THE INSTITUTION OF FIRE ENGINEERS
FOUNDED 1918 • INCORPORATED 1924

PROFESSIONAL REVIEW REPORT AND INTERVIEW GUIDANCE FOR INCORPORATED ENGINEER APPLICANTS

1. PURPOSE

Benchmark standards of competence and commitment are specified by the Engineering Council (UK). In order to show that you meet these standards, you are required to write a Professional Review Report in which you describe and cross-reference relevant career episodes to the UK-SPEC standards.

This report forms a very important part of your application and it is considered as part of an initial peer review of your application. The final stage of the application process involves a Professional Review Interview to discuss your professional development including relevant aspects of the Professional Review Report. At the interview, which will take about one hour, you are likely to be asked to make a short presentation on aspects of your Professional Review Report, during and following which you will be asked questions on areas where the interviewers would like clarification or further information. Therefore, it is essential that you take a copy of your original report to the Professional Review Interview and that you are able to talk about any aspect of it knowledgeably and with the minimum amount of prompting. The applicant will be notified in writing of the outcome of the interview by the Institution's Membership Administrator.

Your report should describe your relevant professional experience in Fire Engineering as concisely as possible. Those reviewing your report will be interested in what you have done, your roles and responsibilities and how you have applied and developed your technical fire engineering knowledge.

Your report will be treated as confidential by the Membership Committee and any other persons authorised to see it. However, please ensure that you have obtained any necessary clearance from employers or others to whom information contained in the report may be considered confidential.

2. STRUCTURE

2.1 Your report must be your own work, in English, word-processed, printed on single-sided A4 paper and must not exceed 10 pages.

2.2 Your report must be written in the first person singular.

2.3 At the end of the report, you must include a statement about the report being accurate and entirely your own work and you and both your referees must sign below this statement. In addition, each page of your Professional Review Report must be initialled by both your referees.

2.4 The body of your report consists of career episodes. You must state your role and responsibilities, and the detail that you provide must be relevant to fire engineering and clearly cross-referenced to the specific UK-SPEC standard(s) being claimed. Whilst the full range of standards must be covered, the extent to which each one has to be demonstrated by each applicant will vary with their job role. However, you are strongly advised to pay particular attention to demonstrating that you have met standards A1 and A2.

2.5 If you specialise in a particular field of fire engineering, it is important to show that you have also acquired an appropriate understanding of the other areas of fire engineering to enable you to work effectively as a Incorporated Fire Engineer.

2.6 You will be expected to demonstrate:

- An appreciation of relevant regulations and legislation as well as a working knowledge of codes and standards in your field of operation.
- A critical understanding of the assumptions and limitations of analytical techniques including computer programmes, in so far as they affect fire safety, where used by you, or on your behalf.

3. EXAMPLE CAREER EPISODE CROSS-REFERENCED TO UK-SPEC

	UK-SPEC
Heat transfer through the enclosing structure of a control room	
This project related to the client's requirement to establish whether the existing passive fire protection measures to a control room within a petrochemical plant were adequate if the control room was exposed to a particular fire scenario.	
The client wanted to establish an estimate of what the temperature rise would be within the control room if it was engulfed by a fireball subjecting the external envelope of the building to a constant heat flux of 31KW/m^2 for 60 minutes.	
To calculate the heat transfer through the wall construction of the control room, I developed a one-dimensional mathematical model incorporating a finite difference technique.	A1
The model was constructed to resolve the radiative heat transfer to the exposed surface and the conduction of heat through the enclosure that was fabricated from a laminate of various materials. The internal environment of the control room was effectively sealed by the enclosure and the temperature rise of the air within the control room was evaluated in the model by calculating the heat exchange by radiation and natural convection from the internal surface of the enclosure walls.	
In order to utilise this finite difference technique I first had to establish the physical and thermal properties of the materials used in the construction of the room. This included reference to standard tables of material properties but also discussions with the product manufacturer to establish the thermal properties of specialist core materials used in the laminate.	B2
Since the core material contained a known percentage by mass of water, the thermal response of the core material in the model included the effects of specific heat capacity and latent heat of vapourisation of the water. The model therefore included the effect of the "moisture plateau" where a material (e.g. concrete) containing water maintains a temperature, during heating, of approximately 100ºC as the water is driven off from the material. Once all the moisture is driven off the temperature of the material will increase again under the continued heating conditions.	
Once I had established these properties I developed a spreadsheet that could calculate the heat transfer through the structure. The spreadsheet conducted the analysis for each of the nodes for each time step. Once this calculation had been conducted this result was used for the next time and node calculation. Thus allowing the temperature at each node to be calculated at each time step.	
To account for the steep thermal gradients between nodes defining the boundaries of the insulation materials within the laminate, it was necessary to utilise a small time step period of 0.01 seconds to achieve a numerically stable result from the model. This created a problem using a spreadsheet due to the amount of memory required by the calculation for the required 60 minute time period.	
I therefore approached a senior colleague to incorporate my methodology into a Visual Basic programme to conduct the calculations previously employed in the spreadsheet.	D1
Once the information on the heat transfer had been obtained from the computer programme the results were plotted. I then conducted a validation exercise that involved comparing the results obtained from the model against test data that had been previously conducted in standard fire resistance tests. In this case the heat exchange from the test furnace gases (at a known temperature) to the exposed surface was modelled using an effective emissivity of 0.6 and convection coefficient of 30 W/m^2.K as these had previously been proven to give consistently accurate results for the transfer of heat from the gas phase to test specimens in fire resistance tests. This validation exercise demonstrated that the model accurately predicted the unexposed surface temperature measured in the test and also reproduced the moisture plateau effect that was seen in the test results	B3
This validated the numerical solution process incorporated in the model which was then run for the scenario in question.	
Once this exercise had been completed I produced a report for the client.	
I identified that the model I has developed could easily be modified to carry out analyses for other materials used as fire separating elements and would provide a means by which the likely impact of material changes could be quickly assessed before testing.	B1

4. UK-SPEC STANDARDS FOR INCORPORATED ENGINEER

A Use a combination of general and specialist fire engineering knowledge and understanding to optimise the application of existing and emerging technology.	**EVIDENCE EXAMPLES**
A.1 Maintain and extend a sound theoretical approach in enabling the introduction of new and advanced technology and other relevant developments.	• Identify and accept limits of personal knowledge and have a clear appreciation of how to extend capabilities by exploiting available sources of information and additional experience. • Be conversant with key information resources in the field such as professional journals, the Internet and major seminars. • Remain abreast of key developments in the field of Fire Engineering, such as changes in Regulations or major innovations and to be aware of key research/experimental programmes likely to have an influence in the field.
A.2 Engage in the creative and innovative development of engineering technology and continuous improvement systems	• Employ creativity and initiative in identifying possible fire safety solutions to achieve the objectives. • Assess marketing needs and make a key contribution to marketing strategies. • Identify constraints and explore opportunities for the development and transfer of technology whilst remaining aware of issues relating to the value of intellectual property. • Demonstrate an ability to take clear cognisance of client, user and community needs in determining the functional objectives of the intended fire safety solutions. • Demonstrate a willingness and ability to extend knowledge into related disciplines or fields. Promote co-operation across engineering discipline boundaries to enable the development of future potential opportunities that could result in better value and/or better performing Fire Engineering solutions.
B. Apply appropriate theoretical and practical methods to the analysis and solution of fire engineering problems	**EVIDENCE EXAMPLES**
B.1 Identify potential projects and opportunities	• Use personal experience, an understanding of the employer's commercial position and available Fire Engineering resources to identify potential projects or opportunities and consider their viability. • In terms of potential projects, possess an ability to identify potential project complexities and problems and be able to exercise original thought in determining a response to new Fire Engineering challenges that the project may introduce.
B.2 Conduct appropriate research, and undertake design and development of engineering solutions	• Select the most appropriate engineering tools and aids to test the potential of design concepts and to determine design parameters for potential solutions. • Such tools may include, but would not be limited to, physical or computer models, analytical or empirical calculation procedures, statistical analysis, risk assessment techniques, cost benefit analysis and value engineering assessment. • Analyse potential concepts, including an assessment of the impact of factors such as performance, reliability and maintainability. • Select suitable media and/or tools for demonstrating potential solutions to clients.

B.3 Implement design solutions, and evaluate their effectiveness.	• Prepare documented proposals that clearly identify and describe the fire safety solutions that have been engineered to satisfy the functional objectives of the project. • Ensure that any testing or proving requirements are discussed and that any potential problem areas are highlighted with options for modifications or adaptations identified as necessary. • Take corrective action to overcome shortcomings or omissions that are identified with the proposals. • Determine the impact on Fire Engineering design solutions of factors such as construction, installation, commissioning, life-cycle implications, technical support, training of users and shifting user needs. • Participate in consultation with affected parties on evaluation of the issues that affect them and how resolution of these issues will impact on Fire Engineering design. • Design and evaluate the effectiveness of agreed resolutions ensuring that improvements, modifications or rectifying actions are practicable and still meet the functional strategic objectives.
C. Provide technical and commercial leadership	**EVIDENCE EXAMPLES**
C.1 Plan for effective project implementation.	• Identify the factors affecting project implementation • Prepare and develop project proposals and negotiate contractual arrangements with customers, suppliers and partners to secure the employer's commercial position. • Analyse and organise the necessary resource provision required to execute the work.
C.2 Plan, budget, organise, direct and control tasks, people and resources.	• Set work objectives and priorities including milestone outputs, project deadlines, quality standards and budgets. • Organise project teams and exercise leadership over other engineers, technical and other personnel as appropriate. • Monitor and/or audit tasks to ensure that work is executed as planned and determine what corrective actions are necessary as appropriate.
C.3 Lead teams and develop staff to meet changing technical and managerial needs.	• Agree objectives and work plans with teams and individuals • Contribute to the identification of the training needs for teams and individuals in order to respond to changing technical and managerial requirements as well as to further their professional progression. • Develop external and work-experience related training plans for teams and individuals and identify and procure appropriate training activities and resources. Undertake reviews of training effectiveness.
C.4 Bring about continuous improvement through quality management	• Promote quality throughout the organisation and its customer and supplier networks • Contribute to the development of systems for quality management and foster the acceptance of the principles of quality control throughout the organisation. • Perform work to appropriate quality standards and apply quality control and assurance techniques.
D. Demonstrate effective interpersonal skills	**EVIDENCE EXAMPLES**
D.1 Communicate in English with others at all levels.	• Develop good personal relationships that are appropriate to the level of communication being used and communicate effectively in a manner that the circumstances of the project dictate. • Ensure effective 2-way communication in discussions and be prepared to liaise with colleagues, peers and experts within and beyond the employer's organisation. • Respond effectively and efficiently to all received communication, howsoever it is received.

D.2 Present and discuss proposals	• Select the most appropriate medium for clearly clarifying Fire Engineering Design objectives and select the most suitable method of communication using, words, images, audio and video as necessary. • Communicate fluently in written and oral expression at an experienced professional standard and prepare and present lectures, reports and published papers at professional level. • Feed back results to improve the proposals.
D.3 Demonstrate personal and social skills.	• Establish fire engineering teams capable of working towards collective goals and create, maintain and enhance effective working relationships. • Be aware of the needs and concerns of others • Develop the team, the individuals within the team and yourself to enhance performance. • Provide negotiation, conflict resolution and counselling within the team and provide a conduit through which ideas, convictions and attitudes can be exchanged and conveyed. • Demonstrate confidence and flexibility in dealing with new and changing interpersonal situations.
E. Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment.	**EVIDENCE EXAMPLES**
E.1 Comply with relevant Codes of Conduct	• Comply with rules of professional conduct of the IFE • Apply professional skill in the interests of the employer and client for whom you act in professional matters. • Give evidence, express opinions or make statements in an objective manner and on the basis of adequate knowledge. • Work constructively within all relevant legislation and regulatory frameworks, including social and employment legislation.
E.2 Manage and apply safe systems of work	• Take account of potential professional risks and liabilities and accept responsibility for them. • Consider and implement as necessary appropriate occupational health, safety and welfare requirements. • Develop and implement appropriate hazard identification and risk management systems • Manage, evaluate and improve these systems.
E.3 Undertake engineering activities in a way that contributes to sustainable development	• Promote the considerations and actions required in engineering practice to improve, sustain and restore the environment. • Be aware of the wise use of non-renewable resources through waste minimisation, recycling and the development of alternatives where possible. • Promote the considerations and actions required in engineering practice to improve, sustain and restore the environment. • Be aware of the wise use of non-renewable resources through waste minimisation, recycling and the development of alternatives where possible. • Strive to achieve the beneficial objectives of Fire Engineering design whilst striving to minimise the consumption of raw materials and energy, and by designing sustainable management procedures. • Take account of life-cycle implications with respect to how Fire Engineering designs will impact on the environment. • Understand and encourage stakeholder involvement.
E.4 Carry out the continuing professional development necessary to maintain and enhance competence in your areas of practice.	• Undertake reviews of own development needs and engage in continued professional development (CPD) to maintain and enhance competence. • Set your own objectives in relation to personal and organisational objectives and maintain a career plan. • Maintain records of professional development activities. • Assist others with their own CPD