Final Report

Working Group 1 – Engineers

Competency Framework for HRRB – Engineering Professionals

A	**Use a combination of general and specialist engineering knowledge and understanding**			
	1- Key competence	**2- HRRB scope/ knowledge (all professions/trades)**	**3- HRRB Specific competence – engineering professionals**	**4- Typical evidence to demonstrate engineering competence**
A1	The ability to understand and apply relevant fire safety principles and practices in the design, construction, operation and maintenance of HRRBs.	Fire science • Principles of Heat transfer • Properties of Materials • Principles of Fire chemistry • Principles of Fire dynamics Human behaviour and evacuation • Human behaviour and physiological response to fire • Life safety design concepts and practice • Fire protection systems • Passive fire protection systems • Active fire protection systems • Fire detection and alarm systems • Fire suppressions systems Fire safety design and specification • Access and facilities for fire and emergency services • Fire performance of materials • Compartmentation and spread of flame • Principles of structural fire protection design • Commissioning and interrogation of specialist analysis by others	This should include underpinning knowledge and understanding of: • The building as a system and how the technical interfaces contribute to the functionality and safety of the building and its occupants • The interrelationship of design and specification with fire performance • Key features and principles of passive and active fire protection (including suppression systems) This should include the ability to: • Apply relevant fire safety principles and practices in the engineering of HRRBs. • Apply fundamental knowledge of fire science, (including key aspects of fire performance of materials) in the engineering and specification of HRRBs. • Integrate key principles of human behaviour and fire escape design in the engineering and arrangement of escape provision in HRRBs. • Integrate and coordinate relevant passive and active fire protection systems into the engineering components of HRRBs • Integrate and coordinate compartmentation and structural fire protection in to the engineering of HRRBs with particular reference to measures which prevent the spread of flame and smoke. • Integrate and coordinate fire-fighting access requirements and provision of fire-fighting facilities into the engineering design and layout of HRRBs. • Integrate new engineering approaches, theories or techniques into engineering practice whilst ensuring safe outcomes.	Examples from your work where you have effectively applied principles of fire safety in the engineering of an HRRB
A2	The ability to apply knowledge and understanding of relevant principles and technical standards for building safety and co-ordinate and integrate these into the design of HRRBs.	Structural safety • Structural design /fixing of cladding / envelope at height • Secondary fixings specification and design • Disproportionate collapse Protection from falling or collision • Stair safety • Guarding / balustrades • Balconies Public Health • Air quality / ventilation • Above ground drainage	This should include underpinning knowledge and understanding of: • The process by which different aspects of building safety should be successfully integrated into the overall design of an HRRB. • The critical safety engineering principles relevant to structure, public health and building services. • Fire safety engineering principles relevant to maintaining the integrity of the building fire strategy. This should include the ability to:	Examples from your work where principles of building safety (other than fire safety) have been effectively applied in the engineering of an HRRB.

		• Water storage • Combustion appliances Building Services • Gas appliances and services • Electrical safety • Mechanical services • Fire integrities Building fabric • Interstitial condensation / corrosion • Water penetration / weather tightness • Service penetrations • Maintenance • Glazing and glazing systems	• Evaluate and integrate new technology safely into the engineering design of HRRBs taking into account:. o Building lifecycle o Buildability o Maintenance and refurbishment • Recognise when advice from others including specialist professionals is needed, obtain this and ensure it integrated effectively in to the engineering design of HRRB. • Co-ordinate the engineering, specification and assessment of building fabric including where necessary commissioning and integrating the work of other specialist building professionals to achieve safe performance throughout the building lifecycle. • Integrate new engineering approaches, theories or techniques into engineering practice whilst ensuring safe outcomes. • Ability to undertake statistically sound appraisal of data to underpin safe engineering outcomes. • Understand original design intent and principles and maintain these when making minor or major modifications to an HRRB	
A3	The ability to apply knowledge and understanding of relevant legislation, regulations, statutory guidance, standards of performance applicable to HRRBs.	Construction legislation relevant to high risk buildings including: Construction Legislation • The Building Act • The Building Regulations • Approved Documents • AD7 Materials and Workmanship • Building regulations (procedural) • Local acts / enactments • Government communications / circular letters • Sustainable and secure building act • Regulatory reform Fire Safety Order • CDM Regulations • Health and Safety at Work act • Gas safety (installation and use) Regulations 1998 Related • RIBA plan of work • BISRIA plan of work • Civil, criminal and case law • Contract Law • Law of Agency • Employment Law • The Housing Acts 1985,1988, 1996,2004 • Housing Health and Safety Rating System • Equalities act 2010 • Town and country planning Acts • Housing and Regeneration Act • Licensing legislation • Water Bylaws	This should include underpinning knowledge and understanding of: • relevant legislation, regulations, statutory guidance and standards of performance in the engineering of HRRBs • the respective responsibilities of roles specified in regulations and relationship of own role to that of the duty holder and other professions, trades or engineering disciplines. This should include the ability to: • Meet or exceed requirements set out in relevant legislation, regulations, statutory guidance and standards of performance in the engineering of HRRBs • Recognise how the statutory or legal requirements of other roles relate to the role of the engineer where these could impact on building safety. • Advise others on what needs to be done to comply with relevant statutory requirements.	Examples from your experience of engineering an HRRB in order to ensure robust compliance with statutory requirements; and evidence of understanding or awareness of relevant statutory regimes.

A4	The ability to develop, manage, distribute and maintain information which is critical to ensuring that HRRBs are safe, built to be safe, operated safely and maintained to be safe throughout the building lifecycle.	Understanding of • Golden thread of building information Safety Management Systems • Safety case • Health and safety file • Fire and Emergency File • Design /construction, as built / as maintained information • Building safety strategies • Building maintenance information and scheduling • Testing and commissioning information • Lifecycle and replacement data • Building installer / constructor / maintainer competency requirements • Regulation 38 • HRB records and certificates • As built information • BIM	This should include underpinning knowledge and understanding of: • All documents (and their content) which the engineer must create, maintain or use to ensure HRRB safety • Competence and needs of building safety managers and owners This should include the ability to: • Develop, manage, distribute and maintain information about the engineering of HRRBs which is critical to ensuring that they are engineered to be safe, built to be safe, operated safely and maintained to be safe throughout the building lifecycle. • Develop and communicate clearly expressed engineering strategies to meet building safety requirements. • Comply with requirements to prepare and submit relevant documentation as part of the Safety Management System, Safety Case, Fire and Emergency file or Health and Safety plan, • Utilise suitable information management tools to ensure accurate design and as built information are developed and issued. • Manage changes to engineering information in order to ensure an accurate set of as built information is available at key gateway stages. • Identify what information is needed from other parties and coordinate that information where relevant to the role of the engineer, including operation and management documents required to operate the building safely	Examples of good practice in developing and maintaining as built information; evidence of leading role in the development of key building safety information packages such as the safety case or fire and emergency file; effective development of information setting out key engineering safety strategies for use by building owners or emergency services; examples of effective management of information post completion.

B	Design and development of processes, systems, services and products			
	1- Key competence	**2- HRRB scope/ knowledge (all professions/trades)**	**3- HRRB Specific competence – engineering professionals**	**4- Typical evidence to demonstrate engineering competence**
B1	The ability to apply appropriate theoretical and practical methods to design, develop, manufacture, construct, commission, operate, maintain, decommission and re-cycle building engineering processes, systems, services and products.		This should include the ability to: • Identify, review and select techniques, procedures and methods to undertake engineering tasks. • Contribute to the design and development of engineering solutions within a HRRB. • Implement design solutions and contribute to their evaluation. • Establish the static and dynamic life safety systems and their design interfaces • Review the test and commissioning plan • Ensure a co-ordinated life-safety solution is achieved •	
B2	The ability to apply relevant standards, testing, assessment and maintenance procedures for building materials, products, components, assemblies and systems effectively through the life cycle of the building.	• British and international product standards • Testing standards, procedures and interpretation of results • Good practice specification • Product characteristics and performance • System / component / assembly testing and performance • Prototyping and sample panel and testing • Maintenance requirement • Maintenance testing and commissioning of building systems and services	This should include underpinning knowledge and understanding of: • Relevant standards, testing, assessment and maintenance procedures for building materials, products, components, assemblies and systems. • Methods and practice of building maintenance. This should include the ability to: • Apply these effectively as part of the engineering process to ensure safety through the life cycle of the building. • Apply these in ensuring the building performs safely as a system. • Conduct testing and verify quality and suitability of delivered/procured products and .materials	Evidence of suitable application or use of relevant standards, testing or assessment procedures in the engineering of an HRRB.
B3	The ability to work within or apply in practice statutory process and procedures applicable to HRRBs.	• Gateway process and stages for HRRB • Role of the JCA • Tenant voice and engagement.	This should include underpinning knowledge and understanding of: • Statutory processes and procedures • Tenant engagement channels This should include the ability to: • Advise clients, project team members and others on duties and procedural requirements relating to the engineering of HRRB • Comply with relevant engineering development activities in order to demonstrate compliance with building safety requirements to the JCA at differing gateway stages. • Engage positively with the JCA and its constituent bodies. • Engage and communicate with tenants and the public.	Examples of successful project delivery through statutory cycles or process; examples of specific complex interactions, discussions or process meeting requirements for HRRB.

B4	The ability to use suitable knowledge and understanding of specific risks relevant to HRRBs in the development and application of risk management frameworks and safe systems of work.	• Definition of HRRB • Critical risk factors in high risk buildings • Safety case development • Safety case review • Fire risk strategy • CDM regulations • Health and safety file • Deleterious materials • COSSH regulations • Building management and maintenance for building and occupier safety;	This should include underpinning knowledge and understanding of: • How and why HRRB are defined and relevance to engineering activities • The importance and purposes of Safety Management Systems • Hazard identification and risk assessment methodologies • The specific engineering risks relevant to each type of HRRB, including typical critical modes of failure and consideration of maintenance and replacement cycles • How these risks should be managed through the design process, including through commissioning or undertaking of work by other specialist persons. This should include the ability to: • Contribute to and work with safety management systems for HRRBs • Lead or contribute to the development, modification and management of the Safety Case • Lead, carry out or contribute to hazard identification and risk assessment • Execute their duties and responsibilities in accordance with the Safety Case	Examples from your work of the development or application of risk management process, procedures, safety case, safety information or frameworks. Examples of identifying specific risks and how these were subsequently successfully managed.

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C	Responsibility, Management and Leadership			
	1- Key competence	**2- HRRB scope/ knowledge (all professions/trades)**	**3- HRRB Specific competence – engineering professionals**	**4- Typical evidence to demonstrate engineering competence**
C1	The ability to identify and where applicable fulfil roles, responsibilities and duties in relation to HRRBs.	• Duties and responsibilities of key roles/dutyholders including client, contractor, building owner / manager, building safety manager, resident • Joint Competent Authority/Regulator • Overarching Competence Body • Local Authority • Relevant statutory regulators • Profession/Trade regulators; • Fire and rescue services • Through life management and maintenance	This should include the ability to: • Explain and comply with the duties of an engineer in relation to HRRB's • Explain the roles and responsibilities of other key duty holders and their interactions with the role of an engineer on HRRBs • Work effectively with other key duty holders • Act as or engage effectively with the Principal Designer, Principal Contractor or Building Safety Manager of a HRRB. • Integrate understanding of through life management and maintenance criteria in engineering activities to ensure safe outcomes • Challenge others where duties are not being effectively met.	Evidence of specific roles and responsibilities you have held as part of your work on HRRB. Evidence of your involvement of ensuring awareness and fulfilment of specific duties relevant to HRRBs; examples or interaction with other key duty holders.
C2	The ability to challenge unacceptable behaviour or practice and to raise, escalate or flag risks to safety at any stage during the building lifecycle.	• Whistle blowing policies • Public Information Disclosure Act • Public duty to report • Liabilities • Company or organisational reporting and escalation policies and procedures.	This should include the ability to: • Explain and comply with professional and ethical duties to raise concerns relating to public safety • Effectively raise safety concerns with colleagues and where necessary escalate these concerns through management chains • Identify if and when it is necessary to utilize whistleblowing provisions under the Public Information disclosure Act and how to do so. • Explain and act on any other duties to raise concerns about life safety within a HRRB.	Examples of industry practice where you may have had concerns and acted upon them; how you have been effective in leading on building safety issues; how you integrate good building safety practice in your day to day work.
C3	The ability to effectively manage or work within complex project teams and co-ordinate technical and procedural compliance to ensure safe outcomes.	• Project management and control • Sequencing of work • Assembling and appointing teams • Effective management practice / procedures for engineering of high-risk buildings.	This should include underpinning knowledge and understanding of of • what competence frameworks and qualifications exist. • change management and change control techniques • quality management techniques This should include the ability to: • Integrate requirements for building safety into project planning and management activities • Assess competencies required within engineering or project teams and ensure suitable expertise is procured. • Apply quality management, control or audit procedures in order verify that building safety measures have been discharged • Explain and comply with relevant procedural requirements, submission and process. • Create and maintain appropriate project and control documentation. • Establish quality criteria for engineering work and objectively evaluate outcomes against those criteria.	Examples of effective team working and team management; good practice in assembling and managing project teams; examples of your role in leading on, participating in or coordinating delivery of complex integrated systems or buildings.

D	Effective Communication and inter-personal skills			
	1- Key competence	**2- HRRB scope/ knowledge (all professions/trades)**	**3- HRRB Specific competence – engineering professionals**	**4- Typical evidence to demonstrate engineering competence**
D1	The ability to communicate with residents, the public and with others clearly and effectively, verbally and in writing.	• Requirements / obligations to communicate, consult with and respond to residents or persons otherwise affected by buildings / building work; • Communication through media relevant to role (verbally, written, drawn) • Communication of technical complex information to non-technical audiences • Effective communication within project and client teams.	This should include the ability to: • Explain and comply with duties to communicate with clients, residents and other persons or organisations involved in or affected by projects on HRRBs. • Write reports, letters, e-mails or give presentations in a manner which can be clearly understood by non-technical persons. • Clearly identify and effectively communicate responsibilities and issues relating to HRRB safety within design, engineering or project teams. • Ability to explain complex technical issues to ono-technical audiences • Ability to promote and actively engage in collaborative working across disciplines. • Understand challenges and requirements of other disciplines. • Read and understand technical documents/drawings and convey details to others • Be inclusive, promote and welcome diversity of thought/ideas • Write clear guidance for end users.	Evidence or examples of effective engagement with residents, building users or those affected by building work; reports, presentations and academic submissions; examples of effective client briefing; examples of effectively explaining complex technical considerations clearly to clients or other non-professional or technical audiences.
D2	The ability to identify limits of competence of self and others involved in the design, construction, maintenance or management of HRRBs buildings and undertake mitigating actions to manage risk.	• Principles and value of competency • Competency assessment techniques • Roles and responsibilities in advising on and ensuring competency • Procurement and management of specialist competencies • Managing residual risk.	This should include the ability to: • Identify limits of competence of individuals or organisations involved in the engineering, construction or maintenance of HRRBs buildings • Identify suitable mitigating actions to manage risk. • Explain what competence is and how this relates to building safety • Identify when and how to assess or request evidence of competence from other project team members • Explain and comply with duties to ensure competence relating to the engineering of HRRBs. • Identify the need to seek advice from others with specialist competences and how to procure that advice • Effectively raise concerns about the competence of individuals or organisations if this is of concern • Mitigate any residual risk relating to competence	Competency self-assessment records and learning from that process; examples of quality assurance or management procedures to ensure competency of self / staff / specialists or other organisations; use of competency scoring or assessment techniques; involvement in competency assessment of individuals.

E	Professional Commitment			
	1- Key competence	**2- HRRB scope/ knowledge (all professions/trades)**	**3- HRRB Specific competence – engineering professionals**	**4- Typical evidence to demonstrate engineering competence**
E1	The ability to apply understand ethical considerations in the occupation of HRRBs and apply these in practice	Obligation to consult / tenants voice; Duty of care to residents Considering diversity and inclusion including differential needs e.g. emergency egress Adhering to Codes of Conduct.	This should include the ability to: • apply understanding of specific ethical principles in engineering practice • Act with honesty, accuracy, respect, integrity, responsibility, and within limits of capability in order to build trust • Respect concerns and issues raised by tenants and respond appropriately • Apply duty of care to residents and people living or working in and around buildings • Take account of differential needs of older and disabled people in accessing and ability to escape from high risk buildings • Act in accordance with professional or company Code of Conduct • Act in accordance with Code of Ethics for HRRB.	Evidence or examples of effective engagement with building residents or users; evidence of consideration of specific needs of older or disabled people in the engineering process; evidence of leading discussions on or presenting ethical arguments in practice; examples of instances where you have raised ethical concerns with clients or as part of a design or project team.
E2	Commitment to maintaining professional competence to work on HRRBs and to ensure continuing competency of others	Continuing Professional Development; Undertaking competency self-assessment; managing personal development; assessing and managing development of team members	This should include the ability to: • Assess the limits of own competence in relation to work being undertaken • Identify personal development needs and put in place a suitable personal development plan including CPD relevant to HRRB • Engage with peer review / assessment and feedback process to obtain external perspective on competency and areas for improvement • Identify the limit of competency of co-workers and take action to assess and manage development of team members to support improvement where necessary.	CPD records; self-assessment records, personal development plans; training records; obtaining of new relevant qualifications; courses attended; evidence of leadership within teams or organisations; involvement in developments of new standards or research relevant to role on HRRB; evidence of on the job learning;