Professional Review Report and interview guidance for Incorporated Engineer applicants

1. Purpose

Benchmark standards of competence and commitment are specified by the Engineering Council. 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 approximately one hour, you will be asked questions about your Professional Review Report and particularly 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 interview and that you are able to talk about any aspect of it knowledgeably and with the minimum amount of prompting. You may bring additional supporting information to the interview with you if you wish.

You will be notified in writing of the outcome of the interview by the IFE's Engineering Council and Membership Adviser after the interview outcome has been ratified by the IFE's Registrants Group Membership Committee.

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. The emphasis being on your personal contributions, not those of others.

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 validation 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 an 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. 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	A1

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. 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 100°C 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. 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 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.	B2 D1 B3 B1