ENGINEERING COUNCIL OF SOUTH AFRICA *Standards and Procedures System*			
Discipline-specific Training Guideline for Candidate Engineers in Mining Engineering			
Status: Approved by Registration Committee for Professional Engineers			
Document : R-05-MIN-PE	**Rev-1**	**12 March 2013**	

Background: ECSA Registration System Documents

The documents that define the Engineering Council of South Africa (ECSA) system for registration in professional categories are shown in **Figure 1** which also locates the current document.

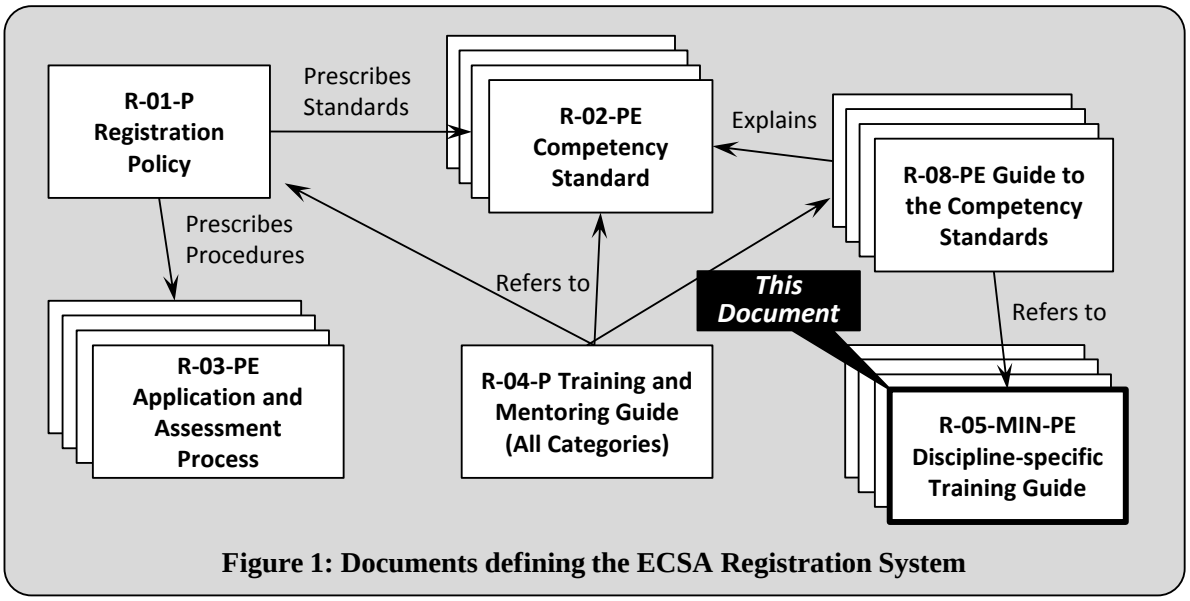


Figure 1: Documents defining the ECSA Registration System

1. Purpose

All persons applying for registration as Professional Engineers are expected to demonstrate the competencies specified in document **R-02-PE** at the prescribed level, irrespective of the trainee's discipline, through work performed by the applicant at the prescribed level of responsibility.

This document **R-02-PE** supplements the generic *Training and Mentoring Guide* **R-04-P** and *the Guide to the Competency Standards for Professional Engineers*, document **R-08-PE**. In document **R-04-P** attention is drawn to the following sections:

7.3.2 Duration of training and period working at level required for registration
7.3.3 Principles of planning training and experience
7.3.4 Progression of Training programme
7.3.5 Documenting Training and Experience
7.4 Demonstrating responsibility

The second document **R-08-P** provides both a high-level and outcome-by-outcome understanding of the competency standards as an essential basis for this discipline specific guide.

This Guide, as well as **R-04-P** and **R-08-PE**, are subordinate to the Policy on Registration, document **R-01-P**, the Competency Standard (**R-02-PE**) and the application process definition (**R-03-PE**).

2. Audience

This Guide is directed at Candidates and their Employers, Supervisors and Mentors in the discipline of Mining Engineering. It is also applicable to engineers who study in related sub-disciplines or practice areas but whose engineering work is primarily that of Mining Engineering and who wish to be assessed for professional registration based on their work/experience in the Mining Engineering environment.

This Guide is intended to support a programme of training and experience incorporating good practice elements and applies to persons who have:

- Completed the education requirements by obtaining an accredited BEng-type qualification, or a Washington-Accord Recognised qualification or through evaluation/assessment;
- Registered as Candidate Engineers; and
- Embarked on a process of acceptable training under a registered Commitment and Undertaking (C&U) with a Mentor guiding the professional development process at each stage.

3. Persons not Registered as a Candidate or not Training under a C&U

All applicants for registration must present the same evidence of competence and be assessed against the same standards, irrespective of the development path followed. Application for registration as a Professional Engineer is permitted without being registered as a Candidate Engineer or without training under a C&U. Mentorship and adequate supervision are however key factors in effective development to the level required for registration. A C&U indicates that the company is committed to mentorship and supervision and to make available the necessary resources to support the training and development of the Candidate or Engineer-in-Training.

If the trainee's Employer have not signed a C&U with ECSA, the trainee should establish the level of mentorship and supervision the employer is able to provide. In the absence of an internal mentor, the services of an external mentor should be secured. The Voluntary Association for the discipline should be consulted for assistance in locating an external mentor. A mentor should be in place at all stages of the development process.

This guide is written for the recent graduate who is training and gaining experience towards registration. Mature applicants for registration may apply the guide retrospectively to identify possible gaps in their development.

Any applicants who have not enjoyed mentorship are advised to request an experienced mentor (internal or external) to act as an application adviser while they prepare their application for registration.

The guide may be applied in the case of a person moving into a candidacy programme that is at a level below that required for registration (see section 7.3) at a later stage.

4. Mining Engineering (OFO 214600)

The Mining Engineer (ME) designs and prepares specifications for mineral-extraction (Mining) methodology, processes and systems and the management of the operation of Mining engineering processes for different types of mineral depositions and minerals.

4.1 Typical tasks performed by MEs

Typical tasks that a ME may perform, include but are not limited to one or more of the following:

- Conducting fundamental or operational research and advising on occupational health and safety and environmentally responsible mineral excavation methodology, processes and systems;
- Designing and specifying mineral excavation (production) processes, application of mining resources and mining technical support services required, occupational health, safety and environmental considerations and quality assurance;
- Establish production/operational control standards and procedures to ensure compliance with legislatory and site-specific requirements;
- Manage occupational health, safety and environmentally-related hazards and accompanying risks;
- Performing tests throughout the life-cycle stages and mineral excavation processes to determine the degree of control over variables identified during the strategic and tactical Mine Design and Planning processes;
- Develop an appropriate site-specific Risk Management Policy, Procedures and Standards (Codes of Practice);
- Prepare Pre-Feasibility and Feasibility Reports and Life-of-Mine Exploitation Strategies and Plans, Business Plans and Bankable Documents based on site-specific assumptions, premises, constrains and best practice standards e.g. SAMCODES (i.e. SAMREC and SAMVAL);
- Converting mineral resources into mineral reserves; and
- Education and Training of candidate Mining Engineering Practitioners.

4.2 Typical Practice Areas for MEs

Practicing MEs generally concentrate on one or more of the following practice areas:

- MEs Conducting Mineral Excavations/Mining Operations;
- Rock Engineers/Strata Control;
- Occupational Environmental Engineering and Hygiene;
- Mineral Asset Valuations (MAV);
- Research and Development;
- Mine Planning and Design;
- Education and Training of ME Practitioners; and
- Consultancy Work.

4.2.1 MEs conducting Mineral Excavations/Mining Operations

Those MEs whose training has been concerned predominantly with the production (mineral excavation) processes should obtain competency/experience in:-

1. **Production:** Mineral Excavation Processes including Occupational Health and Safety and Environmental Management.
2. **Production Programming and Scheduling:** To be captured in an appropriate Mining Plan.

3. **Project Work / Research and Development:**. To be covered in a project report.
4. **Mining Technical Services:** Work Study, Survey and Mineral Evaluation, Ventilation Engineering and Occupational Hygiene, Rock Mechanics, Strata Control, Mineral Benefication, Geology, Grade Control and Administration, Integrated Environmental Management.
5. **Supervisory Experience:** Miner/Rockbreaker, Shift Supervisor, Mine Overseer or equivalent and preferably Sub-ordinate Manager.
6. **Training and Development of MEs:** Lecturers at Tertiary Institutions, Supervisors and Mentors
7. **Consultancy work:** Specialist consultancy services in one or more of the ME practice areas.

4.2.2 Rock Engineers/Strata Control

Those MEs whose training has been concerned with Rock Engineering/Strata Control should obtain competency/experience in:-

1. **Production:** Mineral Excavation Processes including Occupational Health and Safety and Environmental Management.
2. **Production Programming and Scheduling:** To be recorded in an appropriate Mining Plan.
3. **Basic Mining processes and procedures:**Mineral Excavation Processes including Occupational Health and Safety, Support Installation and Rock Stability, Stability of Mining Excavations.
4. **Project Work / Research and Development:** To be covered in a Project Report
5. **Rock Mechanics Design:**Optimisation of mining layouts, Computer applications in Rock Mechanics, selection of occupationally safe Mining Methods, addressing OH&S-related Hazards and Risks and Stability of Mining Excavations.
6. **Supervision of Rock Mechanics:** Support installation in a supervisory capacity, e.g. Miner/Rockbreaker, Shift Supervisor / Mine Overseer equivalent Monitoring and Maintenance of Support Installations.
7. **Training and Development of REs and RMs:** Lecturers at Tertiary Institutions, Supervisors and Mentors
8. **Consultancy work:** Specialist consultancy services in one or more of the ME practice areas.

4.2.3 Occupational Environmental Engineering and Hygiene

Those MEs whose training has been concerned with the ventilation of mines and occupational hygiene should demonstrate that they have obtained competency/experience in: -

1. **Basic Mining:** Mineral excavation Processes including Occupational Health and Safety and Environment Management.
2. **Project Work/Research and Development:** To be covered in a Project Report
3. **Mine Environment Design & Specification:** Layouts, Refrigeration, Fan specifications, Airflow; Occupational Environment Control/Hygiene.
4. **Supervision of Ventilation:** Controlling and Monitoring of Dust, Air Control, Fumes and Gases in a section of a mine, Installation of Fans, Air Conditioners, Hazardous Substances and Pollution, etc.
5. **Installation:** Fans, Air Controls, Brattices, etc.
6. **Training and Development of Mine Environment Practitioners:** Lecturers at Tertiary Institutions, Supervisors and Mentors
7. **Consultancy work:** Specialist consultancy services in one or more of the ME practice areas.

4.2.4 Mineral Asset Valuations (MAV)

Those MEs whose training has been concerned with the evaluation of mineral deposits should obtain competency experience in: -

1. **Basic Mining:** Mineral Excavation Processes including Occupational Health and Safety and the Environment Management.
2. **Tonnage / Grade Estimates:** Sampling, Regression, Geostatistics, Kriging, Geology, Sedimentology on Evaluation process.
3. **Mine Planning and Design**: Impact of Mine layouts on the Evaluation Process, Rock Mechanics, HIRA.
4. **Survey:** Appreciation of survey techniques and interpretation of mine plans.
5. **Project Work /Research and Development:** To be covered in a Project Report
6. **Economic Evaluation:** Costs, Revenue, Pay Limits, Life of Mine calculations, Cash Flow Estimates, Return on investment, Pre-and Feasibility Studies, Bankable documents and Business Planning,
7. **Geology:** Appreciation of geological analysis techniques and interpretation of geological models.
8. **Training and Development of MAV practitioners:** Lecturers at Tertiary Institutions, Supervisors and Mentors
9. **Consultancy work:** Specialist consultancy services in one or more of the ME practice areas.

4.2.5 Research and Development

Candidates must undertake research and development work that is predominantly of a mining engineering nature, and this work must include an in-depth application of the various aspects of mining engineering principles. Candidates must be involved in improvement projects necessary for mining operational efficiencies. In addition applicants must develop the skills required to demonstrate the advanced use of mining engineering knowledge in mining business optimization.

1. Application of mining engineering principles in complex mine design problems
2. Use of applied Operations Research in Mineral Resources Management
3. Mine-to-mill or resource to market optimization
4. Decision analysis techniques

4.2.6 Mine Planning and Design

Those MEs whose training has been concerned with the Planning and Design of mines should develop competency/gain experience in:

1. Mineral resource to mineral reserve conversion
2. Mining value chain
3. Mine design criteria
4. Mining technical risk analysis
5. Production focasting
6. Public reporting requirements, compliance to Codes
7. Planning horizons and planning cycles
8. Multi criteria decision process and trade off studies
9. Planning integration
10. Mining business optimization
11. Mineral resource management
12. Value engineering

4.2.7 Education and Training of ME Practitioners

Those MEs whose Education and Training enables them to participate in the:

- The education of MEs candidate and/or specialist Candidate MEs;
- Perform the duties of Supervisors as set out in **R-04-P**; and
- Perform the duties of the Mentor as set out in **R-04-P**.

4.2.8 Consultancy Work

Those MEs whose Education, Training and/or Experience qualifies them as recognised specialists in a unique competency area to provide specialist consultancy services in one or more of the practice areas set out in **4.2.1** through **4.2.7** hereinbefore.

5. Training Implications of the Nature and Organisation of the Industry

MEs may be employed in both the private and public sector.

Typically in the private sector they would be involved in consulting, contracting, or in supplier or manufacturing organisations. ME consultants are responsible for planning, designing, documenting, and supervising the construction of projects on behalf of their clients. ME contractors are responsible for project implementation and activities include planning, construction, labour and resource management. Those working in supply or manufacturing companies could be involved in research and development, and would be involved in production, supply and quality control.

An extension of the public sector would include tertiary academic institutions and research organisations.

Depending on where the candidate is employed, there may be situations where the opportunuties in-house are not sufficiently diverse to develop all the competencies required in both Groups A and B noted in document **R-02-PE**. For example the opportunity for developing problem solving competence (including design or developing solutions) and for managing engineering activities may not both be available to the candidate. In such cases employers are encouraged to put a secondment system in place.

It has been fairly common practice that where an organisation is not able to provide training in certain areas, that secondments are arranged with other organisations so that the candidate is able develop all the competencies required for registration. Such secondments are usually of a reciprocal nature so both employers and their respective employees get the mutual benefit from the other party. Secondments between consultants and contractors, and between the public and private sector should be possible.

Problem solving in design, operational, construction and research environment is the core of ME. It is a logical thinking process that requires engineers to apply their minds diligently in bringing solutions to technically complex problems. This process involves the analysis of systems or assembly of mechanical components, and integration of various elements in mechanical engineering through the application of basic and engineering sciences.

5.1 Diversity of Mining

Owing to the diversity in application of Mining Engineering within the SA Mining Industry, Mining Engineers can follow a range of routes to registration across multiple minerals/commodities (e.g. precious metals, precious stones, ferrous metals, coal) in differing mining method environments (e.g. sur-

face mining, narrow tabular underground mining, massive underground mining) and underground coal mining.

These routes to registration usually cover, from graduation as a Candidate ME, a period of operational experience which leads to specialization in an application of mining engineering in a particular field or sector of the SA Mining Idustry. Typically these fields are: mining operations, mine planning and design, rock engineering/strata control, occupational environment engineering (ventilation), refrigeration engineering, techno-economic evaluation, equipment selection, establishment and maintenance of Mining infrastructure, provision of Mining consulting services and education and training of engineers-in-training.

Each field should have been covered but not necessarily all the supplementary elements mentioned after each heading. The objective should be that the ME has become a well-rounded Engineer.

5.2 Engineering Lifecycle Considerations. Mining projects follow the typical Mining Value Chain

The typical engineering industry lifecycle is depicted in **Figure 2** below:

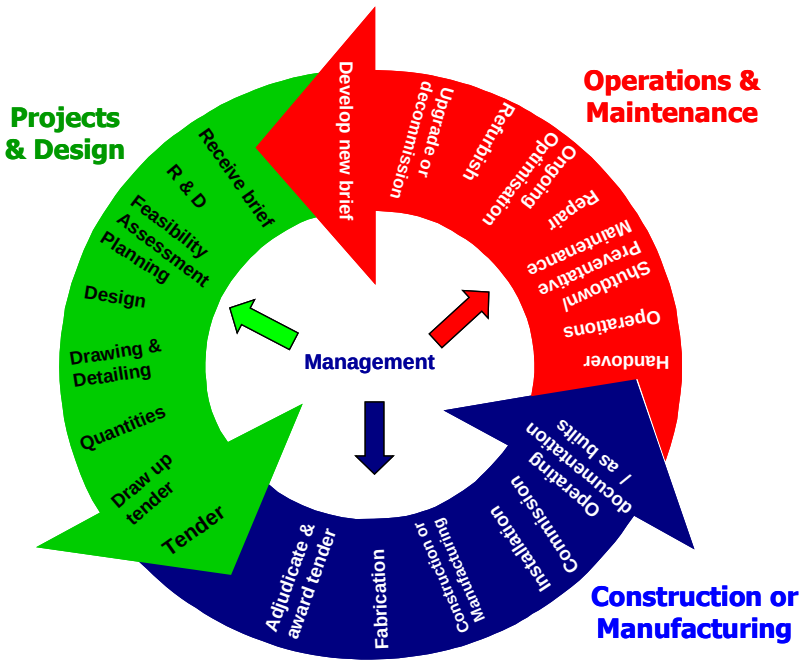


Figure 2: Typical Engineering Industry Life Cycle

MEs should demonstrate sufficient and appropriate exposure and experience across the elements of the typical Mining Value Chain set out in **Figure 3**.

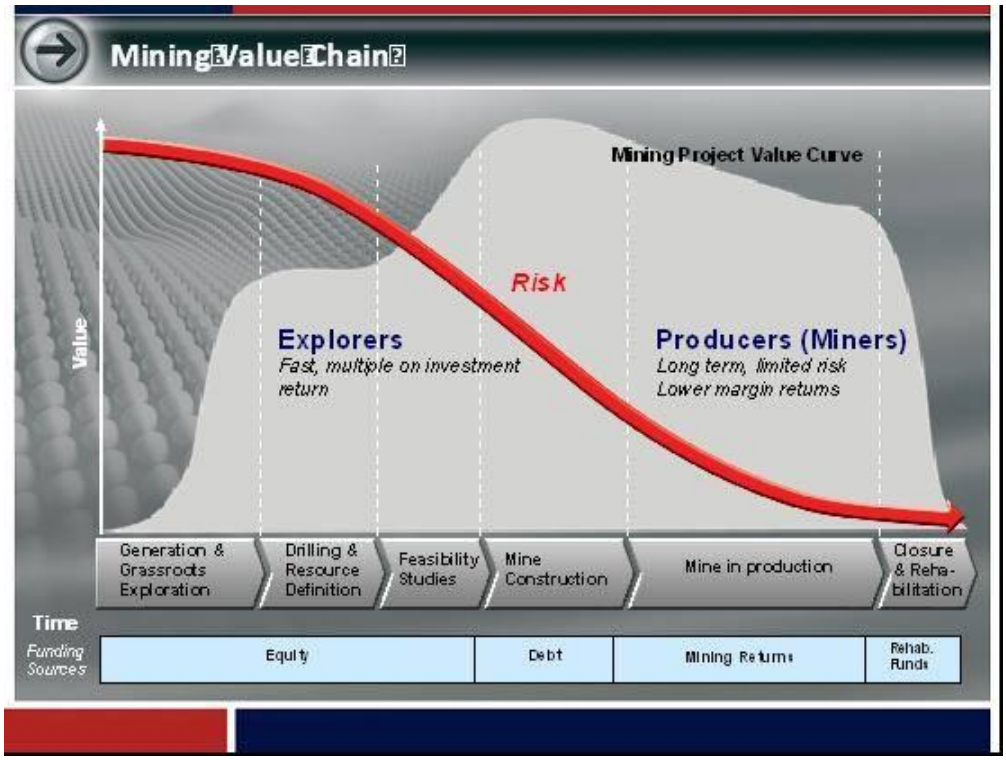


Figure 3: Typical Mining Value Chain

Specific appropriate exposure and/or experience should be demonstrated across the following five phases of the typical mining project life cycle.

- Project data collection and investigations;
- Evaluation Planning and Design;
- Construction and Mine Establishment;
- Mining Operations (Mineral excavation/exploitation);
- Mine Decommissioning and Closure.

6. Developing competency: Elaborating on sections in the Guide to the Competency Standards, document R-08-PE

Developing competency: Elaborating on sections in the Guide to the Competency

Applicants are required to demonstrate the insight and ability to use and interface various design aspects through verifiable work carried out in providing engineered and innovative solutions to practical problems experienced in their operating work environment. In addition applicants must develop the skills required to demonstrate the advanced use of ME knowledge in optimizing the efficiency of operations.

Applicants must show evidence of adequate training in these activities through complex project work carried out in the analysis of problems and the synthesis of solutions.

Applicants need to demonstrate that they have had an opportunity to apply their technical knowledge and engineering expertise gained through university education and practical work experience. In applying technical and scientific knowledge gained through academic training, the applicant must also demonstrate the financial and economic benefits of engineered solutions, synthesized from scientific and engineering principles at a sufficiently advanced level.

What is a sufficiently complex engineering problem?

We can summarise the definition of *complex* in *complex engineering problems* as follows:

> "Composed of many ***inter-related conditions***; requiring ***first principle empirical judgment*** to create a solution within a set of ***originally undefined circumstances***"

Candidate Engineers must obtain experience in solving a variety of problems in their work environment, and the solution to these problems should also involve the use of fundamental and advanced ME knowledge obtained at university. The problems that require scientific and engineering approach in solving them may be encountered in any engineering work environment that consists of integrated engineering systems, equipment, machinery and mining infrastructure. From their early training years, candidates must actively seek opportunities to obtain experience in the area of synthesizing solutions to real life engineering problems encountered at the workplace.

Candidates are encouraged to familiarise themselves with the Mining and Minerals Sector in general by reading journals, joining relevant professional associations and attending conferences. This includes gaining knowledge of industry standards and specifications.

6.1 Contextual Knowledge

Candidates are expected to be aware of the requirements of the engineering profession. The Voluntary Associations applicable to the ME and their functions and services to members, for example, provide a broad range of contextual knowledge for the Candidate Engineer through the full career path of the registered Engineer.

Across all these routes to registration, ME in training should demonstrate appropriate exposure and experience in:

- Mineral Excavation processes;
- Mine Planning and design;
- Project execution;
- Research and Development
- Supervision and Management;
- Technical and Financial valuation;
- Occupational Health and Safety and Environmental Management; and

This should be done in one or more of the following sub-sectors/contexts of the SA Mining Industry:

- U/G Narrow Tabular Hard Rock;
- U/G Massive Hard Rock;
- U/G Coal Mining; and
- Surface Mining inclusive of Open Pits, Open Cast and Quarrying operations.

6.2 Functions Performed

Special considerations in the discipline, sub-discipline or speciality must be given to the competencies specified in the following learning outcome groupings:

A: Knowledge based problem solving (this should be a strong focus)
B: Management and Communication
C: Identifying and mitigating the impacts of engineering activity
D: Judgement and responsibility
E: Independent learning

It is very useful to measure the progression of the candidate's competency by making use of the Degree of Responsibility, Problem Solving and Engineering Activity scales as specified in the relevant documentation. The degrees of responsibility defined in document **R-04-P**, Table 4, are used here (and in the Training and Experience Report):

A: Being Exposed	B: Assisting	C: Participating	D: Contributing	E: Performing

Degree of responsibility E means performing at the level required for registration. This corresponds to the range statement in outcome 10 in the Competency Standard **R-02-PE** which requires that the applicant to display responsibility "for the outcomes of significant parts of one or more complex engineering activities".

It should be noted that the Candidate working at Responsibility level E carries the responsibility appropriate to that of a registered person except that the Candidate's supervisor is accountable for the Candidates recommendations and decisions.

6.3 Industry-related statutory requirements

Candidates are expected to have a working knowledge of at least the following relevant mining-related legislation and how they affect their working environment:

- ECSA – Engineering Profession Act, 2000, (Act No. 46 of 2000)' its Rules and the Code of Conduct;
- Labour Relations Act;
- Environment Conservation Act, 1989 (Act No. 73 of 1989), as amended by Act No. 52 of 1994 and Act No. 50 of 2003;
- Water Services Act 1997 (Act No. 108 of 1997);
- National Water Act 1998 (Act No. 36 of 1998);
- Mine Health and Safety Act. 1996 (Act No. 29 of 1996) and Minerals Act and Regulations 1991 (Act 50/1991);
- Mandatory Codes of Practice;
- SANS and other relevant Mining-related Standards;
- Chief Inspector of Mines, Directives/Instructions; and
- Guidelines issued by the Chief Inspector of Mines.

Candidates are also expected to have in-depth knowledge of at least the following site/mine-specific mining-related standards/requirements:

- Hazard Identification and Risk Assessments (HIRA/HAZOP);
- Occupational health and Safety Risk Management Programme;
- Managerial Instructions;
- Mine/Site-specific Standards Procedures;
- List of Recorded significant OH&S-related Risks;
- Working Guides; and
- Relevant Original Equipment Manufacturer's (OEM's) Specifications.

6.4 Recommended Formal Learning Activities

Candidates may find many of the following recommended formal learning activities, which is by no means extensive, useful in developing the required competencies:

- Formally registered CPD courses;
- Project Management (basic);
- Value Engineering;
- Negotiation Skills;
- Engineering Finance;
- Hazard Identification and Risk Assessment (HIRA, HAZOP);
- Quality Systems;
- Environmental Impacts;
- Management;
- Report Writing;
- Planning methodology and technique;
- Public speaking; and
- Systems Engineering.

7. Programme Structure and Sequencing

7.1 Best-practice programmes

Since professional development programmes (PDPs) should primarily be outcomes-based, there is no ideal (prescribed) training programme structure or a unique sequencing that constitutes best practice.

The training programme for each candidate will consequently depend on the work opportunities available at the time for the employer to assign to the candidate.

It is suggested that the candidate works with their mentors to determine appropriate projects to gain the necessary exposure and experience needed to comply with the desired ELOs. A regular reporting structure with suitable recording of evidence of achievment against the competency outcomes and responisbility need to be put in place.

The training programme should be such that the candidate progresses through levels of work capability, which is described in 7.3.4 of **R-04-P**, such that by the end of the training period, the candidate must perform individually and as a team member at the level of problem solving and engineering activity required for registration and exhibit at the degree of responsibility E.

Depending on the nature and extent of the engineering-related work undertaken by an Employer, it should be possible to develop candidate-specific PDPs which will provide opportunities to undertake the necessary exposure/experience in a phased approach described in **APPENDIX 1**. This guidance should be read in conjunction with sections hereinbefore.

APPENDIX 2 lists the recommended Training Elements up to the third level as prescribed by the Quality Council for Trades and Occupations (QCTO).

7.2 Orientation requirements

- Introduction to Company;
- Company OH&S requirements;
- Company Code of Conduct;
- Company Staff Code and Regulations;
- Typical functions and activities;
- Hands on experience and orientation in each of the major company divisions; and
- Overall Mining Operations and Mining-related facilities.

7.3 Realities

This section should be read in conjunction with 5.1 hereinbefore.

Generally, no matter the discipline, it is unlikely that the period of training and development will be less than three years the minimum period prescribed by ECSA. The length of the candidates' individual PDP will be determined, amongst others, by Recognition of Prior Learning (RPL) and the availability of opportunities in the actual work situation.

It should also be appreciated that the envisaged individual PDPs' period of 3 years would most probably only accommodate exposure to experience in one of the following sub-sectors/specialisation practice areas:

- U/G Thin Tabular Hard rock operations;
- U/G Massive Hard Rock operations;
- U/G Coal mining; and
- Surface Mining.

In the case of candidates specialising in practice areas referred to in 4.2.2 through 4.2.8, the recommended period for the candidate-specific PDP is 5 years.

Should the Employer require exposure to/experience in more than the initial sub-sector/specialisation practice area, this would have to be addressed through a supplementary PDP.

7.4 Considerations for generalists, specialists, researchers and academics

This section to be read in conjunction with 5.1 hereinbefore.

Section 10 of document **R-08-PE** adequately describes what would be expected of persons whose formative development has not followed a conventional path, for example academics, researchers, and specialists.

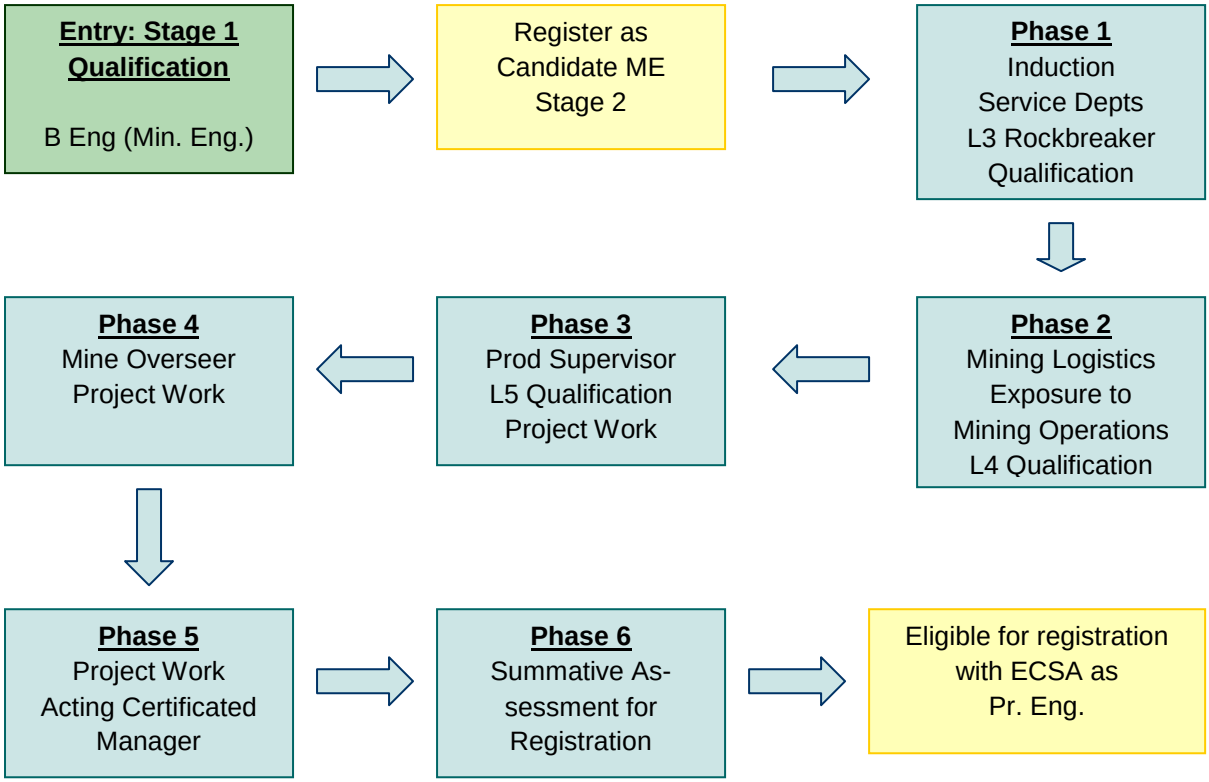
The overriding consideration is that, irrespective of the route followed, the applicant must provide evidence of competence against the prescribed standard.

7.5 Moving into or changing Candidacy Training Programme

This Guide assumes that the candidate enters a programme after graduation and continues with the programme until ready to submit an application for registration. It also assumes that the candidate is supervised and mentored by persons who meet the requirements in document **R-04-P** section 7.2. In the case of a person changing from one candidacy programme to another or moving into a candidacy programme from a less structured environment, it is essential that the following steps be completed:

- The candidate must complete the Training and Experience Summary (TES) and Training and Experience Reports (TER) for the previous programme or unstructured experience. In the latter case it is important to reconstruct the experience as accurately as possible. The TERs must be signed off.
- On entering the new programme, the Mentor and Supervisor should review the candidate's development in the light of the past experience and opportunities and requirements of the new programme and plan at least the next phase of the candidate's programme.

Appendix 1: Phased approach for PDPs



Appendix 2: Training Elements

	Occupational tasks	Occupational contexts	Work ex-perience	Scope of WE
1	Solving problems based on engineering and contextual knowledge			
1.1		Conceptualisation of complex engineering problems		
1.1.1			Receive brief	
1.1.2			Investigate/evaluate requirements	
1.1.3			Develop preliminary solutions	
1.1.4			Justify the preliminary design	
1.2		Design or development processes for complex engineering problems		
1.2.1			Detailed design or development processes	
1.2.2			Documentation development for Implementing Complex Engineering Solutions	
2	Implementing or operating engineering projects, systems, products or processes			
2.1		Planning processes for Implementation or Operations		
2.1.1			Develop business and stakeholder relationships	
2.1.2			Scope and plan	
2.2		Organising processes for Implementation or Operations		
2.2.1				Manage resources
2.2.2			Optimisation of resources and processes	
2.3		Controlling processes for Implementation or Operations		
2.3.1			Monitor progress and delivery	
2.3.2			Monitor quality	
2.4		Close out Processes for Implementation or Operations		
2.4.1			Commissioning processes	
2.4.2			Development of operational documentation	
2.4.3			Handover processes	
2.5		Maintenance and repair processes		
2.5.1			Maintenance planning and scheduling	
2.5.2			Monitor quality	
2.5.3			Oversee repairs and/or implement remedial processes	
3	Risk and Impact Mitigation			
3.1		Impact and risk assessments		
3.1.1			Impact assessments	
3.1.2			Risk assessments	
3.2		Regulatory compliance processes		
3.2.1			Health and Safety	
3.2.2			Legal and regulatory	
4	Managing Engineering Activities			
4.1		Self Management Processes		
4.1.1			Manage own activities	
4.1.2			Communicates effectively	
4.2		Team environment		
4.2.1			Participate in and contribute to team planning activities	
4.2.2			Manage people	
4.3		Professional communication and relationships		
4.3.1			Establish and maintain professional and business relationships	
4.3.2			Communicates effectively	
4.4		Exercising Judgement and Taking Responsibility		
4.4.1			Ethical practices	
4.4.2			Exercise sound judgement in the course of complex engineering activities	
4.4.3			Be responsible for decision making on part or all of complex engineering activities	
4.5		Competency development		
4.5.1			Plan own development strategy	
4.5.2			Construct initial professional development record	

NOTE: The Phases of the PDP and Training Elements is work in progress.

Revision History

Version	Date	Revised/Approved by	Nature of Revision
Rev 0: Concept A	2011-Nov-01	Dr Gordon Smith	Drafting of point 3
Rev 0: Concept B	2012-Jul-02	HH	New Draft of template
Rev 0: Concept C	2012-Sep-18	PAC (Mining)	New Draft of template
Rev 0: Concept D	2012-Oct-29	PAC (Mining)	Standard section 1-3 inserted. Formatting.
Rev 0: Concept E	2013-Feb-22	PAC (Mining)	Total review/editing of document
Rev 1	12 Mar 2013	Registration Committee for Professional Engineers	