Promoting Heritage Conservation Practice for Professional Engineers

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SUMMARY: The conservation requirements for built heritage have been evolving rapidly in the past 20 years as the community has demanded that it be protected and conserved for the future. The engineering skills required to do this work have not been adequately catered for by normal engineering training and experience and some practitioners have extended their knowledge to answer the need. This paper describes the basis for defining conservation as a separate area of expertise for engineers, the trends overseas and the progress made in Australia.

1. INTRODUCTION

In the British Commonwealth, engineering practice has continually evolved and diversified into different specialties ever since the formation of the Institution of Civil Engineers, distinguishing its members from the military engineers, and subsequently as the Institution of Mechanical Engineers and others broke away from the parent body in the 19th century. Similar evolution took place in other countries. In Australia we have been lucky in having one body encompassing all disciplines, but it, too, has continually recognized the evolving specialties by the formation of disciplinary groups in the form of Colleges: in turn, these disciplinary groups have been further formalised by registration. However, in recent years it has become obvious that not all engineers understand the additional skills required for conservation engineering and that some think they can apply the same skills and knowledge they use in their regular work: this applies particularly in structural engineering but also in other disciplines. In the most obvious example, the materials used in the past usually do not have properties that can be determined from current codes of practice.

In 2004 the engineering institutions of the UK introduced the CARE programme for registration of heritage and conservation engineering practitioners. This was prompted by a requirement of English Heritage that all practitioners working on projects funded by grant moneys should be suitable registered as conservation specialists. In the United States of America a different course has been taken with a national training scheme recognized by most significant client bodies; this approach appears to have been taken to produce some uniformity and overcome the problems presented by the individual registration requirements in each of the American states. Engineering Heritage Australia has been working towards a scheme for Australian engineers for some years and, at the time of writing, the proposal appears about to be accepted and implemented.

In the discussion which follows, my own professional experience dictates that I use examples from the field of civil or structural engineering. I apologize to mechanical, electrical and other engineers, but I’m sure they can fill in the gaps with parallel examples.

2. HOW DOES CONSERVATION ENGINEERING DIFFER FROM NORMAL PRACTICE?

2.1 Normal practice — the problems

Engineering in the 21st century is mainly concerned with obtaining the most economical solution for the building of infrastructure and the production of goods. To do this most effectively, engineers are educated to produce the solutions with which industry and government are comfortable. Most civil and structural engineering students, for example, spend most of their education learning how to design in reinforced concrete and steel; only a small number of universities give students more than passing references to the use of masonry and timber.

The problem is exacerbated by the state of Australian Standards. Unfortunately, it now seems that standards are written to satisfy the financial interests of industry pressure groups rather than reflecting the results of scientific research; this differs according to the nature of the standard; the AS 1170 “loading codes” are probably closest to being based on research, whereas many of the materials–based standards, such as those for reinforced concrete and masonry, at times seem to be unhealthily influenced by the industry hip–pocket nerve.

Unfortunately too, the first point of reference for most engineers when they are trying to solve a problem is Australia standards (or manufacturers’ catalogues), as little else is readily available, and they have an influence in law which makes it risky for practitioners to depart from them.

2.2 Conservation practice

Conservation engineering practice differs from normal engineering practice in a number of important, and sometimes radical, respects:

- the philosophy of conservation is quite different from that used for the design and construction of new work;
- new work is rarely designed for a “design life” exceeding 100 years (usually much lower), yet
heritage structures have often had a life already far exceeding that, and community expectation is for a continuing life of at least the same magnitude;

- all conservation work has to conform with the requirements of heritage significance assessment, as set out in the Burra Charter of Australia ICOMOS, similar documents in other countries, and as codified by heritage legislation and regulations;
- materials used in traditional construction have often no real equivalent in the regular marketplace and attempts to use current equivalencies can be misleading or even risky.

In the Australian context, the Burra Charter precept “do as much as is necessary, but as little as possible” does not seem to be able to be grasped by most people, be they engineers, architects or builders, who are not experienced in conservation practice. Their whole life experience is based on building the new.

2.3 Standards — are they relevant?

Engineering at the beginning of the 21st century is very much governed by standards, many of which are considered as legally binding for most projects. It is only in the most extraordinary and well-funded projects that departure from standards can be justified, and only then with considerable difficulty, as often the basic data is not readily available.

The make-up of the committees formed to compile Australian Standards shows how far the concept of their production has departed from that used by the Institution of Engineers Australia when it was instrumental in forming the Standards Association in the early 20th century.

One of Australia’s pioneering conservationists, the late Professor “Jack” Cowan, once remarked that, as a young engineer, he was encamped in training with the British army in the ruins of an old abbey. He was led to question the relevance of the standards of the time when he realized that a (unreinforced) stone column, still standing after 100s of years, had a slenderness ratio not permitted under the then current codes for reinforced concrete. Similar examples can probably be thought of by many experienced engineers, which have led to the formulation of such rules of thumb as “if it has stood for 100 years, and there is no marked deterioration or change in loading conditions, should a structure be condemned because it does not comply with a current code?”

2.4 Materials

A consequence of the way standards are written and used is that most engineering is done with the liberal use of manufacturers’ catalogues: load and other performance capacities of components are taken directly from the manufacturer’s data, often with little knowledge of the secondary property assumptions which have been made. For example, many “masonry” anchors have only been extensively tested in concrete, and the tabulated properties reflect this. Some manufacturers may show properties for brickwork, but the fine print may show that testing has been limited and confined to a particular type of hard, modern brick with cement mortar. What chance has an engineer of applying this data for work on a 19th century, sandstock brick or stone building in a meaningful fashion? Unfortunately, many do without seeing the error of their ways.

2.5 Analysis methods

Analysis methods in general use are intended for the efficient design of new structures. The two in most common use today, computerised elastic analysis for frames and the finite element method for structures modelled as other than line elements, have given engineers enormous power compared with the tools available before the computer era. They do not necessarily give an accurate picture of the structural behaviour being modelled, particularly when the materials being modelled are not homogeneous: materials such as masonry and wrought iron are anything but uniform in their properties, so the simplistic use of modern analysis tools can lead to misleading results. Instances of masonry structures being condemned through lack of understanding of their structural behaviour are all too common and the lack of understanding of the fatigue behaviour of wrought iron led to a costly and ultimately embarrassing closure of the main railway line south of Sydney some years ago.

A common case where analysis may not tell the full story involves the behaviour of 19th century roof trusses. Such trusses can be found that have given successful service for over 150 years, yet a simplistic analysis may show that the bottom chord is unstable under compressive forces resulting from wind uplift. The engineering “solution” in such cases often involves the installation of intrusive and inappropriate bottom chord bracing. At no time does the engineer involved seem to have stepped back and asked what forces have the trusses been subjected to over their life and have those forces caused any problem? A more detailed analysis, still using modern tools but with understanding of the behaviour, might show that a force redistribution takes place when tension members are placed in compression or that torsion in the truss top chord can give sufficient bottom chord support by way of the web members. Even the “Code solution” for wind actions is not necessarily accurate for the determination of what the actions may really be, or have been over the life of the structure.

3. WHAT HAS BEEN THE SITUATION TO DATE?

3.1 The profession

The need to recognize engineers with an understanding of conservation, and heritage issues generally, has been accepted for 20 years or more, but on an informal basis; in Australia most State Heritage Councils have kept lists
of practitioners, but there has been no vetting of people who request listing. After experience with these lists, an informal network has determined who is best able to undertake certain types of work: this procedure, however, does not provide any degree of certainty for clients, nor does it provide any clear procedure for younger engineers to commence in the specialty. As a corollary of this situation, there have been no formal education courses offered specifically for engineers: some have attended overseas courses, others have undertaken courses aimed at architects, historians and other professions; others have learnt on the job and through research.

The engineering profession has survived in this environment mainly through goodwill and adherence to the code of ethics, but such a set of circumstances does not provide a sound basis for professional practice.

3.2 The community and regulators

Heritage conservation practice is subjected to law and regulations at Local Government, State and Federal levels by various acts of parliaments, development control plans and other such instruments. Oversight is provided, to a greater or lesser degree, by the State and Federal bodies charged with administering the acts and, to some extent, by heritage officers employed in local government.

3.3 The engineering profession

In Australia, of course, Engineering Heritage Australia and its progenitor, the National Committee on Engineering Heritage, commenced to take an interest in conservation more than 20 years ago. At first the aim was to recognize and conserve our engineering heritage, and that is still EHA’s main aim, but it soon became the engineering profession’s voice in conservation matters and that role has assumed increasing importance as the community’s interest in heritage has increased.

3.4 Training

Training in conservation practice for engineers has not been done systematically in the past in Australia. Some individual university academics have offered electives with heritage content, but these units have not survived the retirement of the academic concerned; none of the courses could be said to have included rigorous conservation practice.

Other universities have offered short courses on conservation open to all, and some of the content has been relevant to engineers. Unfortunately there has been nothing in Australia to parallel the courses offered in the UK (e.g. York), Europe (Rome) or the USA (NCPTT – see below).

Pathways to recognition in the proposed registration guidelines have post graduate qualifications as an entry path. It is hoped that there will now be some incentive for universities to offer suitable courses.

4. OVERSEAS EXPERIENCE

4.1 Professional bodies

In the United Kingdom the experiences of both engineers and client bodies was not dissimilar to those in Australia. One major difference was one of scale, in the amount of heritage engineering work that had to be done, in the much greater level of funding available and in the longer history of the perceived need for specialists. In 2003 a joint scheme administered jointly by the Institution of Civil Engineers and the Institution of Structural Engineers was implemented. CARE (Conservation Accreditation Register for Engineers) has among its bases:

1.3 The Conservation Accreditation Register for Engineers (CARE) is intended to provide clients and other professionals with a body of civil and structural engineers who are familiar with the philosophy and methods of the conservation of historic structures and sites.

1.4 It is also intended as a means of encouraging engineers to raise their awareness and standards by pursuing their continuing professional development in this field.

The principles of operation are:

- accreditation of individuals rather than companies or practices
- eligibility of all suitably qualified and experienced professional engineers to gain accreditation
- assessment by suitably experienced assessors
- assessment of verifiable records of case studies (CARE guideline, ICE)

The Engineering Council of the UK, the body responsible for setting standards, “now require that all engineering degrees support students ‘understanding of historical, current, and future developments and technologies’”, (Swales and Chrimes, 2005). The Joint Board of Moderators (JBM) actually undertake University course accreditation and this requirement is now included in the JBM curriculum guidelines. The situation in North America is closer to the model which has been informally operating in Australia; it is complicated by the State-based registration of the engineering profession. However, in place of registration a very strong training culture has developed nationally led by the National Parks Service of the U.S. Department of the Interior. This was initiated in 2000 and resulted in the Professional Development Program In Engineering For Older Buildings, Including Heritage Buildings.

The National Center for Preservation Technology and Training (NCPTT) (run by the Parks Service) training program is aimed at all professionals, with specific courses for professional engineers. The NCPTT also cooperates closely with organizations such as the Association for Preservation Technology, mentioned below. One departure from the UK and intended Australian model is that the program is open to professions other than engineering. In justifying this it is stated that:
The program is intentionally multi-disciplinary in content because many technical problems in older and historic buildings do not respect the boundaries prescribed by conventional professional practice disciplines. Many successful interventions in preservation of historic buildings are the result of highly collaborative problem-solving; in this regard, the class exercises develop teamwork, rather than individual effort (M. Henry/NPCTT, 2003). It should be noted here that, in most of North America, “preservation” has the same meaning as “conservation” for those of us who take our terminology from the Burra Charter of Australia ICOMOS.

The National Parks Service is the owner of a large proportion of the buildings of heritage significance in the USA and is very influential in all heritage work in that country. There is no comparable body in Australia which can command such influence; on the other hand the engineering profession is not as affected by State boundaries. The registration model appears to be the better of the two for Australian adoption.

4.2 Multi-disciplinary conservation organizations

Conservation in a building or structure rarely involves just one professional discipline: a typical project may involve a historian, an architect, an archaeologist, an engineer and a materials scientist; small projects may involve just one of these people using their general knowledge to fill in the gaps outside their professional discipline; large projects may involve even more disciplines.

The realization that conservation cannot be confined to one profession has led to the formation of a number of cross-professional organizations. The most important of these is, I believe, the Association for Preservation Technology which was started in 1968 as a joint venture between “preservationists” in Canada and the United States. It now has members in 19 countries with its first non-American chapter formed recently in Australia. Its main strengths are the well-researched professional papers in its journal and the annual conference which attracts many delegates from all conservation professions.

In the UK much of the expertise, until recently, appears to have been kept “in house” by English Heritage and its Scottish and Welsh counterparts. One notable cross-discipline organization for both trades and professional people, which started in the early 1990s, is the Building Limes Forum. It set out to recover the lost knowledge of historical building techniques and now finds itself as one of the principal proponents of sustainable construction. It, too, publishes a journal with well-researched papers.

5. REGISTRATION IN AUSTRALIA

As I write this paper, the proposal to register conservation and heritage engineers on the National Professional Engineers Register (NPER) appears to be close to approval.

The concept arose from discussion within EHA some years ago in response to continuing enquires from State Heritage Councils, and other bodies, for recommendations for appointment of engineers with heritage experience for conservation projects. The problem confronting EHA was that, without a suitable register which had been compiled using a transparent process, there was no way of knowing confidently who could, and who could not, be recommended for appointment: there was also the danger of perceived nepotism.

Registration on NPER has been closely aligned with the Institution’s Colleges, Civil, Mechanical etc. Conservation and Heritage Engineering, however, is seen as a secondary discipline which is usually practised in conjunction with the primary discipline and practitioners should be expected to maintain their competency and continue with registration in a primary discipline.

A suitable model had been developed for Fire Safety Engineering which also has practitioners from a number of primary disciplines and refers to a “Specific Area of Practice”. Using this as a basis the guideline passed through many revisions and was first considered as a basis for registration by the National Engineering Registration Board (NERB) in late 2002: the Board did not approve the recommendation at that time on the basis of lack of community demand: chicken and egg problems have always been with us.

It was back to the drawing board for the members of EHA and this time outside assistance was sought and steps taken to ensure that the known community demand was recognizable. Soon after, it became known that the move to registration in the UK was well advanced and advice was freely given by the people preparing that scheme. The draft guidelines were more widely circulated and valuable input obtained from people in the NSW Heritage Office in particular.

The revised guidelines were submitted to the NERB in August 2007. One of the chief problems with voluntary work is that it tends to be relegated in importance compared with income producing and family commitments. EHA and its members are just as prone to this as are many other groups within Engineers Australia and some of the promised lobbying to obtain letters of support was a little tardy and the support did not quite make the deadline for the NERB meeting. However, the quality of the submission was acknowledged and, at the time of writing, it was expected that the letters of support would be available for the NERB to endorse the proposal between meetings.

The final draft of the registration guideline is appended.

6. CONCLUSIONS

The registration of professional engineers in Australia, in the specialty area of conservation and heritage, is an important step in having engineers take responsibility for conservation work in a defined and rigorous manner. I believe that Engineers Australia now has the
means to allow engineers to be accepted as fully fledged heritage professionals equal with the members of other professions who have taken the lead in the past.

7. ACKNOWLEDGEMENTS
The work of many members, past and present, of the board of Engineering Heritage Australia has contributed to the acceptance of the need for recognition of heritage and conservation engineering as a specialist area of practice; within this group, Michael Clarke’s work when chairing the board, and later, deserves special mention. Input to the proposed practice guideline has also been generously given by people outside Engineers Australia, of whom Murray Brown of the NSW Heritage Office deserves special mention for his insightful input.

8. REFERENCES
Institution of Civil Engineers, accessed May 2006, Conservation Accreditation Register for Engineers (CARE), Principles of Operation.
National Professional Engineers Register (NPER)
Guideline
Eligibility Criteria and Procedures for Registration in the
Specific Area of Practice of
Heritage and Conservation Engineering

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, Mining 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.

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:
Several bullet points outline the requirements for recognition with NPER Heritage and Conservation Engineering:

- 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 predominately 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 IEAust to register on NPER.

Your application for recognition in the specific area of heritage and conservation engineering must be forwarded with the appropriate fee to the Associate Director Registration, Engineers Australia, 11 National Circuit, BARTON, ACT 2600.

4.2. Required Documents

If you are not a CPEng, then:

You must follow Application Guidelines in the Chartered Membership Application Kit (even if you do not intend to join IEAust) 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. a completed application form for recognition in the specific area of practice heritage and conservation engineering;

b. a fee of $250; and

c. 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 to 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;
Specific Area of Practice NPER Heritage and Conservation Engineering

- 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.
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 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 ✓ Recognized standards for the management of machinery and other engineered creations (mandatory alternative for practitioners working outside Burra Charter application with activities below* )

- The Burra Charter of Australia ICOMOS (mandatory)

- Conservation Management Plan preparation

- Codes of Practice as related to historical structures, where available

- Research, recording and documentation of historic works

- Specification and sourcing of conservation materials

- Maintenance and repair techniques and materials

- Appropriate analysis and design techniques for conservation

- Conservation Terminology

- Concept of Significance

- Theory of Conservation

- Physical and chemical characteristics of historical construction materials

- Understanding of appropriate chemical processes or electronic circuit behaviour

- 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 ……/……/………..