

# Registration as a Professional Engineer with ECSA

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# Engineering Act

- The Engineering Profession Act, 2000 (Act No. 46 of 2000)
- In terms of Section 18(1), the Act **empowers ECSA to register persons** in certain prescribed Categories of Registration.
- The Categories are:
  - Professionals,
  - Candidates and
  - Specified Categories.

# Engineering Act

- 18. (1) The **categories** in which a person may register in the engineering profession are-
  - (a) Professional, which is divided into-
    - (i) **Professional Engineer**;
    - (ii) Professional Engineering Technologist;
    - (iii) Professional Certificated Engineer; or
    - (iv) Professional Engineering Technician; or
  - (i) **Candidate Engineer**;
  - (ii) Candidate Engineering Technologist;
  - (iii) Candidate Certificated Engineer; or
  - (iv) Candidate Engineering Technician; or

# Candidate Category

- The Candidate Category provides for the registration of persons who only meet the **academic requirements** for registration in the Professional Categories referred to above and who are undergoing professional development (preferably) through a Commitment and Undertaking. It should be noted that all persons who are registered for example as "Engineers in Training" can automatically refer to themselves as "Candidate Engineers".
- **Thus you can register immediately after obtaining your degree as your degree is accredited by ECSA**

# Candidate Category

- Complete form E1.1
  - R360 (within first year)
  - R890 (later than one year)
  - Annual fees
- 
- For PrEng after min of three years:
  - R1 765 (if previously registered as CE)
  - R3 530 (if not registered as a CE)

# Why register?

## INDIVIDUAL

- Peer recognition of qualifications and experience
- Public confidence in professional competence
- International recognition
- Marketability in employment market
- Exclusive use of reserved name
- Statutory empowerment (provide for the reservation of work of an engineering nature for the exclusive performance by registered persons)

# Why register?

## EMPLOYERS

- Confidence in professionalism of staff
- Recourse in the event of improper conduct
- Marketability of firm or organisation
- Compliance with statutory requirements

# Information and forms

- General website of ECSA

[www.ecsa.co.za](http://www.ecsa.co.za)

- Application form

[http://www.ecsa.co.za/documents/1A\\_ECSA\\_ProfEng\\_Appform.doc](http://www.ecsa.co.za/documents/1A_ECSA_ProfEng_Appform.doc)

- Policy R2/1A

[http://www.ecsa.co.za/documents/2A\\_ECSA\\_PrEng\\_PolicyStatementR2\\_1A.pdf](http://www.ecsa.co.za/documents/2A_ECSA_PrEng_PolicyStatementR2_1A.pdf)

- Branch specific guidelines for mechanical

[http://www.ecsa.co.za/documents/DSG\\_Mech.pdf](http://www.ecsa.co.za/documents/DSG_Mech.pdf)

- Branch specific guide for aeronautical

[http://www.ecsa.co.za/documents/DSG\\_Aero.pdf](http://www.ecsa.co.za/documents/DSG_Aero.pdf)



# Registration process for Candidate Engineer

- **Washington accord**
  - Certified proof that the applicant holds a recognised or accredited academic qualification
- **Non-Washington accord or non-accredited**
  - Certified copies must be submitted of the degree certificate as well as an academic record reflecting all the subjects taken and passed during all the years of study.
  - Detailed information of modules, content of each module, number of lectures, practicals, Project, names and qualifications of academic staff
  - Interview to assess if qualification is equivalent to SA accredited degree

# Registration for PrEng

- Lodge an application on prescribed forms
- Applications from persons holding accredited qualifications or qualifications recognised by ECSA in terms of the Washington Accord, will not be subjected to a detailed evaluation of their qualifications.
- It is a prerequisite, however, that they should at least have had **three years of post-qualification** training and experience before their applications will be considered.

# Process

- Consult policy statement R2/1A and [specified guidelines](#)
- Meticulously follow the [instructions](#)
- Complete and submit the [required forms](#)
- Checked by ECSA for completeness
- Assuming that an applicant's [qualification is recognised](#), the process of [evaluating](#) the applicant's training and experience starts
- Copies, varying between 15 and 20, are distributed amongst the members of the relevant Professional Advisory Committees ([PAC](#)).
- Since January 2001 all applicants are required to sit for a "[Professional Review](#)". This entails an interview with the applicant
- After the Professional Review the Panels [report back](#) to the PACs on their findings and the PACs decide on the [outcome of the application](#).

# Acceptable Engineering Work

- Acceptable Engineering Work for Candidate Engineers for Registration as Professional Engineers is described in **Policy Statement R2/1A**
- General rule is that candidate engineers for registration must demonstrate their professional development and competence
- **Take responsibility for registration – normally your employer is not doing it. Monitor yourself regularly and request specific tasks (the sooner the better)**
- Some employers have a C&U (Commitment and Undertaking)

# Essential Elements of Acceptable Practical Training (Section 5)

1. Problem investigation
2. Problem solution
3. Execution/Implementation

## 4. Responsibility

“The work must be aimed at **increasing** engineering and managerial responsibility until candidate engineers are clearly able to **accept professional responsibility** for taking engineering decisions. Part of their responsibility should also be to ensure that sufficient cognisance is taken of **economic considerations, social circumstances, environmental factors, quality assurance, safety and legal aspects as well as the code of professional conduct.**”

# Post-Qualification Practical Training

- “**Practical training**” means engineering experience gained **after** obtaining a recognized qualification in engineering
- Candidates should be **trained** in the application of **engineering principles** and **methods**
- Be given **progressively** more **responsibility**
- Until **capable** of **accepting professional responsibility** in making and **executing engineering decisions** at the level appropriate to a professional engineer

# Practical training

- Minimum is **three years**
- Anticipated that it will generally take **longer**
- In judging practical training:
  - **Nature** of practical training
  - **Standard** of practical training
  - **Variety** of practical training
- Knowledge of **Code of Conduct**
- Undertake Continuing Professional Development (**CPD**)

# Practical training

- **Recognition of advanced study**
  - Up to 12 months
- **Specialisation**
  - Attained knowledge in their field at least at the level of a masters degree
  - Minimum of 5 years (after bachelor degree)
- **Lectureship**
  - Consulting work
  - Research
  - Management of workshops
  - Minimum of 5 years (after bachelor degree)



# Supervision of Candidate Engineers

## INTERNAL MENTORSHIP

- Training supervised by a **PrEng** in the employing organisation

## EXTERNAL MENTORSHIP

- Through VA (Voluntary Organizations)
  - SA Inst of Mechanical Engineers
  - Aeronautical Society of SA

# Elements of Practical Training

- Fill in forms **A2.1** and **A4.1** after completion of **every task/job/training**
  - Form A2.1 **Training/Experience report**
  - Form A4.1 **Referee report**
- **Structure your experience/training**
  - Basic training (6 months)
  - Design
  - Management

# Basic training (6 months)

- In order to be able to take effective control of manufacturing, maintenance, operational or design functions, applicants must show evidence of practical experience after graduation of one or more of the functions leading to the outcomes listed below.
- The requirement for Basic Training stems from the need to understand how things are made, altered, constructed or operated before an engineer can reasonably be expected to execute or assume responsibility for the professional engineering function.
- In addition to the knowledge gained in terms of work processes at shop floor and / or operational level it is important for the engineer to understand the underlying sociological aspects of engineering in the work situation.

# Basic training

- The following are considered **outcomes** resulting from Basic Training and one or more aspects must be included.
  - The engineer must **understand the technical requirements of the various material forming and manufacturing techniques.**
  - The engineer **must understand how maintenance on plant and equipment is carried out. This would include the physical aspects of maintenance such as disassembly, removal, refurbishing and re-assembly as well as for instance the use of maintenance management systems.**
  - The engineer must understand the **requirements and effective implementation of the principles of plant operation and / or plant commissioning.**

# Basic training

- The following are **not** considered valid Basic Training for the purpose of registration through ECSA, although ECSA is mindful that these aspects of the training are important for the trainee's employer and will complement ECSA's requirements.
  - Training with the aim to **learn company procedures, practices and systems and the like.**
  - Training to **familiarize the trainee with the company's employed technologies, manufacturing processes, installed equipment and the like.**

# Basic training

- **An important outcome of this training period is to be able to distinguish between safe and unsafe work practices as well as between good and poor engineering practices.**
- This training period should last at **least six months** and may include **attendance of practical courses.**

# Design

- Design is the **core of mechanical engineering**.
- Applicants must show **evidence** of adequate training in this function through **verifiable work carried out in the analysis of problems and the synthesis of solutions**.
- Evidence is required in the form of a **report** (of approximately **10 to 15 pages**) **certified by the supervisor**.

# Design

- This report should describe a **sufficiently complex design** to demonstrate that applicants have had an opportunity to **apply their technical knowledge** and **engineering judgement** gained through **academic training** and **practical experience** in the design process, at a **sufficiently advanced level**.
- The following are considered the **expected outcomes** resulting from the training and must include the following:



# Design

The engineer must, in applying technical and scientific knowledge gained through academic training and its application have carried out all or some of the following

- Complete designs of a sufficiently complex nature:  
Examples of acceptable designs would include, but are not limited to the design of:
  - complex fluid systems which includes rotating or reciprocating machines, such as pumps, compressors and blowers.
  - complex machines/equipment or major parts thereof.
  - complex energy systems involving heat transfer.
  - complex pressure systems/HVAC systems.
  - complex structures.

# Design

- If designs are carried out using **commercial computer programs** the candidate engineer must demonstrate his or her understanding of the underlying assumptions of such programs as well as the theory behind program development.
- Examples of designs which are considered **not** sufficiently complex are the standard design of
  - pressure vessels, tanks, containers and the like.
  - simple structures such as supports and the like.
  - common air-conditioning, ventilation, or piping systems using commercial software.
  - stress analysis of components using commercial software without proper interpretation and recommendations.

# Design

- **Design review** of sufficiently complex design:
- **Acceptable complex design reviews** would include **reviews of major machine systems** such as **turbines/compressors** with their **auxiliary systems**, **power station systems** and their **major components**, **complex refrigeration systems** and the like.

# Design

## Problem solving (new!):

- This would mostly deal with investigating **failure or underperformance of major equipment or systems** and the **synthesis of implemented and proven solutions to avoid recurrence of the problem.**
- The engineer must, in carrying out the above, **apply professional engineering judgement to all work he or she does.** This would include, but would not be limited to, the ability to assess design work against the following criteria:
  - Conformance to specifications, design codes, and health and safety regulations.
  - Ease of fabrication and assembly.
  - Constructability.
  - Maintainability.
  - Conformance to environmental requirements.
  - Ergonomic considerations.
  - Life cycle costs.
  - Alternative solutions.

# Management

- The work of an engineer includes the integration of technical knowledge with control over manpower and finances and the management of time and materials. It is, therefore, important that the candidate engineer will have had sufficient opportunity to practice these activities.

# Management

- The following are considered outcomes resulting from this training period.
  - The candidate engineer must be able to estimate plan and control the use of resources, such as money, time, manpower and material.
  - The candidate engineer must be able to manage human resources and have sufficient knowledge of the Occupational Health and Safety Act to be able to ensure safety at the workplace of human resources under his or her control.
  - The candidate engineer must be able to integrate the work of multidisciplinary teams and to communicate clearly and unambiguously with such teams, all levels of management and other contacts.

# Responsibility

- As they progress through their training period, graduates must be given **increasing responsibility** for the **independent execution** of engineering work.
- CEs must satisfy ECSA that they have been able to deal adequately with such **increased responsibility** by having taken significant control of tasks.

# Form A2.1

- Date from to
- Employer's name and address
- Supervisor's name and address
- Supervisor's signature
- Description
  - Our Department was responsible for the design and development of brake system components
  - What is wrong with the above?



# Form A2.1

- 2000 words maximum report (form A2.1)
- ECSA wants to know what **YOU** did
- **Our** Department was responsible for the design and development of brake system components (**wrong**)
- Brake system components were developed (**wrong**)
- **I** was responsible for ..... (**correct**)

# Form A2.1

In the Training/Experience Report on each period (Form A2.1) you are expected to show how your engineering experience meets ECSA's requirements (see Policy Statement R2/1A and the Discipline Specific Guidelines). Cover, where applicable, such points as:

- Your responsibility in a task
- Your own contributions in a task
- Organogram with your position
- Objective of each major task
- Information base used
- Method of problem analysis
- Method of arriving at a solution
- Criteria used in evaluation
- Communication on a task
- Interaction with other disciplines
- Preparation of documentation
- Compliance with regulations
- Management of materials, machines, manpower, methods or money
- Handling of hazards and/or environmental aspects
- Completion of courses relevant to your profession.

# Other tips

- **Do not** attached large drawings in design
  - They are usually reduced to A4 and is then not readable
- Do not include **CFD/FEM results in colour** (is photocopied in black and white)
- Be **meticulous (professional)** in your application (read all the documents and know all the rules). **Don't do a rush job**
- Make sure you do the job of an **engineer** and **not a technician**
- Typing: do not use smaller than 12 font (people reading your applications are mostly >50 years and are reading it late at night – they can't see well)

# Acknowledgement

- A significant amount of information on these slides were copied and pasted from the documents listed on slide 8