

*The Institution
of Structural
Engineers*

Initial Professional Development
Technician Member

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Initial Professional Development

Initial Professional Development: Technician Membership

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The **Institution**
of **Structural**
Engineers

Becoming a Technician Member

Becoming a Technician Member



Becoming a Technician Member

1.0 Introduction

- 1.1 The Institution of Structural Engineers is the preeminent global professional body for structural engineering and is recognised internationally for the high technical and professional competence of its members. The vision of the Institution is ‘working together to promote world-class standards of safety, efficiency and excellence in structural engineering’.
- 1.2 The Institution sets and maintains standards for professional structural engineers and implements these through a qualifying Professional Review (incorporating an interview and written examination), Code of Conduct and a policy of Continuing Professional Development (CPD). The interview and examination are internationally available and can be taken in a number of centres throughout the world.
- 1.3 Members of the Institution have a high degree of professional knowledge and expertise in structural engineering. They display judgement in making the best use of resources in the interests of public health and safety and in the care of the environment. Technician Members are entitled to use the designatory letters ‘TIStructE’. They may also be registered as Engineering Technicians (EngTech) with the Engineering Council.
- 1.4 Technician Members of the Institution will be able to demonstrate:
- A sound understanding of core structural engineering principles.
 - An awareness of relevant existing technology coupled with the ability to locate and use new research and development to benefit their work and structural engineering generally.
 - Use of structural engineering knowledge and understanding to apply technical and practical skills.
 - An ability to contribute to the construction design process.
 - The capability to function as a reliable member of a team involved in solving complex structural engineering problems.
 - Commitment to the public interest in all aspects of their work, including health, safety, risk, financial, commercial, legal, environmental, social, energy conservation and sustainability.
 - Effective communication and interpersonal skills.
 - Knowledge of the statutory and other regulations affecting current practice in structural engineering.
 - A base of information technology skills.
 - Commitment to the profession of structural engineering, particularly with regard to the Institution’s Code of Conduct and the requirement for Continuing Professional Development.

1.5 There are three stages in becoming a Technician Member of the Institution:

1. Achievement of the required educational base.
2. A period of responsible work experience initially under guidance and supervision, known as Initial Professional Development (IPD).
3. Success in the Institution's Professional Review

Note: Completion of the educational base and IPD can run concurrently but both must be completed before applying.

2.0 The educational base

2.1 The educational base required for a Technician Member is one of the following:

- A National Certificate (NC) or National Diploma (ND) in either:
 - Civil Engineering
 - Civil Engineering Studies
 - Construction and the Built Environment
 - Building Studies
- An approved academic or vocational qualification set at level 3 in the QCF or NQF for England and Northern Ireland; or at level 6 in the SQCF for Scotland; or at level 3 in the QCF for Wales
- A City & Guilds Higher Professional Diploma in a relevant engineering discipline
- A technical certificate as part of an approved Advanced Modern Apprenticeship Programme
- A foundation degree in Structural/Civil or Construction Engineering
- Qualifications recognised under the Dublin Accord

If you hold a qualification in a similar area and are not sure of its equivalence you may apply to the Institution for an academic assessment.

If you do not hold any of the qualifications listed above you may be able to apply for a 'Route B Appraisal'. This involves an in-depth appraisal of your knowledge and skills and is aimed at experienced practising Engineering Technicians who have gained the necessary knowledge and skills for their job through working closely with other skilled colleagues over a number of years.

3.0 Initial Professional Development (IPD)

- 3.1** IPD comprises the acquisition and development of the specialist knowledge and skills, and their practical application, which are needed to practise as a structural engineer. It bridges the gap between your educational base and attaining professional qualifications. The Institution describes IPD in terms of core objectives, which are defined to minimum standards.
- 3.2** Acquiring competency and experience at work will develop your ability to carry responsibility and make independent judgement. The first part of your IPD should be managed by you and should provide a broadening of experience introducing you to new activities and skills. The second part will be a gradual progression, dependent upon your personal development and commitment, towards increasing your understanding and ability in various areas of responsibility. These two elements can be viewed as broadening your experience and deepening your knowledge/ability. The two parts of your IPD should preferably be concurrent rather than consecutive.
- 3.3** All relevant experience may be taken into account, including experience from 'sandwich', part-time or vacation work.
- 3.4** A key element of a managed training programme is the production of regular reports which, by recording the activities undertaken and the lessons learned in relation to the objectives, not only act as a first source for future reference, but also demonstrate your progress towards and achievement of the core objectives. Even if you are not following either an accredited training scheme, recognised by the Institution as satisfying its core objectives, or an individually managed programme, we recommend completing the IPD quarterly report forms every three to four months as an aide memoire towards finalising the IPD final report forms and compiling a portfolio of work.
- 3.5** There is no concept of 'time-serving' although it is extremely unlikely that most candidates will achieve an adequate range of experience/ability at work in less than two to three years. The progress summary record provides a useful means of monitoring achievement of the core objectives and highlighting areas requiring review.

4.0 Core objectives

- 4.1** The core objectives are compulsory and outline the basic competence required of candidates pursuing Technician membership of the Institution. Achievement of the objectives will not in itself create the skills and abilities of a Technician Member but should ensure a sound and broad base upon which you can build further professional and managerial responsibility.
- 4.2** The core objectives relate to all types of structural engineering work and associated disciplines. They permit maximum flexibility and indicate only the minimum standard of required competence. They do not depend on time-served as a measure of achievement but are capable of objective and progressive assessment. Guidance notes are included within the core objectives section in this file and examples of activities which may contribute to the achievement of the core objectives are also provided.

4.3 The core objectives are arranged in three sections:

1. Personal: effective communication and interpersonal skills, leadership and professional commitment.
2. Engineering: identification and solution of engineering problems and the safe, economic and sustainable implementation of the solutions.
3. Management and commercial: efficient procurement and management of resources within economic, environmental and regulatory constraints to achieve the engineering objectives.

5.0 Routes to completion of IPD

There are three routes for demonstrating achievement of IPD:

- Individually managed
- Accredited training schemes
- Retrospectively collated

5.1 Individually Managed

Where IPD is individually managed, each candidate is responsible for managing their own training with the assistance of a personal mentor.

You must keep records of your training and experience to indicate your progressive achievements against the core objectives. The Institution has produced IPD quarterly report forms and progress summary records for this purpose.

You should keep these updated on a quarterly basis. To aid in this the Institution recommends the use of a personal development diary which you should update on a weekly basis. This diary should be used to include all IPD related activities making it easier to complete your quarterly reports as you will have a week by week guide to refer to. It is important that you have regular meetings with your personal mentor to review your progress in meeting the core objectives and agree your action plan.

You should also maintain your own record of continuing professional development (CPD). Further information on CPD can be viewed in section 8.0. You should keep a professional development action plan of your training objectives for subsequent periods of your training.

A mentor should preferably be a member of the Institution ((i.e. a Technician Member, Associate-Member, Chartered Member or Fellow), or an individual of equivalent standing. They will normally be an experienced engineer in your workplace and will provide guidance, advice and training.

There may be situations where a mentor will not be available within your organisation, but the Institution will be able to offer you guidance. The Institution is an international organisation and has links with a number of structural engineering organisations throughout the world to which it can also call on for assistance with mentors.

A candidate may have several mentors throughout their period of IPD. The level of experience of the candidate's mentors should be appropriate to the relevant core objectives.

Guidance for mentors, in the form of a mentor's handbook, is available from the website or by contacting the Membership Department. A mentor experience record is included in section 3 of this document. The Institution would be grateful if this could be completed by your mentor, if you have one, and sent to Institution HQ as this will facilitate effective dissemination of updated guidance and procedures as appropriate.

Once you have satisfied the IPD requirements you should complete the Institution's IPD final report forms. These should be signed by your personal mentor and sent to the Institution when submitting your completed application at the appropriate time.

Those candidates following the individually managed route will be required to submit their IPD quarterly report forms, progress summary records and portfolio of work directly to their reviewers when requested.

5.2 Accredited Training Schemes

The Institution does not accredit company training schemes but candidates following comparable training schemes accredited by other bodies (e.g. ICE, HKIE) may submit those training records to demonstrate compliance with the Institution's core objectives. The experience must be in structural engineering and candidates will be required to submit their full records of training and portfolio of work when requested to do so by their reviewers. They will also be required to complete the Institution's IPD final report forms.

5.3 Retrospectively Collated IPD

There will be situations where candidates wishing to apply for membership have not followed either the individually managed route or a training scheme. In this situation, candidates applying for the Professional Review must demonstrate that they have satisfied the core objectives by completing and submitting the Institution's IPD final report forms at the appropriate time, and submitting a portfolio of their work when requested to do so by their reviewers.

6.0 Guidance on submission of portfolio

- 6.1** All candidates are required to prepare a portfolio of work in support of their IPD final report forms, which will need to be submitted to your regional group in due course. However, in order to avoid unnecessary delays in the interview process the portfolio must be ready for submission at the time when you make your interview application to headquarters. Submission instructions for the portfolio will then be confirmed by your regional group after receipt and processing of the PRI application.
- 6.2** Two copies of the completed portfolio will need to be submitted. If you are following the individually managed or accredited training scheme routes you will also have to submit your supporting documents (i.e. IPD quarterly report forms, training records, etc.) with your portfolio. Remember, if you cannot provide your portfolio within the timescales required by your reviewers you may be prohibited from attending the interview.

- 6.3** The portfolio must demonstrate that you have attained at least the minimum level of competence and responsibility for Technician membership. It is a vital element of the PRI process, and you should devote the necessary time and care to its production. Remember, it is in your interest to submit a quality and comprehensive portfolio, as it will make the interview itself more straightforward.
- 6.4** Core objective 1.2 is ability in communication, and your IPD final report forms and portfolio will contribute to the assessment of this objective. It is therefore important to ensure that your documentation is of a high standard.
- 6.5** The portfolio must be A4 size and not more than 40 mm (single-sided) or 25 mm (double-sided) in thickness, excluding the folder/binding. If you exceed this amount your reviewers will be unable to assess all of the submitted information in detail, and consequently may reject your portfolio and can decline to interview you.
- 6.6** The pages of text within the portfolio must also be A4 size, i.e. you cannot reduce your pages to A5 to fit two pages onto an A4 sheet. Drawings must be no greater than A3 size, and folded to suit. The font size used in your portfolio and IPD final report forms must be no smaller than Arial 9.
- 6.7** The portfolio must contain evidence relating to all of the core objectives on which you are being assessed, and allow easy cross-referencing with the IPD Final Report Forms. We recommend that you are judicious in your assessment of what to include, as it will not benefit you to overwhelm your reviewers with stacks of information. The overriding principle is to ensure that it is relevant and relates directly to the core objectives and how you have achieved the standards associated with each objective.
- 6.8** Candidates will be expected to include examples of work from a variety of projects that they have worked on, and the portfolio must be sub-divided into the core objectives, with the evidence provided in each subsection relating specifically to the associated core objective.
- 6.9** Where appropriate, candidates should provide hand written comments/annotations on the submitted information to help demonstrate an understanding of the work and its relevance to the core objectives.
- 6.10** All work included within the portfolio must be clearly attributable to the candidate, and relevant to the core objectives.
- 6.11** Although not intended as an exhaustive list, the following are examples of information that could be expected in a typical portfolio:
- Evidence of attendance at in-house lunchtime seminars or external CPD events, e.g. attendance certificates, personal notes, etc.
 - Correspondence by the candidate, e.g. letters, faxes, emails, site notes, meeting notes, etc.
 - Hand drawn sketch details by the candidate.
 - Basic calculations by the candidate, e.g. foundation loads/widths, beam designs, drainage designs, etc.

- CAD project drawings by the candidate, e.g. foundation drawings, superstructure drawings, external works layouts, drainage layouts, etc. ideally covering a range of structure/project types.
- Evidence of an understanding of health and safety issues, i.e. risk assessment procedures, drawing CDM notes, PPE requirements, etc.
- Evidence of engagement with structural safety, e.g. SCOSS and CROSS reports.
- Evidence of an understanding of environmental/sustainability issues, either by personal involvement on a project or background reading, i.e. SUDS solutions, ground contamination, etc.
- Evidence of any site experience, e.g. photographs taken during site visits, site notes, etc.
- Examples of where you have exercised your duties in an ethical manner, where you have applied ethical principles, or where you have upheld ethical principles as defined by your organisation or company.
- Evidence of quality assurance systems, e.g. in-house issuing procedures, in-house checking procedures, checking of subcontract/specialist design information, etc.
- Candidates should avoid submitting repetitive designs or drawings.

6.12 A portfolio checklist has been provided in this file and is also available for download from the Institution's website. All candidates must include a signed version of the checklist as the first page of their portfolio. By completing the checklist you are confirming that you have complied with the Institution's requirements in terms of the layout and variety of evidence provided within the portfolio. Failure to comply with these requirements will reduce the likelihood of success at the Professional Review.

7.0 The Professional Review

7.1 When you consider that you have accrued sufficient experience and supporting documentation you may apply to the Institution's Membership Department for the Professional Review in accordance with the relevant deadlines (please see the Institution website for details). You will be required to submit:

- Form TM.
- A two-page experience report detailing your roles and responsibilities over the course of your career.
- Your IPD Final report forms for each of the 12 core objectives.
- Your portfolio of work and, dependant on which IPD route is followed, the associated documents.
- Your application fee (please see the Institution website for details).

Once your application has been processed, it will be presented for review to the Application and Professional Review Panel at the next available meeting. They may request that you sit an interview. If an interview is required, we will contact your regional group to make the necessary arrangements and the interview fee will be applied.

- 7.2 Form TM must be signed by a Fellow (FIStructE), Member (MIStructE), Associate (AIStructE) Associate-Member (AMIStructE) or Technician Member (TIStructE).

If you are unable to acquire the requisite supporter we recommend that you:

- Try previous employment or colleagues. If they themselves are not of the relevant grade of membership they may know someone who is.
- Contact the university where you studied to see if any members would be able to assist.
- Contact your local Regional Group or representatives via the Institution's website.
- Search the online members' directory for members in your area.

Contacting Regional Group members is very much a last resort and we make it clear that group members are under no obligation to sign the forms. It is important to note that in acting as a supporter they are not stating that you are qualified to be a Technician Member but rather that, subject to satisfying the requirements of the interview, you are a fit and proper person to become a Technician Member of the Institution.

On this basis some members will sign the form, others will only do so after they have met with you and reviewed your work, whilst some refuse to act as supporters. The decision is very much a personal one for each member and although we try to be as supportive as possible we do encourage members to take the role of supporter seriously.

- 7.3 The Professional Review Interview will verify that you have achieved the core objectives to the minimum standards.

Interviews are usually arranged through your Regional Group and will be with two trained reviewers who will normally be experienced members of the Institution.

The interview will normally be approximately one hour long but this may vary according to the length of time it takes for the reviewers to determine whether you have reached the required standard in each core objective. It will include an informal presentation of your career in structural engineering which should last approximately 10 minutes. You will not be permitted any electronic aids when making the presentation, however it is expected that you will make some use of your portfolio and IPD Final Report Forms.

Whilst the reviewers will try to help you by putting you at ease and asking questions about your work and experience, it is important that you realise that the onus is on you to demonstrate that you have achieved the stated attainment levels for all 12 core objectives.

- 7.4** After the Professional Review Interview the reviewers are required to complete a reviewer's summary report form which indicates whether you have passed all the core objectives. This form is returned to the Institution and reviewed by the Applications and Professional Review Panel. If you have passed all the core objectives then the Panel will recommend your election to Technician Member to the Membership Committee. The final election list is then forwarded to the Institution's Executive Board for approval and you will be informed when your election has taken place. As a Technician member you may use the designatory letters of 'TIStructE'. You will be recognised as a professional member of the Institution with the same voting rights as other members (i.e Associate-Members and Chartered members).
- 7.5** If you have failed the Professional Review Interview the Institution secretariat will write to you and advise you of the core objectives where you did not sufficiently demonstrate achievement of the required standard. If you fail three or fewer objectives you will be re-interviewed on those objectives only. If you fail four or more objectives you will be required to re-sit the full interview. In both cases an updated and improved submission will be required.

On request the Institution will provide you with guidance on how you might address deficiencies in meeting the core objectives and you are strongly advised to seek the help of your mentor before re-applying. There is no limit on the number of times you can sit the Professional Review. However, should a candidate fail up to three core objectives in their first interview, they will have three years to pass the failed core objectives before being required to resubmit IPD Final Report Forms for all 12 core objectives and to be re-interviewed on the full 12 core objectives.

8.0 Continuing Professional Development (CPD)

- 8.1** At the Professional Review Interview you will be assessed on your commitment to CPD which is defined by the Institution as: The systematic maintenance, improvement and broadening of knowledge and skill and the development of personal qualities necessary for the execution of professional and technical duties throughout the practitioner's working life.
- 8.2** All members of the Institution have an obligation to keep their skills and knowledge up to date and as a prospective member of the Institution you will be expected to understand this commitment at an early stage in your career. Evidence of your CPD can be demonstrated by regular use of a development action plan, a CPD record/diary and keeping a portfolio of your work and responsibilities during the period of your IPD.
- 8.3** The Institution provides a CPD Activities Record which can be used to record your CPD. There is also a secure online version accessible via My Account on the Institution's website.
- 8.4** Please note that the Institution operates mandatory reporting of CPD whereby a proportion of those elected to Fellow, Chartered, Associate, Associate-Member and Technician will be obliged to submit a CPD record on request or be removed from membership. It is therefore recommended that you develop the habit of recording and submitting your CPD from an early stage in your career.

Please visit the Institution's website for further details.

9.0 Ethics

9.1 All members of the Institution are expected to uphold ethical values and should demonstrate within their application that they are committed to working in an ethical and socially responsible manner, as outlined in the Institution's Code of Conduct.

9.2 The Code of Conduct states that all members shall:

- Act with integrity and fairness
- Have regard to the public interest and to the interests of all those affected by their professional activities
- Uphold the reputation of the profession
- Maintain and broaden their competence, and assist others to do so
- Undertake only those tasks for which they are competent
- Exercise appropriate skill and judgement
- Not maliciously or recklessly injure or attempt to injure the reputation of another person
- Avoid conflicts of interest
- Members must disclose to the Institution if they have been convicted of a criminal offence.

9.3 The Institution believes that ethics should apply throughout all aspects of an engineers' working life, and it is not therefore represented by a single core objective as ethical issues can have an influence across multiple objectives. The Professional Review Interviewers expect to see examples of how you have upheld ethical values relevant to your working practices within your IPD Final Report Forms and portfolio, and you may also be asked to discuss this during your interview.

10.0 Appeals Procedure

The Institution has an appeals procedure for candidates who have been unsuccessful in their application. An appeal may be made on the following grounds only:

- Extenuating circumstances occurring immediately before or during the application process, and/or
- Departure from the Institution's application or interview procedures.

Full details of the procedures are published on the Institution website.

Please note that recording of your interview by any means is not permitted and any such recording cannot therefore be used as evidence in an appeal or other disagreement with the judgement of the reviewers.

11.0 Registration with the Engineering Council

Candidates who are successful in the Technician member Professional Review may apply to the Engineering Council for registration as an Engineering Technician (EngTech). This further demonstrates your proven knowledge and competence. In particular, registration demonstrates a commitment to professional standards and to the development and enhancement of competence.

Further information about the Engineering Council can be found on their website (www.engc.org.uk).

The **Institution**
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Core Objectives



Core Objectives

Core Objectives: Technician Membership

Introduction

The following list of compulsory core objectives details the requirements for IPD for candidates intending to qualify as Technician Members of the Institution of Structural Engineers and thereby as Engineering Technicians. Candidates will be required to demonstrate the minimum level of competence in each of the objectives within their chosen career path. Achievement of the objectives will not in itself create the skills and abilities of a Technician Member, but should ensure a sound and broad base upon which the candidate can build further professional and managerial responsibility.

The minimum standards required for the core objectives are:

A	Appreciation	A general appreciation of the subject is required, as well as an understanding of how the subject may affect, or integrate, with other subjects.
K	Knowledge	A knowledge and understanding of the subject and its application is required.
E	Experience	The subject should be performed independently or under supervision.
B	Ability	Perform the subject without supervision and be competent to advise others.

The core objectives are highlighted in bold type, whilst the notes and examples after each of the core objectives indicate further guidance to candidates and mentors on possible ways in which the core objectives may be satisfied. These are given in terms of examples of ways in which candidates may choose to satisfy the core objectives to the level of competence required and should be seen as guidance only and not prescriptive.

IPD final report forms

IPD final report forms are available on the Institution website.

General advice for completing the IPD final report forms:

Personal: the reviewers will not be interested in what your company does, they are only interested in what you have done. Therefore, ensure that you state what you have personally undertaken and try to avoid generic statements about how your company operates.

Positive: do not sell yourself short. Try to avoid statements such as 'I have limited/some experience' – you either have experience or not. Try and ensure that the correct words are applied to the relevant core objectives, e.g. if it's an 'ability' core objective, do not use 'experience' or 'knowledge' always use 'ability'.

Practical: ensure you state how you have achieved the core objective standards; all too often candidates fall into the trap of simply describing the core objective or stating why it is important. This is not what the reviewers will want to know. There is no benefit in describing the properties of various materials (for core objective 2.3) as the reviewers will already know this; what they need to know is how you have developed your understanding of materials and what practical experience you have.

Core objectives for Technician membership: Guidance notes

1.0 PERSONAL

1.1 INSTITUTION (Minimum standard K)

Objective: Knowledge of the Institution and involvement in Institution affairs

Guidance note: The candidate should demonstrate knowledge of the structure and purpose of the Institution of Structural Engineers, together with an awareness of the Institution's Code of Conduct.

Candidates are strongly encouraged to support, and encourage others to support, Institution activities in universities, colleges and schools by giving careers talks, lecturing, providing case studies, assisting in the marking/critiquing of project work, etc.

Where appropriate and practicable the candidate is expected to have an involvement in Institution affairs, for example attendance at technical meetings and seminars. The objective could typically be met by attendance at three Institution events per year or equivalent involvement in other professional institution or relevant CPD activities. The candidates may list their involvement with a brief overview of all activities and a brief commentary on two events.

The candidates should have an appreciation of the institutions of other disciplines (e.g. ICE, CIBSE, RICS, RIBA, IEE, IMechE, IEI, HKIE, Engineers Australia, SAICE, etc.)

- Regular attendance at Regional Group meetings/seminars over a prolonged period of time
- Regular contact with members of the Regional Group committee
- Knowledge of and adherence to the Institution's Code of Conduct
- Knowledge of the Institution's Council and committee structure and the work of those committees
- Regular use of the Institution's website
- Regular review of the Structural Engineer journal
- Knowledge of the Institution's services including CPD courses and the library
- Knowledge of the international dimension of the Institution
- Knowledge of other institutions and disciplines
- Industrial engagement with a local university/college in terms of delivering lectures, assisting in the marking of project work, mentoring, arranging site visits, etc.

1.2 COMMUNICATION (Minimum standard B)

Objective: Ability to demonstrate effective communication and interpersonal skills

Guidance note: The candidates should demonstrate competence in effective communication and inter-personal skills using written, oral and visual media. Where resources permit the candidate should demonstrate the ability to communicate via IT links, produce spreadsheets and database documents.

The Candidate should develop drafting skills to be able to produce drawings to illustrate general arrangements and initial design details.

The candidate should have an appreciation of the skills of other professionals in the construction team and demonstrate an ability to work as an effective member of a diverse team.

Candidates should be able to demonstrate ability in communication and interpersonal skills. This will be assessed in the interview and via the documentation submitted by candidates. It is important that candidates have an understanding of the principles of effective communication and can highlight how they have developed the abilities as stated in the core objective guidance note.

Candidates may choose to record involvement in the following:

- In-house presentations
- Formal communication e.g. technical report writing
- Presentations to schools, colleges, universities, etc.
- Team building exercises
- Institution competitions e.g. Young Structural Engineers' International Design Competition or other competitions supported by other institutions

2.0 ENGINEERING

2.1 STRUCTURAL SOLUTIONS - CONCEPTUAL DESIGN (Minimum standard A)

Objective: Appreciation of the process of producing viable structural solutions, within the scope of a design brief

Guidance note: The candidate should demonstrate an appreciation of conceiving approximated scheme solutions to assess the viability of alternative materials and forms of construction.

In producing drawings and other information candidates should demonstrate that they have an appreciation of the following:

- Assessment of the brief
- Various types of static and dynamic loading
- Load transfer and overall stability
- Foundations and soil/structure interactions
- Function of frame system
- Progressive or disproportionate collapse
- Location and use of the structure
- Sustainability and environment
- Construction methods, materials and costs
- Buildability and construction techniques

2.2 STRUCTURAL SOLUTIONS - ANALYSIS AND DESIGN (Minimum standard K)

Objective: Knowledge of the processes involved in the analysis and design of basic structures

Guidance note: The candidate should be able to demonstrate knowledge of the processes of the following aspects of structural design:

- i. The design of at least one of the primary structural materials (concrete, steel, masonry, timber).
- ii. The design of individual components.
- iii. The application of appropriate loading criteria load paths.
- iv. The elements which determine overall stability and structural integrity
- v. Basic knowledge of civil works including drainage, together with mechanical, electrical and building services considerations.

The candidate should have the ability to use the appropriate standards/Codes of Practice, specifications, Institution publications, technical agency publications, bulletins, reports, commercial and relevant publications from other professional institutions, etc., and have knowledge of how the controlling requirements of these documents are applied within specification or design criteria within their own discipline.

The candidate should have knowledge of the processes which lead to the development of specifications and method statements.

Candidates who complete the Certificate in Structural Behaviour will have demonstrated theoretical knowledge and understanding of structural behaviour, including trusses, beams, plasticity and dynamics.

Candidates should be able to demonstrate a knowledge of the following:

- Basic beam and frame interaction
- Braced and unbraced frame analysis
- Movement joints
- The software packages involved in the analysis/design process
- Structural planning
- Soil-structure interaction

2.3 PRODUCTION OF ENGINEERING DOCUMENTS (Minimum standard B)

Objective: Ability in the production of structural engineering documents

Guidance Note: Candidates should be able to demonstrate ability in:

- i. General arrangement drawing. Detailing and scheduling of reinforced concrete work, structural steel work and other structural materials.
- ii. Working with relevant regulations
- iii. The use of various forms of construction details, interface and connection details between different materials and elements in a structure e.g. sub-structure, superstructure, weathering details etc.

The candidate should be able to demonstrate ability in the following:

- Production of drawings which coordinate information issued by other designers on the project in relation to the structure.
- Generating job specific details of structural components.
- Organising and recording information issued and received on a project and the preparation of document issue sheets.
- Preparation of schedules to be used for quantifying material or components on a project including lintel schedules, bar bending schedules and reinforced concrete drawings.

- Use of standard draughting methods of showing various materials and components on drawings. Such methods being as described in the various national codes of practice, commonly accepted drawing office guides or company procedures.

2.4 MATERIALS (Minimum standard K)

Objective: Knowledge of how materials are specified and incorporated into the structure

Guidance note: Candidates should develop a knowledge of the properties and behaviour of the primary construction materials, i.e. steel, concrete, masonry and timber, and knowledge of their use in structural elements.

Candidates should also have an appropriate knowledge of relevant materials and their specifications, e.g. bolts, rebar systems, steel connections, dpms, tanking systems, etc.

Steel: grades and types of steel and other metals including their physical properties and their limitations. Their use as primary or secondary materials e.g. beams or rebar fixings, protection requirements, etc.

Concrete: grades and types of concrete – its use, durability and properties including thermal shrinkage etc.

Masonry: types of masonry – its use, durability and properties including thermal shrinkage etc.

Timber: grades and types of timber

Other materials including glass, plastics, etc. can also be considered.

2.5 ENVIRONMENT (Minimum standard K)

Objective: Knowledge of relevant environmental, societal, sustainability and economic issues, and associated legislation

Guidance note: The candidate should demonstrate knowledge of the relevant environmental and sustainability objectives, issues and legislation.

The candidate should demonstrate knowledge of relevant environmental and conservation legislation. For example, a candidate could demonstrate appreciation of potential sources of contamination, investigation measures required and design solutions adopted to mitigate risk. Some candidates may have knowledge of the conservation of structures and restoration techniques and demonstration of this type of work would also help satisfy this core objective.

The Candidate should appreciate the different mitigation measures required for the control of contaminants which may be present in the form of solids, liquids or gases.

Candidates must promote the message of sustainability through their words and actions.

Candidates may choose to develop knowledge of:

- Protection of vegetation and wildlife at the planning, design and construction stages
- Environmental legislation
- Methane/radon gas
- Sustainability (and knowledge of the Institution's Panel on this matter)
- Brownfield sites
- Contaminated land
- Environmental Impact Assessments
- Recycling in construction

2.6 CONSTRUCTION (Minimum standard E)

Objective: Experience in construction techniques

Guidance note: The candidate should demonstrate experience in basic construction techniques, construction plant and machinery, temporary support systems, material testing procedures, construction programmes, construction sequencing, etc.

Ideally, the candidate should gain construction experience by visiting sites. The checking of reinforcement, structural steelwork and other structural elements on site would assist the candidate in providing additional relevant experience for this core objective.

Candidates should have a basic understanding of civil works especially drainage systems and other services, e.g. mechanical or electrical, which are relevant to construction sites.

Candidates should be encouraged to gain knowledge and experience in some or all of the areas listed below:

- Demolition
- Setting out
- Materials testing
- Defects and their investigation
- Temporary works
- Substructure construction
- Superstructure construction
- Construction programming and sequencing
- Site construction plant
- Health and safety

3.0 MANAGEMENT AND COMMERCIAL

3.1 MANAGEMENT SKILLS (Minimum standard K)

Objective: Knowledge of management skills for programming and control

Guidance note: The candidate should demonstrate knowledge of the management and control of design team resources and administrative support necessary for the successful delivery of projects.

The candidate should demonstrate knowledge of the interfaces and exchanges of information with other disciplines.

Candidates should be aware of the needs and concerns of others, especially where related to diversity and equality, and develop an understanding of relevant legislation.

This knowledge may be gained through:

- Attendance at project meetings (design and contract)
- Liaison with colleagues
- Involvement in Quality Assurance procedures
- The development of time management and delegation skills

3.2 HEALTH AND SAFETY (Minimum standard K)

Objective: Knowledge of health and safety requirements and legislation

Guidance note: The candidate should demonstrate knowledge of health and safety standards and reports on structural and construction safety, publications produced by public authorities, relevant trade bodies and professional institutions, including for example in the UK CDM Regulations, Health and Safety Executive documentation and any other statutory documentation relevant to the candidate's location.

Candidates will be required to demonstrate knowledge of, and engagement with, structural safety within their portfolio and during the Professional Review Interview.

The candidate should develop knowledge of commonly used materials and activities, and be familiar with the precautions and procedures required to avoid and reduce the design, construction and users, risk, and the appropriate risk assessments with respect to construction personnel, the general public and user. The candidate should be responsible for their safety in the workplace.

Candidates are required to develop their knowledge in health and safety issues including:

- Health and safety legislation
- Hazards and risk assessments
- Health and safety standards and reports of safety, e.g. SCOSS and CROSS reports
- Insurance
- Risk management
- Security

3.3 COMMERCIAL AWARENESS (Minimum standard A)

Objective: Appreciation of commercial and financial constraints

Guidance note: The candidate should develop an appreciation of the costs of commonly used materials and construction methods, the total component cost and the costs of the structural frame relative to the whole project cost.

Candidates are required to have an appreciation of commercial issues including:

- Costs and the impact of national and international affairs on the demand and supply of raw materials, labour and manufacturing processes
- Value engineering and whole life project costing
- Bill of quantities
- Competitive tendering
- Fee assessment and quotations
- Monitoring the control of project costs within their office

3.4 QUALITY SYSTEMS (Minimum standard K)

Objective: Knowledge of quality systems

Guidance note: The candidate should develop an understanding of the requirements for quality systems and a knowledge of the specific procedures required to achieve quality in design and construction including:

- Total Quality Management
- Quality Management Systems e.g. BS ISO 9001; 2000
- Project Quality Plans
- Environmental Management Systems (EMS)

The **Institution**
of **Structural**
Engineers

Portfolio checklist



Portfolio Checklist Technician member

All candidates must complete this checklist and include a signed version as the first page of their portfolio. By completing the checklist, you are confirming that you have complied with the Institution's requirements in terms of the layout and variety of evidence provided within the portfolio. Failure to comply with these requirements will reduce the likelihood of success at the Professional Review Interview. Remember also that your portfolio must be A4 size and not more than 40mm (single-sided) or 25mm (double-sided) in thickness, excluding the folder/binding.

Please ensure that your portfolio is sub-divided into the core objectives, with the evidence provided in each subsection relating specifically to the associated core objective.

Please tick to confirm that your portfolio includes all the following:

Evidence relating to all the core objectives on which you are being assessed.	
Evidence of attendance at in-house lunchtime seminars or external CPD events, e.g. attendance certificates, personal notes, etc.	
Correspondence by the candidate, e.g. letters, faxes, emails, site notes, meeting notes, etc.	
Hand drawn sketch details by the candidate.	
Basic calculations by the candidate, e.g. foundation loads/widths, beam designs, drainage designs, etc.	
CAD project drawings by the candidate, e.g. foundation drawings, superstructure drawings, external works layouts, drainage layouts, etc. ideally covering a range of structure/project types.	
Evidence of an understanding of health and safety issues, i.e. risk assessment procedures, drawing, CDM notes, PPE requirements, etc.	
Evidence of an understanding of environmental/sustainability issues, either by personal involvement on a project or background reading, i.e. SUDS solutions, ground contamination, etc.	
Evidence of engagement with structural safety, e.g. SCOSS and CROSS reports.	
Examples of where you have exercised your duties in an ethical manner, where you have applied ethical principles, or where you have upheld ethical principles as defined by your organisation or company.	
Evidence of any site experience, e.g. photographs taken during site visits, site notes, etc.	
Evidence of quality assurance systems, e.g. in-house issuing procedures, in-house checking procedures, checking of subcontract/specialist design information, etc.	

Name:	Signature:
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