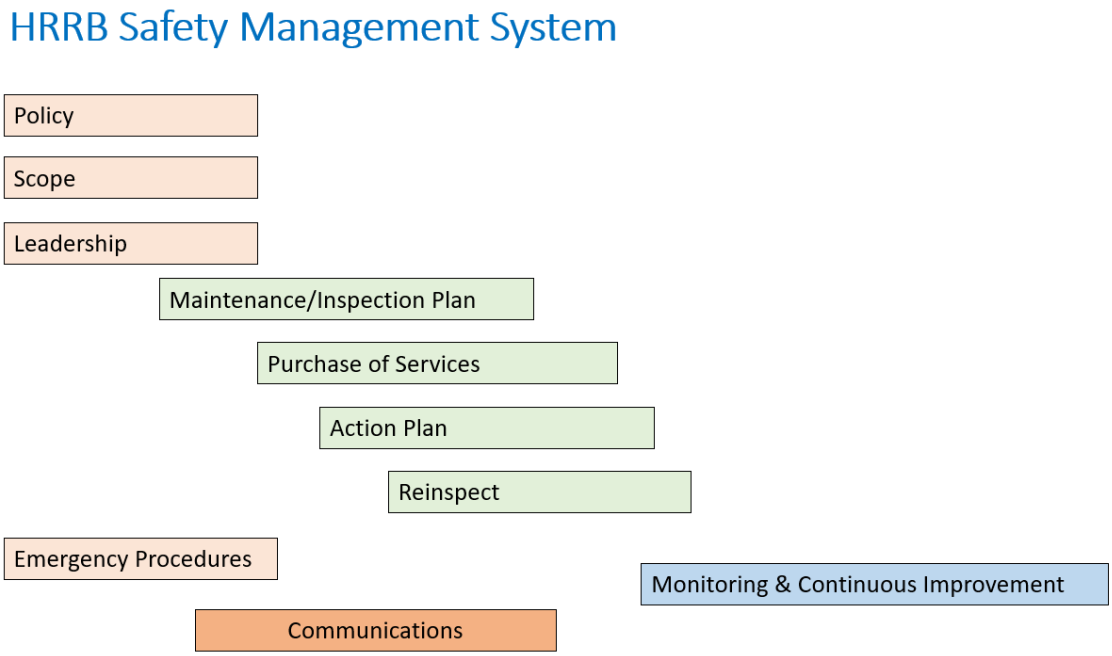


Policy: Organisation's Safety Policy

Scope: Buildings/Assets covered by this SMS

Leadership: Including identification of Dutyholder and appointment of Building Safety Manager/Coordinator.

Maintenance/Inspection Plan: Ongoing rolling programme of maintenance and inspections and tests as required to comply with applicable legislation, best practice and output of the hazard and risk analysis.

Purchase of Services: Qualification and appointment of competent suppliers to fulfil the maintenance/inspection and test programme and the ensuing action plan.

Action Plan: Planned action to correct the faults found during inspection and testing.

Reinspect: Rechecking of work carried out under the action plan.

Emergency Procedures: As required by current building status and risk assessment.

Monitoring & Continuous Improvement: Measurement of control parameters such as number and timespan of outstanding action plan items.

Communications: Includes Residents Voice, employee communications, website, newsletters, PR statements etc.

It is understood that some Building Owners carry out a large part of these functions under current Asset Management procedures. However, the emphasis under asset management is generally to preserve the value of the assets. Other Owners use Planned Preventative Maintenance (PPM) planning software. Safety may not always get the necessary priority.

3.2 Safety Case

BSF Recommendation 3.3 reads:

> "The safety case must identify the hazards and risks, describe how risks are controlled, and describe the safety management system in place"

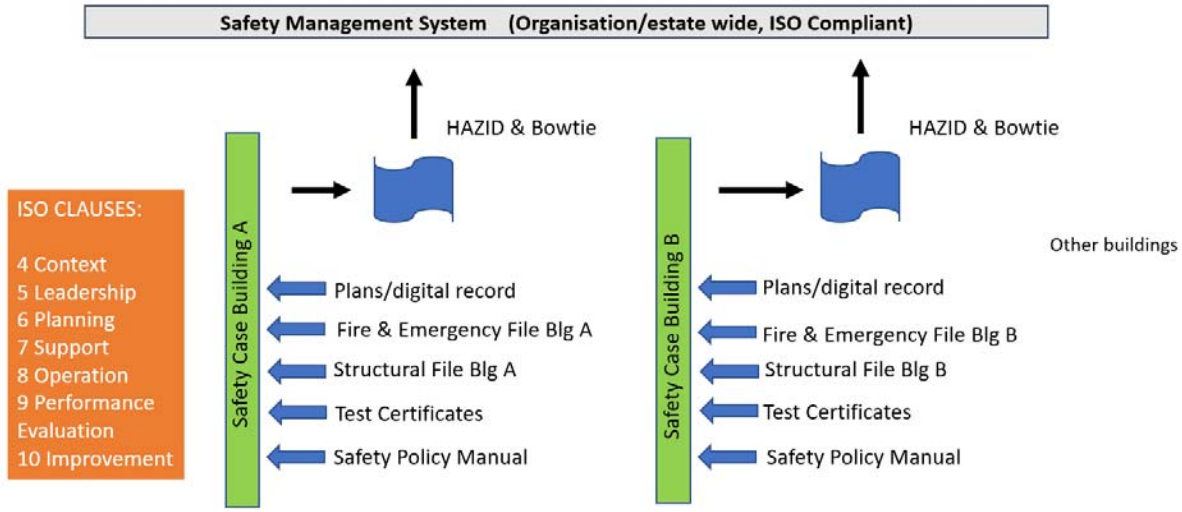
and that (BSF 3.34)

> "the safety case file should include:
>
> • information on the building management system in relation to fire and structural safety, records of maintenance, inspection and testing undertaken on the structure and services and evidence that the competence of those undertaking work on the building was sufficient;
>
> • a resident engagement strategy;
>
> • the maintained and updated Fire and Emergency File (see Appendix D) and digital record (see Chapter 8);
>
> • A copy of any fire safety inspections undertaken by the Dutyholder and/or regulator; and a copy of the latest fire risk assessment and evidence of actions taken and the appropriate competence of the person who performed it.

Based on its work to date, WG1 proposes the template at Appendix A for use by Owners of Existing/Occupied Buildings.

For a typical Building Organisation there will normally be one safety management system but safety cases for each HRRB as shown:

(There may be a case for a small number of identical buildings within an estate to be covered by a single Safety Case)



This Safety Case is supported by a Safety Policy Manual. This is a controlled document which has original signed copies of the Safety Policies underlying the SMS and the Safety Case. It should form part of the supporting documentation for the Safety Case together with other documents such as the Fire and Emergency File, Fire Risk Assessment, OH &S manual etc.

Example: Policy for the purchase of safety related goods and services.

3.3 Hazard Identification and Risk Assessment

The Safety Management System and Safety Case are informed by hazard identification and risk assessment. Hazard identification is used to identify the critical independent hazardous situations affecting the building, and ranking them in order of criticality. Risk assessment considers the probability of the hazard occurring, the consequences if it does and the effectiveness of any mitigation measures.

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3.3.1 Hazard Identification

A hazard is a situation that poses a level of potential threat or risk, to life, health, property, or environment. Most hazards are dormant or potential, with only a theoretical risk of harm; however, once a hazard becomes "active," it can create an emergency situation.

Hazardous situations in buildings can be thought of as either External or Internal.

Examples of external Hazards are flooding, nearby chemical release etc. The risk from these hazards are normally assessed at the LA level but need to be considered by the building owner as part of the overall risk assessment. Internal risks are for example various kinds of fire, gas explosion, burst water pipes etc.

The CAA has identified the so called “Significant Seven” top level hazards for Airline operations. These are separate hazardous situations such as an onboard fire or an obstruction on the runway. Although the mitigation barriers may be common in some cases, looking at each hazard in turn makes the risk assessment stage more manageable.

Applying this principle to HRRBs it is suggested that the following four situations are the most critical hazards events (Significant Four):

Fire
Flooding
Gas Explosion
Vandalism or potential terrorist action

Each building management team needs to identify the most critical hazards for their building stock. This might take the form of a workshop involving representatives of all stakeholders.

3.3.2 Risk Management

Various risk management methodologies are used by the industries mentioned above. Through discussion with representatives from other industries, WG1 identified the ‘Bowtie risk barrier model’ as the basis for furthering its understanding of how a Safety Management approach could work in HRRBs. The bowtie model is widely used in the Oil & Gas, hazardous chemical, nuclear, civil aviation and rail sectors and by some Fire & Rescue Services. A particular appeal is that, in its simplest form, it is accessible to a wide audience, and for it to be most effective all stakeholder groups must be involved in developing the model for any given situation.

The bowtie process involves the following steps:

- identify the barriers to the hazard occurring
- identify the barriers which mitigate the consequences if the hazard occurs
- analyse the barriers in terms of: critical person(s), critical equipment, critical documents, re-assess the risks in light of the barriers.
- assess the criticality of the risk using a risk matrix.

The whole is done through a team process involving (at least initially) all stakeholder groups.

WG1 worked with TüV Rheinland Risktec to develop a Bowtie model for a hypothethical HRRB. Engineering competence was found to be a critical competence in the analysis of a significant proportion of the barriers to the hazard risks and consequences. This led WG1 to conclude that the Dutyholder and Building Safety Manager would need to have or have access to engineering competence throughout the building lifecycle.

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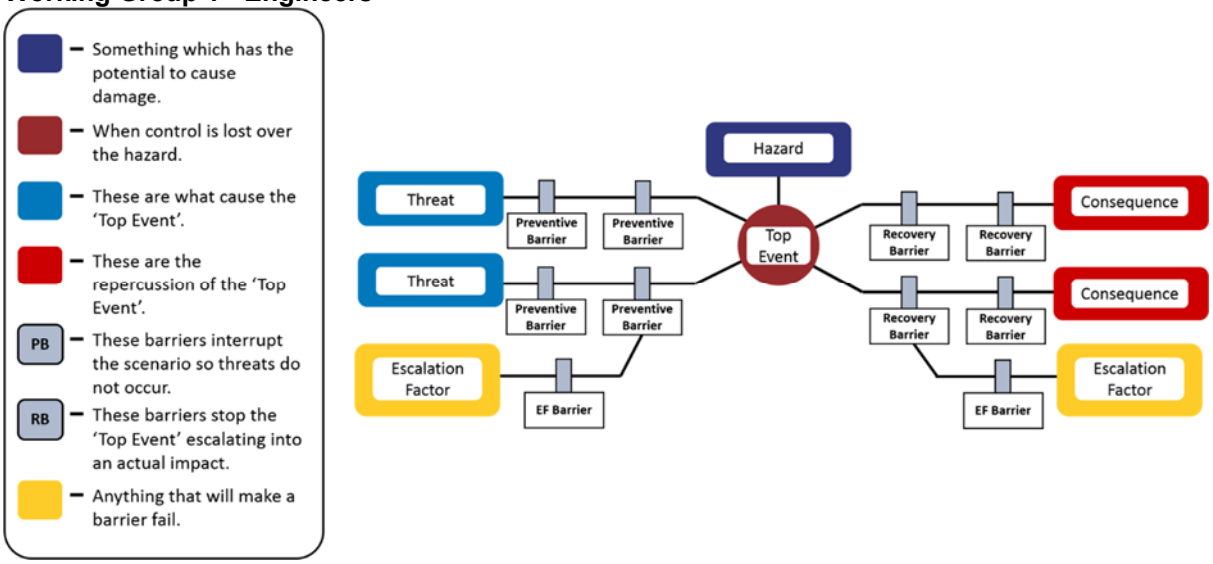

An excellent introduction to the Bowtie method is available on the CAA Bowtie site

https://www.caa.co.uk/Safety-Initiatives-and-Resources/Working-with-industry/Bowtie/

Once the Bowtie model has been created it can be used to map the impact of a change to any individual barrier or group of barriers across the whole model. This can be used to determine factors including:

- whether a change or a series of sequential changes is significant (material) and will require a change to the Safety Management System and Safety Case
- the impact of a change to one component of a building on the safe functioning of the building as a whole system;
- the competences needed to implement the change while maintaining the integrity of the building safety strategy

In the case of Rail Safety, the **Railways** and Other Guided Transport Systems (Safety) **Regulations** (**ROGS**) ref 1 Section 2 covers the issue of deciding whether a change to the operation results in a material change to the safety of the operation. Where the answer is yes, an application for licence renewal would be required.

In ROGS this decision is made by the Dutyholder. If there will be a new significant safety risk or a significant increase in risk (the 'risk test') then the Dutyholder must appoint an Independent Competent Person to do the verification assessment.

Whilst the size of HRRB estate can vary significantly, the Safety level requirement and therefore the competence of those responsible remains the same. Where used, the bowtie model described above can help to determine the competences building owners and Building Safety Managers will need to have or have access to when planning any changes to an occupied building.

(A bowtie or other risk analysis of an existing building will usually lead to the conclusion that retrofitting a sprinkler system will significantly reduce the fire risk. We have found that building managers in London and elsewhere are well aware of this and many are already starting to install sprinkler systems.)

4. Learning from other industries

The Safety Case Review process is very well developed in the Offshore, Nuclear and Chemical related industries. There is also much to be learned from the Aviation and Rail industry safety

procedures. The transport industries have similar safety problems to HRRBs in that there are large numbers of people in close proximity to any potential hazardous event.

5. Key Roles

WG1 proposes three key roles within the HRRB safety management process:

Dutyholder
Building Safety Manager
Independent Competent Person

Dutyholder

As defined in *BSF* Recommendation 3.1:

> Government should specify that responsibility for the safety of all parts of a HRRB must be held by a clear, senior Dutyholder which should be the building owner or superior landlord.

Building Safety Manager

As defined in *BSF* 3.16

> The Dutyholder must nominate a 'Building Safety Manager' with the relevant skills, knowledge and expertise to assist in discharging their duties and to be available to residents concerned about safety in their building. They will also need to bring in the right additional expertise (if they do not have it*) ie the Independent Competent Person*, to undertake work such as fire risk assessments or carry out internal safety management system audits prior with Safety Case submission.
>
> The Dutyholder must notify the JCA, residents, and occupiers of other premises in the building of the name and contact information of the Building Safety Manager, or declare that they will take that role themselves.

BSF 3.17

> Accountability must remain with the Dutyholder. They cannot pass or delegate their *accountability* to the Building Safety Manager but can delegate the *responsibility* for certain tasks to them. For many buildings the day-to-day management of safety and engagement with residents will be undertaken by, for example, a residential management agent who would most likely be nominated as the building safety manager.

Independent Competent Person

BSF does not set out a role of Independent Competent Person. However, WG1 concluded that the Dutyholder and Building Safety Manager will require engineering competence or access to engineering competence in order to assess whether proposed and completed changes result in a new significant risk, an increase to an existing risk, or another change to the risk profile. WG1 proposes that this role be identified as an Independent Competent Person, and is seen as the continuation of the Lead Engineer role appointed during the construction phase.

Clearly over the lifecycle of an HRRB this will not be a single person, and the person appointed may need to have specialist competence appropriate to the project involved such as M & E, Building Systems, Fire Safety, Structural Engineering, etc.

From the ROGS rail regulations guide:

> 2.7 There are three important things to consider when appointing an independent competent person.

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(i) They must have the skills and knowledge needed to carry out the safety verification.

You should gather and keep evidence to prove this. This evidence usually includes:

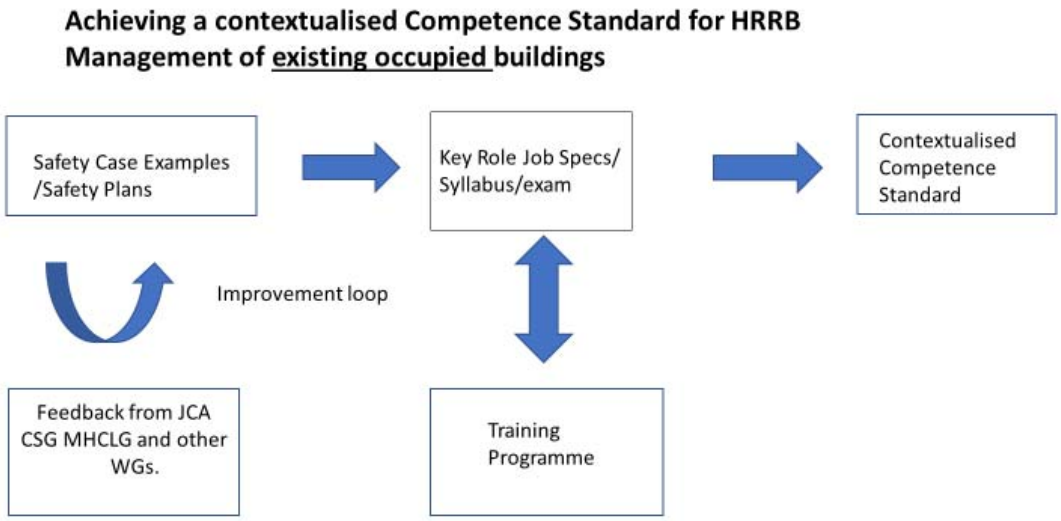
- written qualifications that can be checked;
- experience in the industry or the type of work and workplace;
- direct knowledge of the specific process they are overseeing;
- experience of the regulatory process, in terms of setting standards and gathering evidence appropriately;
- being aware of current best practice; and
- being aware of the limits of their skills and experience.

(ii) They must not have been responsible, in a way that might cause them to be biased in their assessment, for any of the things they will have to assess. For example:

- they should not benefit personally from the project being completed successfully and quickly; and
- they should not profit from the project being introduced, such as if they owned shares in a company which makes parts being used in the project.

(iii) They must not be part of the management chain that is responsible for introducing the project.

6 Achieving Competence



Both existing building owners and newly appointed Building Safety Managers will need to be trained and qualified as competent in their roles. This will include being able to recognise when and how to bring in an Independent Competent Person to review the Safety Case.

Training for these roles will need to cater for early career staff as well as experienced staff who may be new to the particular requirements for managing HRRBs.

Detailed proposals for the Competence of Engineers working on HRRBs is covered in a separate report.

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7 Residents Voice

Regular opportunities should be provided for Residents to know about, discuss and contribute to the safe operation of the building. This may include regular Residents Group meetings with the building management, publication of all relevant documents in an open and transparent way on a website and in newsletters.

New residents should receive a New Residents Pack including safety information and be guided through the safety procedures in the building.

Opportunities for residents to engage in the Risk Identification and Assessment process can also be valuable. This can provide a means for residents to understand how they contribute to the management of risk barriers, and also to achieving the objective that they not only are safe but feel safe in their homes.

8. Proposed Safety Management Process for HRRBs

In summary, WG1 proposes that a practical and realistic Safety Management Process for HRRBs could include the following practice from other safety critical industries:

- Day-to-day work of maintaining safety in the HRRB should be carried out in conformance with a Safety Management System
- The Safety Management System should follow the ISO High Level Structure, and where possible and appropriate be integrated with other management systems used by the Dutyholder
- Where the same Safety Management System is used for multiple HRRBs, each HRRB (or cluster of identical HRRBs) should have its own Safety Case
- The Safety Case should follow a standard template, such as the one at Appendix A
- The Safety Management System and development and review of the Safety Case is supported by adoption of an appropriate hazard identification and risk assessment methodology, such as the Bowtie risk barrier model
- Hazard identification should be undertaken through a team process including representatives of all stakeholder groups
- Hazard identification should, as a minimum, consider the ‘Significant Four’ top level hazards of gas explosion, fire starting in a flat [or common or adjacent area] and spreading, flooding, vandalism or terrorist action in a flat, common or adjacent area
- The Dutyholder and Building Safety Manager should at all times have access to the services of a suitably qualified Independent Competent Person to assess the impact of any change on the Safety Case and provide independent safety audits.

9 References

1 https://www.caa.co.uk/Safety-Initiatives-and-Resources/Working-with-industry/Bowtie/
2 http://orr.gov.uk/__data/assets/pdf_file/0020/2567/rogs-guidance.pdf

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APPENDIX A: Safety Case Template for Existing/Occupied Buildings

Draft 06/03/19 Version 2

(General: format A4 PDF aim for less than 10 pages. Supporting documents accessed via links)

A Heading: Site Name and Address Allocated Ref Number

B Document Control

1 Executive summary including clear Ownership Statement.

2 Policy

The organisation's safety policy.

3 Scope

The scope of the building(s) covered by this Safety Case.

The context of the organisation.

(ISO Clause 4)

4 Leadership

Names of the Dutyholder and Building Safety Manager. Organisation chart.

Competence processes for internal and external use.

Evaluation procedure for Independent Competent Persons/Organisations involved.

Policy on external contractors re C(DM) regulations and HRRB specific training.

(ISO Clause 5)

5 Building Details and Structural Design Statement.

Link to Digital Record, BIM files if available, and latest Structural Surveys.

Include separate Cladding, Fascia and curtain wall (ADB B4) assessments where appropriate.

Internal Structure including Compartmentation (ADB B3)

6 Fire and Emergency Statement

Link to Fire & Emergency File including Fire Strategy Report where available, latest Fire Risk Assessment, CDM H & S Files and Fire Incident log/reports.

7 Hazard Identification and Risk Assessment

Identification of most likely Hazardous Situations for the building (s). Using HAZID or other process to consider at least Gas explosion, Fire Spread, Flooding and Arson.

Use Bowtie or other process to assess the risk to People, Environment, Assets and Reputation/Trust (PEAR).

8 Safety Management System (SMS) and Safety Manual

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Description of the safety management system used to create, plan, carry out, and check the actions required resulting from the Structural, Fascia and Fire reports, Hazard ID and Risk Assessment, Regulatory Inspections such as water, asbestos etc, and best practice.

The SMS Action plan should include regular discussion with residents, and other stakeholders.

The SMS should include monitoring of the effectiveness of the process leading to continuous improvement.

The SMS should include clear procedures for the procurement of outside services and products.

Training of those working on the building(s) to be planned and recorded.

It is preferred that the SMS should be integrated with other ISO management systems already in use by the organisation.

There should be a Safety Manual containing original signed copies of the safety policy and all safety procedures and processes. This should be a controlled document under the responsibility of the Building Safety Manager or other named individual.

(ISO Clauses 6,7,8)

9 Emergency Procedures and Evacuation Strategy

Incident response procedure and log

Procedures in place to deal with known risks. Evacuation strategy and evidence of training and practice of the strategy for both organisation employees and Residents. (ADB B1)

10 Residents Voice

Description of the regular opportunities provided for Residents to know about, discuss and contribute to the operation of the facility.

11 Continuous Improvement

Description of monitoring and measurement procedures, Internal audit process, and

Non-conformance reports and log.

Regular management reviews with records and timetable.

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