

# Research and Development Route Guidance to Chartered Membership or Associate-Membership

## 1. Introduction

The Institution's Research and Development Route is intended for candidates who are seeking either Associate-Membership or Chartered Membership of the Institution and who have gained their experience of structural engineering mainly through research and development activity.

In this context, structural engineering includes but is not limited to improving the understanding of existing structures and the development of new structural materials, software, components and/or design and analysis methods in concrete, glass, masonry, polymers, steel, timber and various other structural composites. It also encompasses any discipline that involves the investigation of the action of internal or external force systems on a variety of structural forms including those found in aeronautical, aerospace, geotechnical, marine and medical engineering.

## 2. The Conventional Route

The principal elements of the conventional route to Associate-Membership or Chartered Membership of the Institution, that is the route followed by the majority of applicants, are:

a) Completion of the Educational Base

For Associate-Members this is normally either:

- i) A Bachelors degree civil engineering (or similar) that has been accredited to Associate-Membership/IEng level by the Institution

Or

- ii) An Institution accredited HND, HNC or Foundation degree plus appropriate further learning.

For Chartered Members this is normally either:

- i) An MEng degree in civil engineering (or similar) that has been accredited to MIStructE/CEng level by the Institution

Or

- ii) An Institution accredited Bachelors degree with honours in civil engineering (or similar) plus appropriate further learning.

- b) Completion of a Period of Initial Professional Development (IPD).

Further details of the training requirements for A-M and CM candidates are contained within the Institution's Initial Professional Development (IPD) regulations. These include details of the thirteen IPD Core Objectives and guidance notes for candidates.

- c) Passing the Institution's Professional Review

This consists of two parts. Initially candidates are required to pass the Professional Review Interview. This is normally conducted in the candidate's own branch or division by at least two trained Reviewers. At least one of the Reviewers will have experience in the same field of structural engineering as the candidate. At the Professional Review Interview, the candidate is required to demonstrate their commitment to continuing professional development and how they have satisfied all thirteen IPD Core Objectives.

On passing the Professional Review Interview the candidate is then permitted to sit the A-M or CM examination, as appropriate. On passing the examination, the candidate is then eligible for election to the grade of Associate-Member (AMIStructE) or Chartered Member (MIStructE) of the Institution and to register with the EC<sup>UK</sup> as an Incorporated Engineer (IEng) or a Chartered Engineer (CEng) respectively.

### **3. The Research and Development Route**

The Research and Development Route comprises the same elements as described above except that, instead of being required to sit and pass either the A-M or CM examination, candidates are required to pass the Institution's Research and Development Review.

### **4. The Professional Review Interview**

As stated in section 2c above, the Professional Review Interview is normally conducted in the candidate's branch/section/division/group by at least two trained Reviewers. Candidates are required to demonstrate how they have satisfied the Institution's Initial Professional Development (IPD) regulations. Accordingly candidates are required to submit the AM/R or M/R form as appropriate, a two-page experience report, an IPD Final Report Form for each of the 13 Core Objectives and a comprehensive portfolio of work to support the statements made in the IPD Final Reports (see form AM/R or M/R).

The Professional Review Interview is designed to test a candidate's ability and ensure that all 13 Core Objectives have been satisfied. The Core Objectives for candidates proceeding through the Research and Development Route may be obtained from the Institution's website. It is important to note that the guidance notes for the Core Objectives have been revised to cater for candidates with a research background.

## 5. The Research and Development Review

Candidates applying for membership via the Research and Development Route are required to complete form M/R or AM/R as appropriate. In addition to the documents to be submitted for consideration at the Professional Review Interview, Research and Development Route candidates are also required to submit three copies of the following additional documents with their application:

### A Research and Development Summary Report

This summarises the candidate's research and development experience and, in particular, explains how the Institution's requirements for A-M and CM, described in section 5 below, have been satisfied. A full record of the candidate's publications being put forward for assessment must be listed in section 7 of form AM/R or M/R as appropriate. The report should not be longer than 2000 words.

### A Set of Research and/or Development Publications

See section 5, below.

The Report and the publications submitted by the candidate will be considered by a Research Review Panel once the candidate has passed the Professional Review Interview. The Research Review Panel will normally consist of at least two members or fellows of the Institution nominated by the Applications and Professional Review Panel. Normally both members of the Research Review Panel will have knowledge and experience of structural engineering research and development activity. It would be preferred that one member of the panel is a practising engineer experienced in this type of review. The Research Review Panel will report its recommendations to the Applications and Professional Review Panel. The recommendation will normally be either "Pass" or "Fail". Should the Research Review Panel have conflicting recommendations, a third Reviewer will be asked to assess the submission. Where candidates have failed they are to be advised, in writing, of the principal deficiencies of their submission by the secretary to the Application and Professional Review Panel. In situations where the candidate has failed and is no longer engaged in research or development activity, the candidate may be advised to attempt the A-M or CM examination.

As with all other candidates attempting to pass the Institution's Professional Review, candidates applying for Associate-Membership or Chartered Membership through the Research and Development Route have the right of appeal.

## 6. Guidelines for the Research Review

### Chartered Membership

When considering the research and development submission, the Research Review Panel will expect to see evidence of important structural engineering research or development work of an original nature that has been carried out over a sustained period. Research undertaken for a higher degree or as part of a postgraduate research project will not, of itself, be sufficient. The research or development work should normally have a blend of experimental and mathematical or numerical investigation. Some evidence of research or development leadership is expected.

Candidates must appreciate that it is very difficult to give precise guidance on what constitutes work that represents an important contribution to an increase in the state-of-the-art of structural engineering. Inevitably the quality of each candidate's submission will be judged on its own merits by the Research Review Panel.

As an approximate guide, it is expected that successful candidates will submit at least five high quality papers (conference papers will not normally be accepted) that have been published in high quality refereed journals. Examples of acceptable refereed journals include, but are not limited to, *The Structural Engineer*, the *Proceedings of the Institution of Civil Engineers (Buildings and Structures)*, the *American Society of Civil Engineering Journal of Structural Engineering*, the *American Concrete Institute Structures Journal*, *Journal of Solids and Structures* or similar

It is expected that the majority of the papers submitted by the candidate will either be sole authored or the candidate should be the principal co-author. The candidate should also have played a principal part in the development and leadership of some of the research work described in the papers. For each co-authored paper, the candidate is required to include a statement signed by a co-author indicating the contribution of the candidate to the research.

Again as an approximate guide, it is unlikely that candidates working in research or development for a period of less than three years since gaining a PhD will have had enough time to produce sufficient research output for consideration by the Research Review Panel.

A candidate offering development work for assessment must have played a major part in the activity. The work should be reasonably generic in content rather than be limited to a proprietary system. Normally the output from the development work should take the form of studies, papers and reports, perhaps culminating in design guides, codes or manuals of which the candidate is the sole author or the principal co-author. The candidate will also be expected to have taken a leading role in the management of a development group or team.

For each co-authored paper, report, design guide or manual submitted, the candidate is required to include a statement signed by a co-author indicating the contribution of the candidate to the research.

The Research and Development Report is an opportunity for the candidates to indicate the importance and originality of their research or development work and their contribution to the activity. It is therefore expected that candidates will, as a minimum, describe the following in their Research and Development Report:

- a) Their role and level of responsibility in the research team.
- b) Their contribution to the development of the research methodologies for example, the development of test methods, design of test apparatus, development and specification of instrumentation systems, field monitoring, modelling (physical and numerical), etc.
- c) Their contribution to the development of the research hypothesis, the development and application of theoretical principles, analysis and appraisal of test data, etc.

- d) Their development of research findings into design guidelines, manuals, recommendations for construction, etc.
- e) How their research or development work has contributed to an increase in the state-of-the-art of their particular field of structural engineering.

For those candidates unsure of the strength of their application, it is now possible to submit a preliminary application. A completed Form M/R, along with the required supplementary documentation should be submitted; however, in the first instance, it is not necessary to acquire the supporter endorsements. This will allow applicants the opportunity to test the water before they attempt to gain the support of colleagues and peers.

### **Associate Membership**

In this case the Research Review Panel will expect the successful candidate to have contributed to important research or development work over a sustained period as a member of a research or development team. Research undertaken for a higher degree or as part of a postgraduate research project will not, of itself, be sufficient but may form a large part of the candidate's submission. The work undertaken by the candidate may be of a more routine nature than is required from a candidate seeking Chartered Membership, e.g. it could include research work undertaken to confirm the findings of previous work undertaken by others or it could be the development of structural engineering software based on design guidelines developed by others.

As indicated previously, candidates must appreciate that it is very difficult to give precise guidance on what constitutes important research or development work. Inevitably the quality of each candidate's submission will be judged on its own merits by the Research Review Panel.

As an approximate guide, successful candidates will submit at least five papers that have been published in refereed journals or the proceedings of structural engineering-related conferences.

It is expected that the majority of the papers submitted by the candidate will be either sole authored or the candidate should be the principal co-author. As an approximate guide, it is unlikely that candidates working in research or development for a period of less than five years since gaining a BEng or BSc degree will have had enough time to produce sufficient research output for consideration by the Research Review Panel.

A candidate offering development work for assessment must have played a significant part in the activity such as undertaking parametric studies, evaluating test data, undertaking design studies, development of software or other elements of development work that will form part of a research report, design manual, guide or code.

For each co-authored paper, report, design guide or manual submitted, the candidate is required to include a statement signed by a co-author indicating the contribution of the candidate to the research.

The Research and Development Report is an opportunity for the candidates to indicate the scope and extent of their research or development activity. It is therefore expected that candidates will, as a minimum, describe the following in their Research and Development Report:

- a) Their role and level of responsibility in the research team.
- b) Their contribution to the development of the research methodologies for example, the development of test methods, design of test apparatus, development and specification of instrumentation systems, field monitoring, modelling (physical and numerical), etc.
- c) Their contribution to the development of the research hypothesis, the development and application of theoretical principles, analysis and appraisal of test data, etc.
- d) Their development of research findings into design guidelines, manuals, recommendations for construction, etc.