



## Heritage and Conservation Engineering

### National Professional Engineers Register

#### 1. Introduction

This document provides the criteria that will be used for assessing applicants for the area of practice of Heritage and Conservation Engineering.

The Guideline was originally prepared by a competency panel comprising representatives of Engineering Heritage Australia and the Colleges of Civil, Structural, Mechanical and Electrical Engineers, in consultation with representatives of the Royal Australian Institute of Architects and State Heritage Bodies. The setting of standards and administration of the registration scheme is the responsibility of the competency panel.

The purpose of establishing a recognised area of practice called 'Heritage and Conservation Engineering' is to provide accreditation for professional engineers competent in that field, and for those where heritage and conservation engineering is a significant area of their professional practice.

Administration of the registration scheme is the responsibility of the Associate Director Registration, Engineers Australia.

#### 2. Background to Heritage and Conservation Engineering

The professional approach to heritage and conservation engineering has developed out of action by the National Trust of Australia and similar bodies to conserve the built environment and maintain its significance. Beginning in the 1970s, State governments in Australia introduced heritage legislation which set out the requirements for recording and assessing places and works and, in turn, for their conservation.

Additionally, the Australian National Committee of the International Council on Monuments and Sites (ICOMOS), which was formed in 1976, adopted in 1979 The Australia ICOMOS Charter for the Conservation of Places of Cultural Significance ("The Burra Charter").

Professional engineers have often been involved as team members in assessing, recording and conserving structures and artefacts, with particular emphasis on the strengthening of structures (for both adaptive reuse and repair following damage or deterioration) and the upgrading of machinery to current safety requirements.

However, in many instances conservation work has been carried out on structures and works without adequate heritage engineering input or with input from engineers who do not have the necessary competence in conservation practice. This can and has resulted in irreversible damage to heritage assets.

Of major concern is that many professionals practising in the sphere of engineering and industrial heritage do not have an

engineering background and many engineers do not possess the requisite heritage knowledge and skills. Many also fail to appreciate when they should seek input from competent practitioners. This can lead to incorrect assessments, inappropriate conservation practice, damage to important heritage items and even to their loss.

By leaving the heritage and conservation engineering field to those without the requisite credentials (e.g., those with architectural or other non-engineering backgrounds), the engineering profession would be abrogating its responsibility for the conservation of its history and heritage.

Engineering works have, since the beginning of the 19th century, been at the forefront of improvements to public health and quality of life. The engineering of roads, railways, telecommunications, power, sewerage and water supply etc. has produced substantial benefits for mankind. In fact, much architectural progress has depended on significant engineering input. As such, the conservation of our engineering and industrial heritage provides continuity with the past and with the Nation's growth, demonstrates the development of ideas and technology and celebrates the genius of our engineering forebears. The conservation of this national heritage asset is substantially dependant on heritage engineers.

Examples of poor practice which recognition of Conservation and Heritage Engineering seeks to redress include the use of incompatible modern materials to repair the old, and the inadequate assessment of cultural heritage significance through ignorance of the engineering that was involved. A common example in building is the retention of a pattern-book architectural façade and the scrapping of the accompanying engineering content which was both significant to the people who used it and of significant engineering heritage value.

Many applicants seeking recognition as heritage and conservation engineers will have academic qualifications and professional experience in civil, structural, mechanical or electrical engineering, but not in heritage and conservation engineering. Such applicants will need to show that they have developed specialist skills within their practice area in heritage and conservation engineering, and that they have expertise in the general field of heritage and conservation engineering. They will also need to describe the continuing professional development which has been specific to heritage and conservation engineering and how this has established their expertise in that field.

### 3. Criteria for Heritage and Conservation Engineering

Heritage and conservation engineering is an area of practice which requires applications and adaptations of all the traditional disciplines of engineering, together with an understanding of the elementary scientific principles involved which might not be directly referenced in current practice procedures.

Practitioners will need to be aware of all the phases involved in conservation and the role of other professions, such as historians, archaeologists and architects.

#### 3.1. Recognition

Recognition in the specific practice area of Heritage and Conservation Engineering requires that:

- you have an acceptable qualification and sufficient experience to satisfy the National Competency Standards for Professional Engineer at Stage 2;
- you have registered in a general area of practice on the NPER;
- heritage and conservation engineering is a significant area of your professional employment or practice;
- you must be able to demonstrate capability in a satisfactory range of the areas of practice of heritage and conservation engineering activities.

#### 3.2. Areas of practice

The following areas of practice are a normal part of the heritage and conservation engineering discipline, with specialties dependent upon the basic discipline of the practitioner:

- conservation of heritage places, works, materials, structures, services and objects;
- assessment of heritage significance of the above;
- preparation of heritage impact studies;
- preparation of conservation management plans for places, works and objects;
- preparation of heritage interpretation plans.

#### 3.3. Areas of knowledge

The main areas of knowledge required for practice are:

##### 1. Materials in Engineering Heritage

- History
- Geographical Variations
- Construction Techniques
- The Process of Deterioration
- Maintenance and Repair Techniques

##### 2. Conservation Philosophy

- Theory of Conservation
- Conservation Terminology
- The Concept of Significance
- The Burra Charter
- International Variations

### 3. Conservation Practice

- The Conservation Process
- Heritage Assessments
- Statements of Significance
- Heritage Impact Statements
- Conservation Management Plans
- Conservation Maintenance Techniques

In addition, practitioners will need expertise in the engineering predominantly involved in the structure or work being assessed or conserved.

### 4. The application assessment process

#### 4.1. Making an application

The following sections indicate what you must do to register on NPER in a general area of practice, and receive recognition in the specific area of heritage and conservation engineering. You do not need to join the Engineers Australia to register on NPER.

#### 4.2. Required Documents

If you are not a CPEng, then:

You must follow Application Guidelines in the *Chartered Status Applicant's Handbook* ([www.engineersaustralia.org.au](http://www.engineersaustralia.org.au) >education >chartered status) (even if you do not intend to join Engineers Australia) and use the Application Form in it to apply simultaneously for a general area of practice on NPER and for heritage and conservation engineering. The same process will also allow you to obtain Chartered Membership (CPEng) and College Membership if you wish.

If you are a CPEng then:

You may apply simultaneously for registration on NPER and/or College Membership using the **Application for College Membership and Professional Registration** form. You must submit a curriculum vitae (CV) and evidence of how you have kept up to date in your practice, as explained on the form. You can apply for the specific area of practice heritage and conservation engineering at the same time.

Even if you are already registered on NPER in a general area of practice:

You [and **ALL OTHER APPLICANTS**] must also provide:

- a completed application form for recognition in the specific area of practice heritage and conservation engineering;
- a fee of \$550 incl GST; and.
- a Training and Experience Report (TER), which may be combined with an EPR, providing details of relevant courses and training activities undertaken to complement your specialisation and practice in heritage and conservation. Typical training activities should have:
  - filled major gaps in your knowledge of heritage and conservation engineering with particular attention to areas 1 to3 in 3.3 above;
  - applied theoretical knowledge to the practice and techniques of heritage and conservation engineering;

- provided a working knowledge of state of the art practice in the specialisation, including any requirements for continuing maintenance and durability of appropriate conservation practices;
- provided a basic understanding of how to deal with emergency conservation procedures such as after accidents, earthquakes etc.

### 4.3. Preparing a Training and Experience Report

#### 4.3.1 General

The training and experience report should address the more difficult, practical and technical problems you have encountered and how your professional training has enabled you to deal with these problems.

#### 4.3.2 Report Sections

##### *General*

The report should have 5 sections, namely:

- Formal Education and Training
- Supervised Experience
- Responsible Experience
- Other Relevant Information
- Verification.

##### *Formal Education and Training*

This section covers courses delivered by recognised education providers, seminars and conferences.

Explain how the course content and the subject matter of the seminars and conferences related to the knowledge and skills in Section 3 above, and provide details of any third-party assessment that may have been undertaken of your performance.

Provide a list of the subjects of your academic award courses in heritage and conservation engineering, and explain how they relate to your involvement indicated against 1-3 under 3.3. The subject matter of seminars and conferences attended should also be related to these activities.

##### *Supervised Experience*

Provide a brief list of examples of your professional involvement in the areas you have indicated in your application (F3). Use bullet points to identify relevant projects and training received.

##### *Responsible Experience*

Provide a structured statement of your responsible experience in the different types of heritage and conservation assignments undertaken and state clearly your own personal role and the extent to which you have been expected to assume responsibility.

##### *Other Relevant Information*

Provide any other information related to your involvement in heritage and conservation engineering that might support your application.

##### *Verification*

Have your report reviewed and substantiated by an experienced professional engineer as being a true representation of your training and experience.

### 4.4. Professional Interview

All applicants must attend a professional interview, with two engineers experienced in heritage and conservation engineering. For applicants concurrently seeking registration on NPER for a general area of practice (Structural, Mechanical etc.) one panel member will be an engineer registered in the general area of practice.

The interview enables a quality assurance check of the educational and professional experience in heritage and conservation engineering detailed in the training and experience report.

Applicants should bring examples of professional work that illustrate their experience and competencies in heritage and conservation engineering. The structure of the interview will be:

- a short period for introductions
- a fifteen minute presentation by the candidate, uninterrupted by the panel
- thirty minutes responding to questions by the panel; and
- a brief discussion of topical and ethical issues.

Your application for recognition in the Heritage & Conservation Engineering specific area of practice, together with appropriate attachments and fees, must be forwarded to: Associate Director Registration, Engineers Australia, 11 National Circuit, Barton ACT 2600

## APPLICATION FOR RECOGNITION IN THE AREA OF PRACTICE – HERITAGE AND CONSERVATION ENGINEERING

Applicant's Name ..... Membership/Registration No.

If already registered on NPER, attach this form to your Training and Experience Report (TER).

If applying concurrently for a general area of practice on NPER, attach this form to your main application form.

If applying for NPER in a primary area of practice refer also to Guideline for that area of practice.

All applicants must provide a Training and Experience Report (TER) as summarised below.

### F1. Professional Formation in Heritage and Conservation Engineering

I have gained competencies in Heritage and Conservation Engineering, through the experience detailed in my CV and my TER which are attached to this supplementary application form. My training activities have included one or more of: (please tick box)

- ◆ an undergraduate or postgraduate qualification in Heritage and Conservation Engineering (please attach certified evidence):
- ◆ undertaking a significant relevant educational program, or a number of relevant short courses
- ◆ producing relevant publications
- ◆ undertaking a relevant course of private study
- ◆ mentored practice in the field for a minimum of 10 years

### F2. Demonstrated Responsibility in Heritage and Conservation Engineering

I have provided professional services independently, or under general direction, in Heritage and Conservation Engineering in the following positions:

.....  
 .....

(if necessary, attach a separate summary sheet for F2)

Please provide, in your CV, details of these positions, stating the functions you performed and the responsibilities you accepted.

### F3. Professional Practice in Heritage and Conservation Engineering

Applicants must have a general understanding of all activities in the left hand column, noting alternative to Burra Charter where applicable (see section 3 of Guideline). You must indicate your professional involvement in at least six activities; activities marked † are alternatives depending on primary discipline of which at least one should be included. Please ✓

- |   |  |
|---|--|
| <input type="checkbox"/> The Burra Charter of Australia ICOMOS (mandatory)                      | <input type="checkbox"/> Recognized standards for the management of machinery and other engineered creations (mandatory alternative for practitioners working outside Burra Charter application with activities below* ) |
| <input type="checkbox"/> Conservation Management Plan preparation                               | <input type="checkbox"/> *Conservation Terminology   |
| <input type="checkbox"/> Codes of Practice as related to historical structures, where available | <input type="checkbox"/> *Concept of Significance  |
| <input type="checkbox"/> Research, recording and documentation of historic works                | <input type="checkbox"/> *Theory of Conservation   |
| <input type="checkbox"/> Specification and sourcing of conservation materials                   | <input type="checkbox"/> †Physical and chemical characteristics of historical construction materials   |
| <input type="checkbox"/> Maintenance and repair techniques and materials                        | <input type="checkbox"/> †Understanding of appropriate chemical processes or electronic circuit behaviour  |
| <input type="checkbox"/> Appropriate analysis and design techniques for conservation            | <input type="checkbox"/> †Manufacturing methods and techniques for historical machinery components   |

This summary of my involvement in Heritage and Conservation Engineering and the details reported in my CV and TER are correct.

Signed ..... Date ...../...../.....