

NATIONAL RIVERS AUTHORITY

TRAINING SCHEME FOR CIVIL
ENGINEERS

ENVIRONMENT AGENCY



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TRAINING OF CIVIL ENGINEERS - APPROVED BY THE INSTITUTION OF CIVIL ENGINEERS
(TO FORM PART OF THE TRAINING RECORD (ICE 1))

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NATIONAL RIVERS AUTHORITY

TRAINING OF GRADUATE AND UNDERGRADUATE CIVIL ENGINEERS

1 INTRODUCTION

This document sets out the National Rivers Authority's (NRA) scheme of training for Civil Engineers. It has been prepared for the guidance of Graduate and Undergraduate (or Trainee) Civil Engineers and all staff concerned with their work and suggests arrangements that should be made to provide satisfactory training to meet the following objectives:

- a) To produce fully qualified and experienced Engineers who are capable of accepting responsibility and producing a high quality of work at a professional level.
- b) To enable the Trainee to fulfill the entry requirements for Corporate Membership of the Institution of Civil Engineers (ICE). This document applies specifically to Trainees who are under agreement but those who are not under agreement should follow the general principles herein.

These guidelines should be read in conjunction with the Institution documents including subsequent updates:

ICE 1 - Training Record

ICE 43 - (Post Chilver) - 'The Route to Corporate Membership'

2 SUPERVISING CIVIL ENGINEER

The Region of the National Rivers Authority, through its Supervising Civil Engineer, will offer graduates and under-graduates under agreement, Civil Engineering experienced in order to prepare them for the Institution of Civil Engineers' Professional Examination (PE1). The Supervising Civil Engineer will be the Engineer named by the ICE for inclusion on their Index of Approved Supervising Civil Engineers.

3 SUPERVISION OF TRAINING

Training shall be supervised by Chartered Civil Engineers at a minimum of two levels of responsibility:-

- a) The Supervising Civil Engineer (SCE).
- b) The Supervising Civil Engineer (SCE) may appoint engineers with delegated responsibilities (described as Delegated Engineers) to provide adequate supervision of Trainees working in their departments or on their projects. Should the SCE be assisted in this way, responsibilities can be delegated as follows:-

- i) The Delegated Engineers should be the immediate line managers responsible for the work the Trainee is undertaking at any one time and will have to change when the Trainee moves to a different department to gain other work experience. No more than three, preferably two, Trainees should be supervised by a single Delegated Engineer at any one time.
 - ii) Be conversant with ICE rules for training (ICE 43 and updates) and the NRA Training Record/Guidelines. The same principles employed in terms of objective achievement within the NRA Training Record should be applied to Trainees not under Agreement as well as to those under Agreement.
 - iii) Manage, monitor and encourage continuing Education and Training to achieve a planned path for training days to the extent necessary. See Section 7 page
 - iv) Check progress against the training record objectives and plan of achievement within the timescales available.
 - a. Comment on all quarterly reports prior to submission to SCE. Note objectives that require to be satisfied via quarterly or other ancillary reports and assist Trainee in planning for these.
 - b. Review progress quarterly with Trainee.
 - c. Assist Trainee in work planning and then sign off assessment level achieved within objectives.
 - d. Ensure quarterly reports are adhered to and produced to time.
 - v) In conjunction with SCE, use the NRA Training Record to prepare a training programme specific to the Trainees' needs or experience reflecting the work undertaken in various departments ie, Direct Labour Construction Group or Assistant Resident Engineer role.
 - vi) Be accessible to Trainee for advice.
 - vii) Attend annual interview between SCE and Trainee.
 - viii) Initially sign off submission documentation for PE1 (and subsequently PE2), ensuring the same meets necessary standards. Pass to SCE for review.
 - ix) Keep SCE aware of any issues or problems that Delegated Engineer cannot resolve.
- c) In addition where the Delegated Engineer alone cannot provide the time for all the Supervisory duties necessary there may be a Counsellor designated by the SCE within the relevant Department who could if necessary:-

- i) Develop a personal relationship with the Trainee conducive to effective training in general and to coaching, professional guidance and counselling in particular.
- ii) Devote sufficient time, effort and skill to monitor each Trainee's progress and to counsel, advise and coach him accordingly.
- iii) Be immediately available to the Trainee for advice and guidance at any time.

Each Trainee will be told who is to carry out each of these functions.

4 MONITORING AND PATTERN OF TRAINING

This will be carried out in liaison with the ICE Regional Training Officer. The latter will have direct access to both the Supervising Civil Engineer and the Trainees.

Trainees will be offered the necessary experience required to meet one of the following two sets of training objectives:-

Engineering Scheme (green coloured sheets)

Water Resources Scheme (blue coloured sheets)

The experience shall be obtained by working within the relevant Regional departments that include the planning, preparation, construction and operation of Civil Engineering projects or catchment studies. This may include engineering project planning, feasibility, design, construction, technical studies, project management, mathematical modelling, surveying and other associated project activities or specialist analyses on some of the following works:

Flood Defences (Fluvial and Sea Defence)

Water Resources

Navigation

Fisheries

Others (eg, Recreation, Water Quality)

In some circumstances it may be necessary to transfer the Trainee from one Region to another in order to achieve the objectives within the agreement period. This would be with the agreement of the Trainee.

5 PERIOD OF TRAINING

The basic length of the Period of training for graduates is three years. The period may be reduced in accordance with Appendix D of ICE 43 (The Route to Corporate Membership) as updated in the ICE Education and Training News April 1989 or as subsequently altered by ICE. See also Core Objectives Preamble later. The period may be increased with the consent of the Trainee, the Supervising Civil Engineer and the Institution.

In addition, Sandwich degree and part time degree students can in appropriate circumstances be included on this scheme of Training where industrial experience before graduating qualifies towards PE1 (see information on Procedures section at end and reference booklet "Preparing for the Professional Examination of the ICE 1989, by Jean Venables).

In the event that any of the PE1 submission requirements are not completed within the basic three year or equivalent period, then the Region will offer to increase the period within reasonable limits.

6

TRAINING OBJECTIVES

Training objectives are incorporated in the Engineering Scheme so as to include the Institution's Core Objectives, some additional Specific Objectives (both mandatory) and some optional specific objectives set by the Supervising Civil Engineer which cover the requirements, practices, specialisms and organisational disposition of the respective NRA Regions. The Water Resources Scheme incorporates the standard core objectives and some specific objectives in the engineering solution section only. Specific objectives in the implementation process section cannot be readily identified in advance and will depend upon the type of Water Resources activity in the Region at any one time. The framework of the Schemes are outlined in more detail 'ICE Approved Training to PE1'. Exposure to the various aspects of the Region's river engineering work will provide the opportunity to fulfill the Core and Specific Objectives set for each Trainee.

Guidance is given in the Training Record for the Engineering Scheme on the minimum number of optional objectives that must be achieved in addition to the Mandatory Core and Specific Objectives. Depending on the Trainee's work experience plan within the Regional department to which the Trainee is allocated, the Supervising Civil Engineer shall determine which optional specific objectives are to be achieved in the Training Period.

Both the Trainee and the Delegated Engineer will be supplied with copies of the training objectives which will provide a framework for monitoring progress towards achieving such objectives. Regular discussions shall be held between the Trainee and Delegated Engineer to establish action to be taken on training. The Delegated Engineers shall report progress on a regular basis to the Supervising Civil Engineer.

Counsellors may also play an important role in assisting the Trainee to meet his objectives.

From the outset, Trainees should be made responsible for their own work and management and the Supervising Civil Engineer and Delegated Engineer should ensure that the Trainees take this responsibility seriously.

A suggested list for reading and reference, which will be updated from time to time, is attached to each of the Engineering and Water Resources Scheme Training Records.

CONTINUING EDUCATION AND TRAINING

Each Region can offer technical expertise in their particular fields but it is necessary to structure a Trainee's experience to include attendance at seminars or courses as an adjunct to the on-the-job technical training.

During the period prior to making application for PE1, the trainee will be provided with opportunity to achieve at least a total of 15 days on off-the-job training or education. This is set to meet the ICE requirements for technical, safety and other training day topics applicable at the time. Further details in the Appendix titled Record of Further Education and Training.

In order to support the number of training days, time will also be made available for the Trainee to attend local association and London ICE meetings. Encouragement to attend evening meetings will also be given.

The Delegated Engineer (or Counsellor) will select with the Trainee the appropriate training courses and plan for attendance over the three year training period.

Additionally it will be possible to organise 'in house' courses on specific topics by utilising internal or external experts and the number of training days qualifying will be signed off by the SCE. These will occur at various times throughout the training period and could be of general application, being attended by Chartered Engineers and Technicians as well. Further details on training course approval procedures in the Appendix titled Record of Further Education and Training.

Candidates are advised to make sure that courses they attend are approved for ICE Continuing Education and Training. The Institution publishes three times a year a 'Guide to Continuing Education Courses for civil Engineering'. The SCE can now approve off-the-job training.

Details of such training are to be shown on Sheet 7 of the Training Record.

TRAINING OUTSIDE THE WORK SITUATION

All Trainees shall be required to become either student or Graduate Members of the ICE and should consider jointing the Institution of Water and Environmental Management (IWEM) and/or the British Hydrological Society. They should be actively encouraged and given facilities to attend meetings and site visits organised by these Institutions and on appropriate occasions be accompanied by their Counsellor or another Senior Chartered Engineer. Details of the Trainee's involvement with Institution affairs are to be shown on Sheet 8 of the Training Record.

9 THE PROFESSIONAL EXAMINATION - PE1 AND PE2

The purpose of the training scheme is to produce engineers who are able to carry out the technical or professional duties appropriate to their particular level of qualification and not merely to produce candidates who can pass a professional examination. Nevertheless, it is sensible, once the Supervising Civil Engineer is satisfied that a Trainee is capable of fulfilling the ICE requirements, to assist in the preparation for this last hurdle.

It is useful to give Trainees regular practice in essay writing in addition to the quarterly reports required as part of the process for the completion of the training record. A period of training in essay writing will normally be given in the period, ideally prior to the professional examination at PE1.

Mock interviews by Senior Engineers may also be helpful.

10 THE TRAINING RECORD

All trainees, whether under-graduates studying on a day release or sandwich degree basis or graduates who are registered as under Agreement are required to complete this Training Record for submission at PE1. Candidates for PE1 who are not registered under the Institution's formal Agreement scheme are recommended to follow the guidance offered in the Training Scheme documents.

It is the joint responsibility of the Trainee and the Supervising Civil Engineer (or Delegated Engineer) to complete documents included in the Record where required.

The training scheme submitted by the SCE and approved by the Institution must be inserted into this Record.

All trainees are required to be thoroughly familiar with the Institution's publication "The Route to corporate Membership", ICE 43 (version 1987) and subsequent editions and particular attention is drawn to Chapter 2 and appendices C, D and E.

The Trainee under Agreement must submit to the SCE a three monthly report and these reports, signed, dated and commented upon by the SCE and his Delegated Engineer, must be inserted into the Record. It is not intended that the report should be just a plain statement of work undertaken during the preceding three months but in addition an account of the trainee's attitude towards the work, a discussion on alternative solutions that could have been applied to problems that arose and comments on items of interest encountered. It is desirable to aim at a report length of about 1000-2000 words, but this will obviously depend upon the work experience gained during the quarter. Notes for guidance on completion of these reports are included later in the Appendices.

It is the responsibility of the Trainee to submit these quarterly reports regularly and punctually to the SCE and his Delegated Engineer for verification and comment.

When making a PE1 submission, the candidate must ensure that all documents contained within the Record have been completed and that the documented training scheme (list of objectives etc), requisite number of quarterly reports and Agreement Certificate of Completion where applicable, are included.

Trainees who have completed a sandwich course, before being placed under Agreement, should insert an account of their college-based industrial training in the Record after the training objectives.

The Training Record, complete to date, must always be available for inspection by the Institution's Training Department (this will usually be carried out through the relevant Regional Training Officer).

To ensure that those who are training under Agreement may receive the full benefit of the scheme it is essential that they should keep the ICE Training Department informed of their address or working location and of each change when it occurs. This should be done by completing and forwarding an advice note from the sheet provided in the Appendices.

When sending the contents of the Record to the PE1 Examiner, they must be removed from the ring binder, enclosed between the green card covers provided and bound together with treasury tags or similar.

THE TRAINING RECORD

ENGINEERING SCHEME

SCHEDULE OF TRAINING OBJECTIVES

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | | 1 | | | |
|--|--|-----------------------------------|---------------------|--------------------|---|---|---|--|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | | |
| Professional and General | | | | A | K | E | B | |
| 1.0 <u>Professional & General</u> | | | | | | | | |
| 1.1 Know the history, purpose and organisation of the Insitution of Civil Engineers Refer to current ICE publications "A Short History" by J G Watson "Present Organisation" ICE "Royal Charter, By-Laws, Regulations and Rules" with particular reference to the "Rules of Professional Conduct" and Presidential addresses Discuss aspects with SCE at a Quarterly Review. | | K | | | | | | |
| 1.2 Develop and maintain an interest in Institution affairs generally Participate in at least six Local Association meetings and meetings of other Professional Institutions within the construction industry Record attendance in the Training Record and write a precis report of about 500 words for one to the satisfaction of the SCE Record other involvement in Institution affairs, for example, committee membership of AMG & S, in the Training Record and Quarterly Reports. | | E | | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 2 | | | | | |
|--|--|-------------------------------------|---------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Professional and General | | | | A | K | E | B |
| 1.3 Have a general understanding of overall civil engineering procedures | | K | | | | | |
| Be aware of the content of the Institution's publication "Civil Engineering procedure, 4th Edition" or similar | | | | | | | |
| Discuss aspects of the content with the SCE at a quarterly interview. | | | | | | | |
| 1.4 Keep up-to-date with current technical and commercial development related to the construction industry achieved by reading, for example: | | A | | | | | |
| New Civil Engineer | | | | | | | |
| New Builder | | | | | | | |
| Construction Today | | | | | | | |
| Other publications relating to, for example, Planning, Building | | | | | | | |
| Construction Architecture, etc | | | | | | | |
| Discuss current development topics with the SCE at a quarterly interview. | | | | | | | |
| 1.5 Take an interest in current affairs both locally and nationally | | A | | | | | |
| Achieve by reading, at least, a quality local and national newspaper | | | | | | | |
| Refer to topics of particular interest to you in the quarterly reports and discuss with the SCE. | | | | | | | |
| Record, if you so wish, any active role you play in the community. | | | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | 3 | | | |
|--|--|-----------------------------------|---------------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Professional and General | | | | A | K | E | B |
| <p>1.6 Be able to communicate accurately and with confidence,</p> <p>Orally</p> <p>In writing and</p> <p>By means of freehand sketches</p> <p>Demonstrate ability for example by:</p> <p>Giving a 10 minute talk on a subject of your choice to your colleagues</p> <p>The quality of your Quarterly Reports</p> <p>Including sketches in the Quarterly Reports.</p> | | B | | | | | |
| <p>1.6.1 Have experience of undertaking at least two short presentations, one during the office phase the other during the site phase, on technical financial, contractual or general subjects pertaining to your experience</p> <p>Present to SCE, Delegated Engineer and other appropriate senior officers for discussion and approval.</p> | | E | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | | 4 | | | |
|--|--|-----------------------------------|---------------------------|--------------------|---|---|---|--|
| CORE AND SPECIFIC OBJECTIVES MANADATORY | | Required Standard | Date First Involved | Date of Assessment | | | | |
| Professional and General | | | | A | K | E | B | |
| <p>1.7 Know your responsibilities with respect to the safety of yourself and others by being familiar with current legislation</p> <p>Read the Guide to the Health and Safety at Work Act and attend an approved course</p> <p>Record involvement in safety matters in the Quarterly Reports and discuss with the SCE at quarterly interviews.</p> | | K | | | | | | |
| <p>1.8 Know the structure of the organisation in which you work</p> <p>Study all available organisation charts</p> <p>Write a report on the management structure of your organisation/project team defining roles and responsibilities.</p> | | K | | | | | | |
| <p>1.8.1 Have a knowledge of how of how the NRA Business Areas are financed and what role the appropriate Statutory & Advisory Committees have</p> <p>Obtain reference material and Committee papers and outline your understand- in in a quarterly report. Also discuss with the SCE</p> | | K | | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | | 5 | | | |
|---|--|-----------------------------------|---------------------------|--------------------|---|---|---|--|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | | |
| Professional and General | | | | A | K | E | B | |
| 1.8.2 Know the NRA Mission Statement and the definition of the four Main Principles thereof Write a report that shows you understand the business of the NRA, how it intends to carry and how it affects you and your work. | | K | | | | | | |
| 1.9 From an early date in your training be fully familiar with the requirements for the Professional Examination, Part I Read the current instructions, Rules and Guidance notes Discuss your planned route to full membership with your SCE. | | K | | | | | | |
| 1.10 Have an appreciation of current legislation and the English legal System. Discuss the legal framework within which works are carried out with your SCE. | | A | | | | | | |
| 1.11 Know how the principles of project management are applied within your NRA Region Discuss these aspects in a quarterly report. | | K | | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 6 | | | | | |
|--|--|-------------------------------------|---------------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Engineering Solutions | | | | A | K | E | B |
| <u>2.0 Engineering Solutions</u> | | | | | | | |
| 2.1 Have experience in identifying and defining a problem accurately Take an active part, probably in a supporting role, in researching, assembling and assessing basic data Record involvement in the Quarterly Reports and demonstrate the thought/ analytical process by which the problem was finally defined. | | E | | | | | |
| 2.1.1 Know the procedures and processes that constitute the NRA Regional and National Corporate Plan/Business Plan and be aware how projects gain inclusion in the programme of works. Discuss these aspects and their relevance to your work in a quarterly report | | K | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 7 | | | | |
|--|----------------------|-------------------------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | Required Standard | Date First Involved | Date of Assessment | | | |
| | | | A | K | E | B |
| Engineering Solutions | | | | | | |
| <p>2.2 Gain practical experience in the identification and evaluation of alternative solutions to a problem</p> <p>Assist in the technical and financial evaluation of alternatives by, for example, assisting with a feasibility study covering such aspects as:</p> <p>Concepts and precedents Sources of information Estimates and budget quotations Quick design methods Writing, production and interpretation of feasibility reports Briefs for detail design.</p> | E | | | | | |
| <p>2.2.1 Have experience in justifying river engineering works by using benefit cost analysis, levels of service methodology, environmental impact assessments and customer and local community consultations</p> <p>Show you understand all the relevant issues and constraints that are part of project option evaluation</p> <p>Demonstrate your knowledge to the SCE and discuss in a quarterly report</p> | E | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 8 | | | | | |
|--|--|-------------------------------------|---------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Engineering Solutions | | | | A | K | E | B |
| 2.3 Know the application and limitations of national and international Standards, Codes of Practice, Technical Memoranda etc | | K | | | | | |
| List the documents you have used | | | | | | | |
| Discuss their relevance to your work in your Quarterly Reports. | | | | | | | |
| 2.3.1 Know how the application of Statutory powers and Policy guidelines is relevant to either NRA engineering projects or operational activities | | K | | | | | |
| List the documents relevant to your work | | | | | | | |
| Discuss their relevance in a Quarterly Report | | | | | | | |
| 2.4 Produce the solution to a problem | | E | | | | | |
| Draw together all the relevant data and analytical work under 2.1, 2.2 and 2.3 appropriate to your sector of the industry | | | | | | | |
| Produce your preferred solution with justification for assessment by your SCE showing throughout, or by an accompanying statement, how this work contributes to the solution of the problem and identify the major factors on which the solution depends for accuracy or completeness. | | | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 9 | | | | | |
|--|--|-------------------------------------|---------------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Engineering Solutions | | | | A | K | E | B |
| <p>2.4.1 Show that you understand the design principles and methods employed in preparing an appropriate engineering solution including the appropriate methods of checking for quality control and project consultation.</p> <p>Produce an example of your design calculations suitably checked for discussion and approval of the SCE.</p> | | B | | | | | |
| <p>2.4.2 Develop a solution to the problem with the assistance of computer aided design and draughting techniques</p> <p>Produce an example output for discussion and approval of the SCE.</p> | | B | | | | | |
| <p>2.4.3 Show that you understand and can interpret the link between geotechnical site investigation requirements and the subsequent engineering design.</p> <p>Discuss the links with your SCE and outline in a quarterly report why you required certain sampling and testing programmes.</p> | | E | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 10 | | | | | |
|--|--|--------------------------------------|---------------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANADATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Engineering Solutions | | | | A | K | E | B |
| 2.5 Present the solution to a problem | | B | | | | | |
| Produce documentation on the solution containing diagrams, sketches, charts etc | | | | | | | |
| AND/OR | | | | | | | |
| Produce general arrangement and detailed drawings using scales and drawing sizes appropriate to be conveyed | | A | | | | | |
| Present an example for discussion and approval of the SCE. | | | | | | | |
| 2.6 Appreciate the way a report on environmental issues is used in arriving at an engineering solution | | | | | | | |
| Understand the relevance of a geotechnical report or environmental assessment as it affects the solution of a problem within your organisation | | E | | | | | |
| Cover this aspect in one of your quarterly reports. | | | | | | | |
| 2.6.1 Gain experience of the diverse environmental impacts and enhancement measures that river engineering projects can have and how acceptable solutions can be found | | | | | | | |
| Discuss the relevance to your work in quarterly reports. | | | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | 11 | | | |
|--|--|-----------------------------------|---------------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Engineering Solutions | | | | A | K | E | B |
| 2.7 Appreciate the way technical specifications are an essential part of the solution of a problem Select or write a specification and/or amend an existing specification for a particular item of work Discuss a specification used in your work with your SCE. | | A | | | | | |
| 2.7.1 Have experience of the use of the Civil Engineering Specification used in your Region and have an understanding of the difference between performance and method specifications Discuss with your SCE and present an example for comment. | | E | | | | | |
| | | A | | | | | |
| 2.8 Have experience of costing the solutions to problems by taking off quantities and building up cost estimates Present examples to the SCE for discussion and comment. | | E | | | | | |
| 2.9 Know the requirements for safety in problem solving by being familiar with the Regulations applying to your work State which Regulations you have used and the safety criteria which you have followed in a Quarterly Report. | | K | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 12 | | | | | |
|--|--|--------------------------------------|---------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Engineering Solutions | | | | A | K | E | B |
| 2.9.1 | Know how and when NRA National & Regional Safety guidelines are applied to your activities Discuss their relevance in your quarterly reports. | E | | | | | |
| 2.10 | Know the way budgetary control, financial and physical progress monitoring and the preparation of work programmes to meet targets are employed in the office Discuss how these are relevant to at least two of your projects in your quarterly reports. | K | | | | | |
| 2.11 | Know the importance of access and land negotiations by being involved as part of your project preparation function Describe in a quarterly report how these were resolved and discuss particular problems with the SCE. | E | | | | | |
| 2.12 | Be able to prepare Contract documentation including Conditions of Contract, Bills of Quantities and Specifications. Show to your SCE you understand the relevance of different Standard Forms of Contract, and Specifications and the reasons for instructions to tenderers and the preamble to the Bill of Quantities. | E | | | | | |

ENGINEERING SCHEME

(at least two of the objectives 2.13 to 2.20 must be chosen by the SCE as mandatory)

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 13 | | | | | |
|---|--|--------------------------------------|---------------------|--------------------|---|---|---|
| OPTIONAL SPECIFIC OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Engineering Solutions | | | | A | K | E | B |
| 2.13 Prepare a Study Brief, giving due account of the requirements and needs of the Project. Present an example for discussion and approval of the SCE | | E | | | | | |
| 2.14 Gain experience in level or topographical survey-ing as applied to the resolution of engineering projects and record data to produce sections and land surveys Produce field books and plotted work and present an example for discussion and approval of the SCE. | | B | | | | | |
| 2.15 Be able to apply basic hydraulic design principles to the solution of engineering problems. Produce detailed calculations showing the solution of a problem in either hydraulics or hydrology or a combination of the two. Present an example for discussion and approval of the SCE. | | B | | | | | |
| 2.16 Know how the application of Statutory Powers and policy guidelines is relevant to NRA Catchment Planning activities. List the documents relevant to your work. Discuss their relevance in a Quaterly Report. | | K | | | | | |

ENGINEERING SCHEME

(at least two of the objectives 2.13 to 2.20 must be chosen by the SCE as mandatory)

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | 14 | | | |
|--|-------------------|-----------------------------------|--------------------|----|---|---|--|
| OPTIONAL SPECIFIC OBJECTIVES | Required Standard | Date First Involved | Date of Assessment | | | | |
| | | | A | K | E | B | |
| Engineering Solutions | | | | | | | |
| 2.17 Have the experience of preparing reports or papers directed at gaining the approval of projects for grant aid or financial authorisation or other forms of commitment. Present an example to the SCE for discussion and comment. | E | | | | | | |
| 2.18 Appreciate how the economic viability and profitability of the unit within which you are working is assessed Discuss the parameters that are relevant with SCE. | A | | | | | | |
| 2.19 Understand the significance of undertaking asset surveys, the process used for undertaking them and evaluating the results obtained Discuss in a quarterly report highlighting your particular involvement | E | | | | | | |
| 2.20 Know the Flood Warning and Flood Emergency arrangements and procedures operated Discuss in a quarterly report. | K | | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 15 | | | | | |
|---|--|--------------------------------------|---------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| 3.0 <u>Implementation Process</u> | | | | | | | |
| 3.1 Know how all parties to a contract exercise their duties and responsibilities by appreciating the practical application of the various documents forming a particular contract Demonstrate your knowledge in a Quarterly Report and discuss with your SCE. | | K | | | | | |
| 3.1.1 Know the procedure for the issue, receipt, opening and evaluation of tender documents Demonstrate your knowledge in a Quarterly Report and discuss with your SCE. | | K | | | | | |
| 3.1.2 Know the reason for inclusion and the relative importance of the items making up the agenda for a pre-start meeting with a successful tenderer Prepare a draft agenda for a contract you will be involved in and discuss with your SCE. | | K | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 16 | | | | | |
|---|--|--------------------------------------|---------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| 3.1.3 Have knowledge of ICE 5th Edition Conditions of Contract with particular reference to the following: a) Clauses through which claims are made b) Clauses which deal with Instructions to Contractors c) Clauses which deal with extensions of time d)How price fluctuations clauses are used. Demonstrate your know-ledge in a quarterly report & discuss with SCE | | K | | | | | |
| 3.2 Know the procedure for the issue and/or receipt, registration and filing of work instructions and/or drawings and amendments Gain practical experience of those procedures and demonstrate by reference in the Quarterly Reports. | | K | | | | | |
| 3.3 Be able to keep accurate daily record of events and instructions Keep an up-to-date, accurate daily diary for inspection by the SCE. | | B | | | | | |
| 3.3.1 Know all the records which should be kept on site and the reason for and importance of keeping them Prepare a resume of all site records for a particular project and discuss with your SCE. | | K | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 17 | | | | | |
|---|--|--------------------------------------|---------------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| 3.4 Read and co-ordinate drawings and/or implement work instructions by being involved on a day-to-day basis in this process Demonstrate competence by the quality of your work. | | B | | | | | |
| 3.5 Participate in the dimensional control and accuracy of the work you are implementing Demonstrate your competence by the quality of your work. | | B | | | | | |
| 3.6 Know the use, performance and cost of equipment and/or plant used in implementing a solution Include in your Quarterly Reports all major items of which you have first hand knowledge Discuss your experience with your SCE at a quarterly interview. | | K | | | | | |
| 3.7 Be able to plan, programme and progress work by programming a section of work and being involved in progress monitoring and reporting Discuss programme with the SCE. | | B | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 18 | | | | | |
|---|--|--------------------------------------|---------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| 3.8 Be able to measure and record or independently check work done for payment purposes Take part in this work for the preparation or checking of Interim valuations and/or Final Accounts Demonstrate your involvement to the SCE. | | B | | | | | |
| 3.8.1 Know how to assess the contractual merits of claims for extra payments or extensions of time Demonstrate your knowledge of claim evaluations, particularly those made in the course of a contract in which you are involved and discuss with your SCE | | K | | | | | |
| 3.9 Have a critical approach to safety matters in the implementation process and the observance of safe working practices Know your responsibilities relating to safety and be familiar with legislation relating to your particular work Appreciate good safety practices relevant to your work by reference to your company safety manual Emphasise your involvement in safety matters in the Quarterly Reports. | | E | | | | | |

ENGINEERING SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | 19 | | | |
|---|--|-----------------------------------|---------------------------|--------------------|---|---|---|
| CORE AND SPECIFIC OBJECTIVES MANDATORY | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| 3.10 | <p>Know the principles of quality control to meet a contractual specification</p> <p>Record your involvement with quality control and any involvement with quality assurance on this aspect in a Quarterly Report</p> | K | | | | | |
| 3.11 | <p>Know the procedures for winding up a contract including substantial completion, maintenance period, final account record drawings and handing over to the Operating Department</p> <p>Demonstrate your knowledge in a Quarterly Report related to a contract you are involved in and discuss with your SCE.</p> | K | | | | | |
| 3.12 | <p>Understand the impact of site working with respect to environmental pollution and measures to alleviate the problems</p> <p>Record your involvement in environmental matters and problem resolution in your quarterly report</p> | K | | | | | |

ENGINEERING SCHEME

(at least three of the objectives 3.13 to 3.22 must be selected by the SCE as mandatory)

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 20 | | | | | |
|------------------------------|--|--------------------------------------|---------------------|--------------------|---|---|---|
| OPTIONAL SPECIFIC OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| 3.13 | <p>Have experience of selecting and inviting tenders for work.</p> <p>Show to your SCE how you have used procedures for the selection of tenderers</p> | E | | | | | |
| 3.14 | <p>Show that you understand the respective roles and duties of the Engineer, the Engineer's Representative, the Resident Engineer and the Contractor's representative (site agent) under the Conditions of Contract 5th Edition</p> <p>Use your quarterly reports to demonstrate your knowledge and discuss with your SCE</p> | K | | | | | |
| 3.15 | <p>Be able to direct the work of subordinate staff and/or workmen respectively when undertaking the Contract Supervision (RE) or the NRA Direct Labour Contractor role</p> <p>Discuss current workloads with your Delegated Engineer on a regular basis, programme that work and report back to the Delegated Engineer on completion</p> | B | | | | | |

ENGINEERING SCHEME

(at least three of the objectives 3.13 to 3.22 must be selected by the SCE as mandatory)

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | 21 | | | |
|---|--|-----------------------------------|---------------------|--------------------|---|---|---|
| OPTIONAL SPECIFIC OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| 3.16 Understand the working practices of the NRA Direct Labour Contractor and be able to produce a resource schedule to meet targets for a section of work. Produce at least one example for discussion with and the approval of your SCE | | B | | | | | |
| 3.17 Be able to design necessary temporary works including formwork and excavation support. Present to your SCE an example for discussion and approval | | B | | | | | |
| 3.18 Demonstrate your knowledge of measures that can be taken to control expenditure Discuss with SCE and include in a quarterly report. | | K | | | | | |
| 3.19 Demonstrate that you can use the experience you have gained in the contracts with which you have been involved to deal with problems encountered on other contracts Discuss with your SCE the approach you would adopt to problems encountered in other contracts which he lays out to you. | | K | | | | | |

ENGINEERING SCHEME

(at least three of the objectives 3.13 to 3.22 must be selected by the SCE as mandatory)

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 22 | | | | | |
|---|--|--------------------------------------|---------------------|--------------------|---|---|---|
| OPTIONAL SPECIFIC OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| 3.20 Demonstrate appreciation of other Conditions of Contract including at least two of; Model Forms A & G, Model Form C, ICE minor works, JCT minor building works and JCT I landscaping works Demonstrate your knowledge in at least two Quarterly Reports and discuss with your SCE | | A | | | | | |
| 3.21 Demonstrate familiarity with the methods used to build up rates, including procurement of materials, provision of plant and labour costs Prepare draft submissions for a works contract with which you are involved and discuss with your SCE. | | K | | | | | |
| 3.22 Have experience of how flood defence maintenance work is identified, justified, planned, programmed and executed. Discuss in a quarterly report highlighting how each phase of the process is controlled. | | E | | | | | |

SUGGESTED READING/REFERENCE LIST

ENGINEERING SCHEME

SUGGESTED REFERENCE/READING LIST

The following are a selection of reference and reading material recommended to Trainees. Trainees are not expected to necessarily read all this material but familiarise themselves with the contents and ensure that they can refer when necessary.

- a) Current Affairs The Economist, New Scientist, New Civil Engineer, Engineering and similar journals or periodicals (including ICE and IWEM).
- The Times, Telegraph and Guardian Newspapers.
- b) General New Books Catalogue - Thomas Telford Bookshope (ICE)
- Civil Engineer: Supervision and Management by Twort
- An Introduction to Engineering Economics (ICE)
- Civil Engineering Procedures - 4th edition (ICE)
- c) Communication and Management The Skills of Communications by Bill Scott
- Who Cares Wins by Peter Savage
- Communication for Professional Engineers by Bill Scott
- In Search of Excellence by Peters and Waterman, Harper and Row
- Understanding Organisations by C B Handley
- Management of Industrial Relations by K Hawkins
- d) Construction and Project Management Principle of Construction Management R Pilcher, Magrawhill, 1976
- A Handbook of Management Techniques, Kogan Page 1986 - M Armstrong.
- Construction Management in Practice Construction Press 1983 - R Fellows D Langford, R Newcombe, S Urry
- Regional Project Management Procedures
- Engineering Management Series, Thomas Telford Ltd:
- Financial Control
- Management of Design Offices

e) Statutory Law and Safety

Land Drainage Act 1976, Regional Land Drainage Byelaws and updates (HMSO)

Regional Navigation Acts and Byelaws (HMSO)

Water Resources Act 1963 (HMSO)

The Building Regulations Act 1985

Health and Safety at Work Act 1974

Health and Safety policy guidelines and Confined Spaces policy documents

Water Act 1989

Wildlife and Countryside Act 1981

The Law of Rivers and Watercourses by Widom

Land Drainage Responsibilities - A practical code for Engineers (ICE)

Construction Regulations:

General Provisions 1961

Health and Welfare 1966

Lifting Operations 1961

Working Places 1966

Engineering Law and the ICE Contracts, 4th Ed. Applied Science Publishers 1979 - M W Abrahamson

Construction Law

Sweet and Maxwell, 4th Ed. 1976 - J Uff

Control of Substances Hazardous to Health Regulations 1989

f) Technical

Water Practice Manual Part I - River Engineering Design Principles IWEM

Water Practice Manual Part II - River Engineering Structures and Coastal Defence Works IWEM

ICE and IWEM Proceedings

A Client's Guide to Quality Assistance in Construction, CIRIA Special Publication SP55

Regional Quality Assurance Procedures

- | | |
|---|---|
| g) <u>Contractual</u> | <p>ICE Conditions of Contract 5th Edition</p> <p>ICE Conditions of Contractor for Minor Works</p> <p>I Mech E Model Form Contract A and G</p> <p>I Mech E Model Form Contract</p> <p>JCT Minor Building Works Contract</p> <p>JCT 1 Landscaping Works Contract</p> <p>Regional Consultants Conditions of Engagement</p> <p>The Resident Engineer ICE Works Construction Guide, ICE 2nd Ed. 1986 by J K Ballantyne</p> <p>Regional Site Investigation Conditions of Engagement</p> |
| h) <u>Specification, Measurement and Estimating</u> | <p>Civil Engineering Standard Method of Measurement 2nd Ed. ICE</p> <p>Regional Estimating Procedures</p> <p>The CESMM2 Handbook by M Barnes</p> <p>Regional Civil Engineering Specification</p> |
| i) <u>Environmental Impact</u> | <p>Conservation Guidelines for Drainage Authorities (MAFF/DoE)</p> <p>Aesthetic Aspects of Civil Engineering Design - ICE</p> <p>Rivers and Wildlife Handbook - Lewis and Williams RSPB/RSVC 1984</p> <p>Conservation and Land Drainage Guidelines - Water Space Amenity Commission 2nd Ed. 1983</p> <p>Regional Environmental Assessment/Conservation Guidelines</p> |
| j) <u>Other Regional Policy Documents</u> | <p>Financial Memorandum/Scheme of Delegation</p> <p>Corporate Plan/Regional Business Plan</p> |
| k) <u>PE1 and PE2 Examinations</u> | <p>ICE 43 - The Route to Corporate Membership (ICE)</p> <p>Preparing for the Professional Examinations of the Institution of Civil Engineers, 1989 by Jean Venables</p> <p>The ICE Essays: A Guide to Preparation and Writing (Thomas Telford Bookshop)</p> |

THE TRAINING RECORD

WATER RESOURCES SCHEME

SCHEDULE OF TRAINING OBJECTIVES

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | | 1 | | |
|--|--|-----------------------------------|---------------------|--------------------|---|---|---|
| CORE OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Professional and General | | | | A | K | E | B |
| 1.0 <u>Professional & General</u> | | | | | | | |
| 1.1 Know the history, purpose and organisation of the Insitution of Civil Engineers Refer to current ICE publications "A Short History" by J G Watson "Present Organisation" ICE "Royal Charter, By-Laws, Regulations and Rules" with particular reference to the "Rules of Professional Conduct" and Presidential addresses Discuss aspects with SCE at a Quarterly Review. | | K | | | | | |
| 1.2 Develop and maintain an interest in Institution affairs generally Participate in at least six Local Association meetings and meetings of other Professional Institutions within the construction industry Record attendance in the Training Record and write a precis report of about 500 words for one to the satisfaction of the SCE Record other involvement in Institution affairs, for example, committee membership of AMG & S, in the Training Record and Quarterly Reports. | | E | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | 2 | | | |
|--|--|-----------------------------------|---------------------|--------------------|---|---|---|
| CORE OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Professional and General | | | | A | K | E | B |
| 1.3 Have a general understanding of overall civil engineering procedures | | K | | | | | |
| Be aware of the content of the Institution's publication "Civil Engineering procedure, 4th Edition" or similar | | | | | | | |
| Discuss aspects of the content with the SCE at a quarterly interview. | | | | | | | |
| 1.4 Keep up-to-date with current technical and commercial development related to the construction industry achieved by reading, for example: | | A | | | | | |
| New Civil Engineer | | | | | | | |
| New Builder | | | | | | | |
| Construction Today | | | | | | | |
| Other publications relating to, for example, | | | | | | | |
| Planning, Building | | | | | | | |
| Construction Architecture, etc | | | | | | | |
| Discuss current development topics with the SCE at a quarterly interview. | | | | | | | |
| 1.5 Take an interest in current affairs both locally and nationally | | A | | | | | |
| Achieve by reading, at least, a quality local and national newspaper | | | | | | | |
| Refer to topics of particular interest to you in the quarterly reports and discuss with the SCE. | | | | | | | |
| Record, if you so wish, any active role you play in the community. | | | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 3 | | | | | |
|--------------------------|---|-------------------------------------|---------------------|--------------------|---|---|---|
| CORE OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Professional and General | | | | A | K | E | B |
| 1.6 | Be able to communicate accurately and with confidence, Orally In writing and By means of freehand sketches Demonstrate ability for example by: Giving a 10 minute talk on a subject of your choice to your colleagues The quality of your Quarterly Reports Including sketches in the Quarterly Reports. | B | | | | | |
| 1.7 | Know your responsibilities with respect to the safety of yourself and others by being familiar with current legislation Read the Guide to the Health and Safety at Work Act and attend an approved course Record involvement in safety matters in the Quarterly Reports and discuss with the SCE at quarterly interviews. | K | | | | | |
| 1.8 | Know the structure of the organisation in which you work Study all available organisation charts Write a report on the management structure of your organisation/project team defining roles and responsibilities. | K | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 4 | | | | | |
|--|--|-------------------------------------|---------------------|--------------------|---|---|---|
| CORE OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| 1.9 From an early date in your training be fully familiar with the requirements for the Professional Examination, Part I | | K | | | | | |
| Read the current instructions, Rules and Guidance notes | | | | | | | |
| Discuss your planned route to full membership with your SCE. | | | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 5 | | | | | |
|--|--|-------------------------------------|---------------------|--------------------|---|---|---|
| SPECIFIC OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Professional and General | | | | A | K | E | B |
| 1.10 Know the Mission Statement and Aims of the NRA. Write a 1500 word report that shows you understand the purpose of the NRA and how it carries out its responsibilities. | | K | | | | | |
| 1.11 Have a general understanding of how the NRA is financed. Describe how the NRA is financed in a Quarterly Report for discussion with your SCE. | | A | | | | | |
| 1.12 Know the procedure to be followed and the documentation required when requesting financial approval. Describe the approvals procedure in a Quarterly Report for discussion with your SCE. | | K | | | | | |
| 1.13 Know the significant aspects of the Acts of Parliament in regular use, including:- Water Acts 1989 & 73 Water Resources Act 1963. Demonstrate your knowledge to your SCE and discuss their relevance to the work of the NRA in a Quarterly Report. | | K | | | | | |
| 1.14 Know the procedures for Drought Order, Water Abstraction & Impounding licence applications. Demonstrate your knowledge to the SCE and discuss their relevance to the NRA in a Quarterly Report. | | K | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 6 | | | | | |
|---|--|-------------------------------------|---------------------|--------------------|---|---|---|
| SPECIFIC OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Professional and General | | | | A | K | E | B |
| 1.15Have a general understanding of the NRA planning cycle. List the documents you have studied for discussion with your SCE. | | A | | | | | |
| 1.16Take an active interest in the affairs of other related proffissional bodies ie IWEM and BHS. Discuss the affairs with your SCE. | | E | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 7 | | | | | |
|--|--|-------------------------------------|---------------------|--------------------|---|---|---|
| CORE OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Engineering Solutions | | | | A | K | E | B |
| <u>2.0 Engineering Solutions</u> | | | | | | | |
| 2.1 Have experience in identifying and defining a problem accurately | | E | | | | | |
| Take an active part, probably in a supportive role, in researching, assembling and assessing basic data | | | | | | | |
| Record involvement in the Quarterly Reports and demonstrate the thought/ analytical process by which the problem was finally defined. | | | | | | | |
| 2.2 Gain practical experience in the identification and evaluation of alternative solutions to a problem. | | E | | | | | |
| Assist in the technical and financial evaluation of alternatives by, for example assisting with a feasibility study covering such aspects as | | | | | | | |
| Concepts and precedents | | | | | | | |
| Sources of information | | | | | | | |
| Estimates and budget quotations | | | | | | | |
| Quick design methods | | | | | | | |
| Writing, production and interpretation of feasibility reports | | | | | | | |
| Briefs for detail design. | | | | | | | |
| 2.3 Know the application and limitations of national and international Standards, Codes of Practice, Technical Memoranda etc | | K | | | | | |
| List the documents you have used | | | | | | | |
| Discuss their relevance to your work in your Quarterly Reports. | | | | | | | |

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1. *Journal of the American Medical Association*, 1964; 191: 1000-1001.

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 9 | | | | | |
|--|--|-------------------------------------|---------------------|--------------------|---|---|---|
| CORE OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Engineering Solutions | | | | A | K | E | B |
| 2.7 Appreciate the way technical specifications are an essential part of the solution of a problem. | | A | | | | | |
| Select or write a specification and/ or amend an existing specification for a particular item of work | | | | | | | |
| Discuss a specification used in your work with your SCE. | | E | | | | | |
| 2.8 Have experience of costing the solutions to problems by taking off quantities and building up cost estimates | | | | | | | |
| Present examples to the SCE for discussion and comment. | | K | | | | | |
| 2.9 Know the requirements for safety in problem solving by being familiar with the Regulations applying to your work | | | | | | | |
| State which regulations you have used and the safety criteria which you have followed in a Quarterly Report. | | | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 10 | | | | | |
|--|--|--------------------------------------|---------------------|--------------------|---|---|---|
| SPECIFIC OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Engineering Solutions | | | | A | K | E | B |
| <p>2.10Have experience in justifying a project based on cost/benefit analysis, level of service methodology, Environmental Impact Assessment and public consultation.</p> <p>Show you understand all the relevant issues and constraints that are part of project option evalutaion.</p> <p>Demonstrate your knowledge to your SCE and discuss in a Quarterly Report.</p> | | E | | | | | |
| <p>2.11Know the procedures for including a project in the Regional Plan.</p> <p>Discuss these aspects and relevance to your work in a Quarterly Report.</p> | | K | | | | | |
| <p>2.12Know the way budgetry controls, financial and physical progress monitoring, and the preparation of work programmes to meet targets are employed in the office.</p> <p>Discuss how these are relevant to your projects in a Quarterly Report.</p> | | K | | | | | |
| <p>2.13To achieve technical competence in identifying the need for, collecting and analysing data relating to water supply, irrigation and river control.</p> <p>Identify the types of hydrological data with which you have been involved eg:- Evapotransportation Precipitation River Levels and flows Groundwater levels</p> <p>Discuss the use of such data with your SCE.</p> | | B | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 11 | | | | | |
|---|--|--------------------------------------|---------------------|--------------------|---|---|---|
| SPECIFIC OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Engineering Solutions | | | | A | K | E | B |
| <p>2.14have a first hand know- ledge of methods/systems for hydrological data collection and processing, including:-</p> <p>Determination of required accuracy.</p> <p>The design of observation networks.</p> <p>Design and selection of sensors and recorders.</p> <p>Installation and operation of hydrometric stations.</p> <p>Methods of collection/ transmission of data eg: a) Manual b) Automatic</p> <p>Means of validating data.</p> <p>Means of archiving and retrieving data.</p> <p>Describe the practical exper- ience you have gained in your Quarterly Reports and discuss with your SCE.</p> | | E | | | | | |
| <p>2.15Have a working knowledge of appropriate British Standards or International Standards, World Meteorol- ogical Organisation or other Codes of Practice.</p> <p>List the documents you have used.</p> <p>Discuss their relevance to your work in your Quarterly Reports.</p> | | K | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | | 12 | | |
|--|--|-----------------------------------|---------------------|--------------------|----|---|---|
| SPECIFIC OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Professional and General | | | | A | K | E | B |
| 2.16Have used hydrological data in the planning and design of water resources systems, including simulation exercises. | | B | | | | | |
| Describe the work you have been doing in your Quarterly Reports. | | | | | | | |
| 2.17Have used hydrological data for estimating low flows and flood flows. Appreciate the use of NERC Reports in preparing these estimates. | | B | | | | | |
| Present an example for discussion and approval of your SCE | | | | | | | |
| 2.18Appreciate the use of computers and mathematical modelling in hydrology, and be able to develop computer applications. | | B | | | | | |
| Present an example for discussion with your SCE. | | | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme 13 | | | | |
|---|-------------------|--------------------------------------|--------------------|---|---|---|
| CORE OBJECTIVES | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | A | K | E | B |
| <u>3.0 Implementation Process</u> | | | | | | |
| 3.1 Know how all parties to a contract exercise their duties and responsibilities by appreciating the practical application of the various documents forming a particular contract Demonstrate your knowledge in a Quarterly Report and discuss with your SCE. | K | | | | | |
| 3.2 Know the procedure for the issue and/or receipt, registration and filing of work instructions and/or drawings and amendments Gain practical experience of those procedures and demonstrate by reference in the Quarterly Reports. | K | | | | | |
| 3.3 Be able to keep accurate daily record of events and instructions Keep an up-to-date, accurate daily diary for inspection by the SCE. | B | | | | | |
| 3.4 Read and co-ordinate drawings and/or implement work instructions by being involved on a day-to-day basis in this process Demonstrate competence by the quality of your work. | B | | | | | |
| 3.5 Participate in the dimensional control and accuracy of the work you are implementing Demonstrate your competence by the quality of your work. | B | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | 14 | | | |
|--|--|-----------------------------------|---------------------|--------------------|---|---|---|
| CORE OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| <p>3.6 Know the use, performance cost of equipment and/or plant used in implementing a solution</p> <p>Include in your Quarterly Reports all major items of which you have first hand knowledge</p> <p>Discuss your experience with your SCE at a quartely inter-view.</p> | | K | | | | | |
| <p>3.7 Be able to plan, programme and progress work by programming a section of work and being involved in progress monitoring and reporting.</p> <p>Discuss programme with the SCE</p> | | B | | | | | |
| <p>3.8 Be able to measure and record or independently check work done for pay-ment purposes</p> <p>Take part in this work for the preparation or checking of Interim valuations and/or Final Accounts</p> <p>Demonstrate your involvement to the SCE.</p> | | B | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | 15 | | | |
|--|--|-----------------------------------|---------------------|--------------------|---|---|---|
| CORE OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| 3.9 Have a critical approach to safety matters in the implementation process and to the observance of safe working practices | | E | | | | | |
| Know your responsibilities relating to safety and be familiar with legislation relating to your particular work | | | | | | | |
| Appreciate good safety practices relevant to your work by reference to your company safety manual | | | | | | | |
| Emphasise your involvement in safety matters in the Quarterly Reports. | | | | | | | |
| 3.10 Know the principles of quality control to meet a specification | | K | | | | | |
| Record your involvement with quality control and any involvement with quality assurance in your Quarterly Reports. | | | | | | | |

WATER RESOURCES SCHEME

| TRAINING OBJECTIVES | | Sheet Number in Overall Programme | | | | 16 | |
|---|--|-----------------------------------|---------------------|--------------------|---|----|---|
| SPECIFIC OBJECTIVES | | Required Standard | Date First Involved | Date of Assessment | | | |
| Implementation Process | | | | A | K | E | B |
| <p>3.11 Specific Objectives for the Water Resources Specialist will need to be specified for individual Trainees by the SCE and approved by ICE.</p> <p>Objectives will depend on the current work programme within an NRA Region. It is possible that the Trainee will need to be seconded to another Region to gain the necessary experience.</p> | | | | | | | |

SUGGESTED READING/REFERENCE LIST

WATER RESOURCES SCHEME

SUGGESTED REFERENCE/READING LIST

TRAINING AGREEMENT RECORD

Name of Graduate/Trainee

Period of Agreement: From To

Supervising Civil Engineer

Employer: Name

Address

Training Agreement No:

TRANSFER

Date

Reason for Transfer

Supervising Civil Engineer

Employer: Name

Address

Transfer No:

NOTE: Additional Agreement record sheets must be used when Agreements are
for less than the full period as defined in Appendix D of ICE 43
(Post Chilver)

RECORD OF SECONDMENTS

TO (Name of Firm)

ADDRESS

.....

.....

Supervising Civil Engineer
(or Employer)

Reason fo Secondment

Date: From To

Type of Work undertaken

during this period and

objective numbers achieved

.....

I hereby certify that whilst seconded to me,

(Name of Trainee)

has received training commensurate with the stated "Reason for Secondment".

Signature

Name (Block Capitals)

Grade in Institution

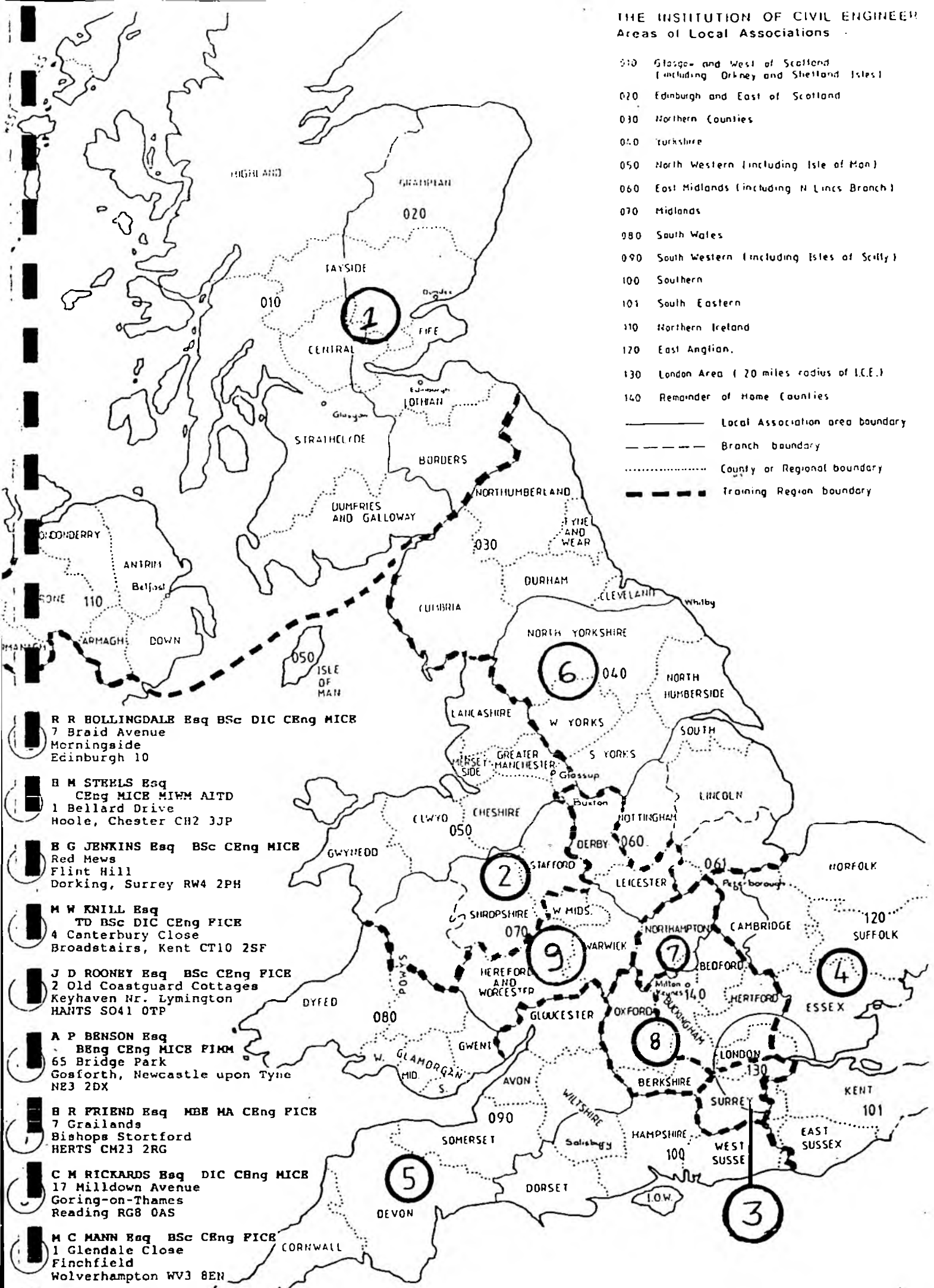
I.C.E. REGIONAL TRAINING OFFICER

The Regional Training Officer (R.T.O.) will monitor progress and achievement against the objectives and will liaise closely with the Region's Supervising Engineer to ensure smooth and timely target achievement. The R.T.O.'s address is indicated on the attached map, distributed October 1990.

THE INSTITUTION OF CIVIL ENGINEERS Areas of Local Associations

- 010 Glasgow and West of Scotland (including Orkney and Shetland Isles)
- 020 Edinburgh and East of Scotland
- 030 Northern Counties
- 040 Yorkshire
- 050 North Western (including Isle of Man)
- 060 East Midlands (including N Lincs Branch)
- 070 Midlands
- 080 South Wales
- 090 South Western (including Isles of Scilly)
- 100 Southern
- 101 South Eastern
- 110 Northern Ireland
- 120 East Anglian
- 130 London Area (20 miles radius of I.C.E.)
- 140 Remainder of Home Counties

- Local Association area boundary
- - - Branch boundary
- County or Regional boundary
- Training Region boundary



SUMMARY OF TRAINING

Number of Objectives classified as: A, K, E, or B

| | | |
|---|-----------------|----------------|
| A | Asked for | Achieved |
| K | Asked for | Achieved |
| E | Asked for | Achieved |
| B | Asked for | Achieved |

Total number of days spent on Continuing Education
(excluding 2nd Degree courses)

Experience gained in:-

(State whether construction (C), design (D), research (R), site investigation (S.I.) financial and contractual (F).)

| | |
|-----------------------------------|--|
| Geotechnics | Tidal defences |
| Foundations | Harbours Docks & Navigation Infrastructure |
| Tunnelling | Land drainage/Flood Defence |
| Seismic Engineering | Irrigation |
| Concrete Structures | Sewerage and sewage disposal |
| Steel Structures | Fresh water purification and distribution |
| Structures other than above | Hydrology & hydraulic computational modelling |
| Building Services | General Municipal Engineering |
| Highways | Town Planning |
| Airports | Gas or Power transmission |
| Railways | Hydro-electric Installations |
| Transportation | Off-shore Engineering |
| Business Planning | River Catchment Planning |
| Other (please specify) | |

Letter to All Supervising Civil Engineers

From P M Stancombe, ICE Training Manager, October 1990

CHARTERED MEMBERSHIP CONDITIONS
APPROVAL OF CONTINUING EDUCATION COURSES

The Council of the Institution at its meeting on 11 September 1990 changed the method of approving Continuing Education and off-the-job Training (CET). The new procedure is as follows:

- 1 The ICE Training Department will only approve courses which are submitted by course organisers, together with the appropriate fee, for inclusion in the "Guide to Continuing Education Courses for Civil Engineers" which is published three times a year by the ICE.
- 2 All other course approval, where it is required for membership purposes, is now the responsibility of the sponsor, ie, the Employer or Supervising Civil Engineer (SCE), who will be required to certify that the required number of CET days have been achieved.
- 3 The Employer or SCE is now responsible for the suitability of courses attended.
- 4 The requirement for achievement of Chartered Membership is still 30 days of relevant CET including one day on Health & Safety.
- 5 Other guidance in "The Routes to Corporate Membership" (ICE 43) with its current two amendments remains unchanged although the detail, not the principles, will be changed with the new publication expected soon.

You should note that the Institution is shortly to make available a Record of Continuing Professional Development for all members to note details of their CPD. A photocopy of the relevant part of this Record will be required by candidates to support their applications for a Professional Review.

CONTINUING EDUCATION AND TRAINING FOR THOSE EITHER UNDER AGREEMENT OR NOT

CURRENT REQUIREMENTS OCTOBER 1990

FOR PE1 - 15 Days Min
(10 Days Technical)
Max 5 Days at PE1/PE2 Level

FOR PE2 - 30 Days Min Cumulative
10 Days PE1 Technical
10 Days PE2 Managerial/Professional
9 Days Association/evening meetings (see below)
1 Day Health and Safety

3 Days Per Year Min

ATTEND LOCAL ASSOCIATION/ICE EVENING MEETINGS
(Combined Limit 5 Days PE1/PE2)

ICE 8 FORMS (Summary Record of Continuing Education Required for Submission
at PE1/PE2 for those under Agreement)

ICE 52 FORMS (Certificate of Attendance for each course/training occasion for
any Trainee)

CONTINUING EDUCATION AND TRAINING

COURSE APPROVAL PROCEDURE

1. In the case of Graduates under Agreement details of approved courses attended, with reference numbers, must be entered by the trainee in the "Training Record - Record of Continuing Education" sheet ICE 8 and certified by the Supervising Civil Engineer.
2. Graduates not training under Agreement must ensure that they receive a signed Certificate of Attendance (ICE 52) from Course Organisers for each course attended and these must be submitted as part of the documentation at the time of applying for PE.1. A copy of form ICE 52 is enclosed for use by those not under Agreement.
3. If an individual graduate wishes to attend a course or a Supervising Civil Engineer wishes to send a trainee on a course which has not already received Institution approval it is the responsibility of the graduate or Supervising Civil Engineer to inform the course organiser of the Institution's approval procedure and to ensure that approval is received before attending the course if that course is to be counted towards the 15 day PE.1 requirement. Form ICE 51, as copy attached, is for use by course organisers in this respect.
4. In addition to attendance at full-time or part-time courses, evening classes or seminars, the Continuing Education and Training requirements may be satisfied in part by attendance at technical conferences, symposia, meetings or discussions which have been organised or sponsored by recognised professional bodies. As evidence of the technical and professional benefit obtained from attendance at such events candidates are required to write a report on the proceedings of not less than 500 words for each attendance of a half-day or less claimed in respect of PE.1. Reports are to be authenticated by the candidate's employer, Supervising Civil Engineer, Local Association officer or other responsible person and made available to the Examiners at the Professional Examination. Apart from these limitations, the choice of Continuing Education courses, their individual duration and subject matter is the responsibility of the Supervising Civil Engineer for the candidate in those cases where training is not being carried out under Agreement).
5. Photocopies of forms ICE 51 and ICE 52 contained in this Training Record may be taken as required. Guidance Note (2), ICE 54 (enclosed), "Continuing Education for the first part of the Professional Examination (PE.1), gives information on the manner by which approved Continuing Education may be achieved.

INVOLVEMENT WITH INSTITUTION AFFAIRS

On this page should be listed all Institution or Local Association meetings, symposia, etc., which you have attended since the commencement of your membership. Please state also any participation with Student, Graduate or Associate Member Committees, etc., or any other relevant activities.

If you have had little or no contact with the Institution and its affairs during your academic education and post-graduate training periods, the reasons should be given why this has been unavoidable.

(In accordance with ICE 43 (Post Chilver) Appendix E)

Name

• • • • •

[illegible]

| | |
|--------------------|--|
| Cand. No | |
|--------------------|--|

Institution of Civil Engineers

CONTINUING EDUCATION AND TRAINING

CERTIFICATE OF ATTENDANCE

Name of participant

Title of Course

Venue of Course

Date of ICE approval

Approval Registration Number

Date of Start Date of Finish

Equivalent number of Chilver days
(No certificate if full course not completed)

Confirmation of attendance

Number of days of course attended by participant

Achievement in any assessment

Signature Date

Name Official position

OR

Approval by Supervising Civil Engineer (where appropriate)

Signature

Name Date

TRAINEE'S REPORT ON TRAINING

(N.B.: On this sheet the Trainee is invited to comment upon the contents and benefits of his training. If the Trainee wishes to comment upon the reports previously made out by the Supervising Civil Engineer this is the opportunity to do so).

QUARTERLY REPORTS

The Trainee's Quarterly Reports should be inserted to follow this sheet. Graduates and students not under Agreement are recommended to write and similarly insert Quarterly Reports on their experience.

NOTES FOR GUIDANCE ON COMPLETION OF QUARTERLY REPORTS

1. Name, Period ... to, Report No:
2. Give a brief description and value of the project or contract; describe the part of the contract that you were involved with and how the project management operates.
3. Give the names of your immediate supervisor and on large contracts show an organisation diagram.
4. Describe the work that you were doing, problems encountered and how resolved.
5. Describe any alternative construction methods considered. If at the feasibility or planning stages of a project, outline why there is a problem and why the preferred solution is recommended.
6. The main body of the report should be about 1000-1200 words (this means that over the 3 year training period, you will have 6,000 words; these can be edited to form the basis of your 2,000 word PE.1 Report).
7. It is very important to include in each report, what you have learned!
8. Admit your mistakes and describe how you will correct and avoid them again.
9. Use appendices to show sketches of construction methods, lists of gang sizes, plant and equipment used, outputs and costs.
10. Describe courses attended (or lectures) and what you learned. Include your essay if you want Chilver days.
11. Give examples of how you are developing yourself.
12. After your Delegated Engineer has read and signed it send the original to your SCE. He will read and comment on it, copy it and return it to you for inclusion in your folder. Do not rewrite it; these reports are working documents and you should learn from the comments and submit a better one next time.

IMPORTANT NOTES FROM THE ICE REGIONAL TRAINING OFFICER

- A. Your training record (green folder) should be kept at your work place.
- B. When you are transferred to another location, notify the ICE (on the pink provided) of your new working address and telephone number, the name and telephone number of your new delegated engineer (or person that the RTO should contact to arrange a visit) and approximately how long you will be at the new site address.
- C. When your home address changes, notify the Institution so that their records are revised (for NCE and your local association).

INSTITUTION OF CIVIL ENGINEERS

It is essential that all trainees under Agreement should notify the Institution's Training Department of any changes of working location. This should be done by sending a completed advice note as below:-

INSTITUTION OF CIVIL ENGINEERS

Advice of change of Working Location Date of change

To Institution Training Department:

Name of Trainee Agreement Number
(in block letters)

Name of firm or organisation

Previous working address

New working address

.....

.....

Name of supervisor at new address Tel
No

INSTITUTION OF CIVIL ENGINEERS

Advice of change of Working Location Date of change

To Institution Training Department:

Name of Trainee Agreement Number
(in block letters)

Name of firm or organisation

Previous working address

New working address

.....

.....

Name of supervisor at new address Tel
No

INSTITUTION OF CIVIL ENGINEERS

Advice of change of Working Location Date of change

To Institution Training Department:

Name of Trainee Agreement Number
(in block letters)

Name of firm or organisation

Previous working address

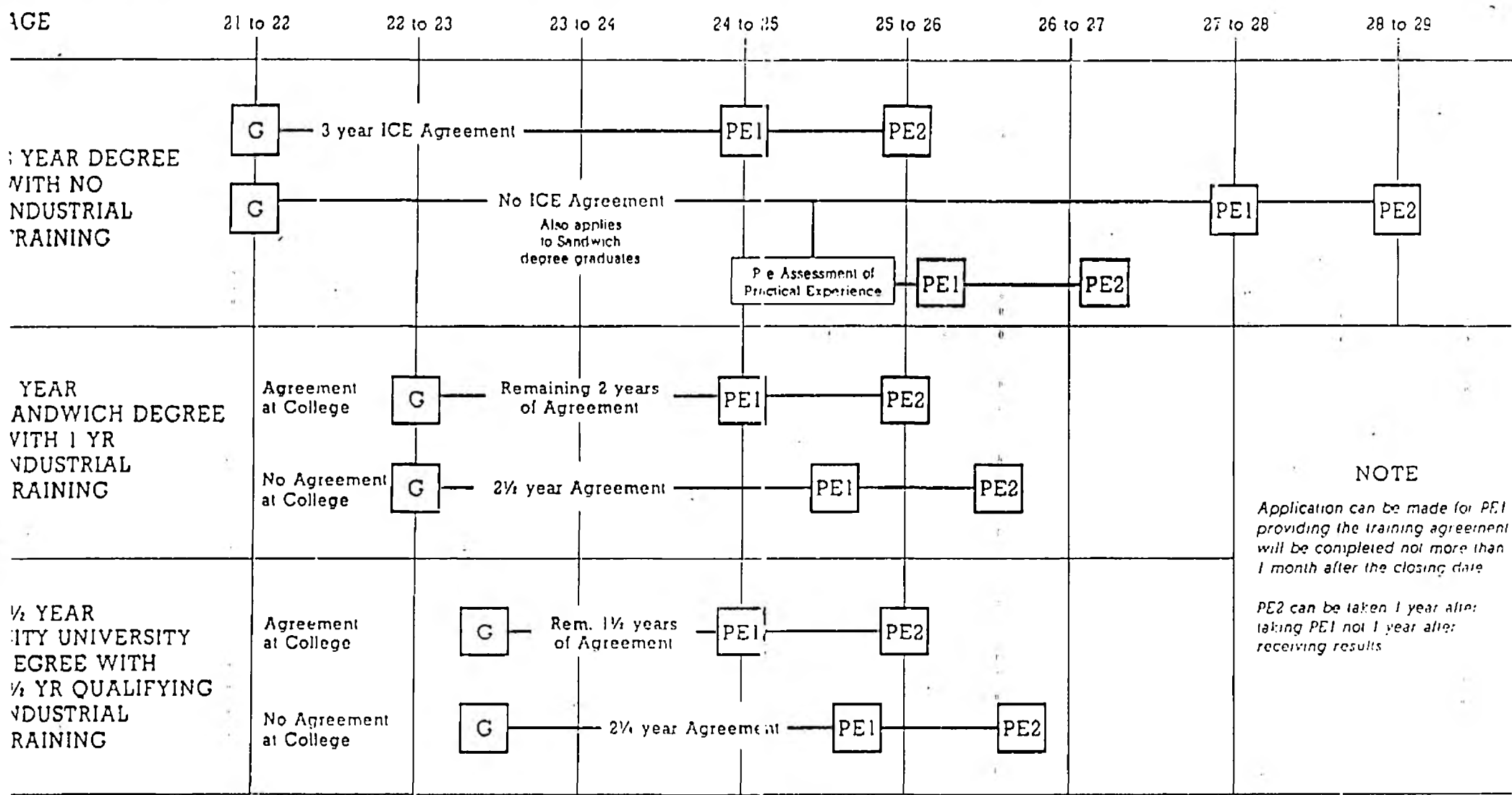
New working address

.....

.....

Name of supervisor at new address Tel
No

INFORMATION ON PROCEDURES
TO MEET PE.1 AND PE.2
REQUIREMENTS.



NOTE

Application can be made for PE1 providing the training agreement will be completed not more than 1 month after the closing date

PE2 can be taken 1 year after taking PE1 not 1 year after receiving results

MINIMUM TIMES TO PE1 & PE2 - CURRENT POSITION

Figure 1

STEPS TO PE.1

1. Employer joins the Institution's "Index of Firms having Supervising Civil Engineers Approved for Training".
2. Graduate enrolls or transfers from Student to Graduate Membership of Institution. Form B of Form B/S (for Students under Agreement).
3. Institution sends Graduate his copy of ICE 43 (1987) - "The Routes to Corporate Membership".
4. Employer registers a Training Agreement at the Institution. ICE 3 or ICE 3/S - "Form of Undertaking".
5. Institution issues Graduate with his copy of ICE 1 - Training Record.

In this will be filed:-

Quarterly Reports
Employer's Training Scheme/Training Objectives
Record of Continuing Education.
6. When trainee is judged ready to take PE.1, Employer registers ICE 5 - "Certificate of Completion of Approved Training under Agreement".
7. Employer completes ICE 15 "SCE's Performance Appraisal Report" (3 annual reports) and sends to Institution via RTO).
8. Trainee applies to take PE.1 - Form 'D' and ICE 35.