



Revision Date: 31 August 2023

Rock Engineering Certificate Practical Examination Guideline – 2023

1. Introduction

These guidelines are drawn up to determine the ability of the candidate to operate in his/her expected field of expertise. The candidate should have completed his/her three theoretical subjects (Papers 1, 2, 3) in previously written examination sittings as stated by the examination rules before registering for the Rock Engineering Practical Examination. The Practical Examination comprises the portfolio review and the planning sections.

The Minerals Council “Chamber of Mines Rock Engineering Certificate” Practical Evaluation is regarded as the final evaluation of a candidate’s ability to practice as a Rock Engineer in his/her area or field of expertise.

Currently, the term “Rock Engineer” is an accepted South African mining industry qualification recognised by the MHSA / government and industry of a person capable of practising in South Africa. It is thus the duty of the SANIRE Council and the SANIRE Examinations Committee, in collaboration with the Minerals Council, to ensure that all candidates are properly assessed to ensure that the industry is supplied with suitably qualified expertise. As the evaluation can only test a small percentage or section of the candidate’s ability, both mentors and examiners must ensure that the candidate is adequately experienced before the assessment. The evaluation of the candidate thus strongly rests on the opinion formed of the candidate’s record of learning (portfolio) and his mentor’s views.

In order to ensure that we have an appropriate process in place which addresses the needs of all our members, SANIRE has launched the new online electronic practical examination registration portal via our website. This will cater for the registration of the Rock Engineering practical examinations. The system's intent is to ensure that SANIRE can administer the registration process to ensure that any potential irregularities are ruled out as far as practically possible. The practical exams will be coordinated at central venues to cater to the needs of all candidates within their branch areas.

The evaluation will not only focus on rock engineering but on the add-on qualities and requirements of an everyday rock engineer. The evaluation will test the candidate’s ability to integrate all competencies and skills to derive an optimum solution to rock engineering challenges.

These may include:

- **Basic mining knowledge.** A competent Rock Engineer understands mining constraints i.e. cleaning, ventilation, people, etc.
- **Financial costing.** Candidates need to have a sense of the costs involved and their impact on the overall production costs. Part of a Rock Engineer's function is to ensure a safe, and economic design.
- **Problem-solving nature.** The candidate must show strong analytical and problem-solving skills. An example will be the analysis of accidents which may result in changes to standards and procedures.
- **Practical Solutions.** A competent Rock Engineer must combine both theoretical approaches, engineering judgement, experience gained, learnings from other sites, benchmarking against similar operations, etc. to develop practical solutions to daily mining challenges.
- **Literacy skills.** As the Rock Engineer communicates both verbally and via written reports, these skills must be properly assessed. The ability to provide clear communication of recommendations is an integral part of rock engineering. Examples may be report writing which is essential for fatal inquiries and everyday duties. Where the candidate supplies detailed reports in his/her portfolio and not just a summary, these reports can assist to measure and evaluate the candidate's abilities and literacy skills.
- **People management.** More than 80% of a rock engineer's work relates to communication with management, production officials and company representatives as well as colleagues.
- **Relationship management.** Ability to tout ideas and more importantly practical solutions, and to convince the mining personnel to implement his/her recommendations.

The evaluation will cover the concepts required in solving practical problems and design challenges that occur routinely in practice.

2. Hosting of a Rock Engineering Practical Examination

The following shall apply:

- The Rock Engineering practical exams will be coordinated and hosted by the SANIRE Council's Education Committee.
- Rock Engineers and Mines are not permitted to host exams without the involvement of the SANIRE Council and the relative exams committee portfolio holder. The practice of not involving the SANIRE Council's Education Committee, will render the examination null and void, and will therefore not be recognised by SANIRE.

President: Kevin LeBron

Secretariat: Mines Professional Associations' Secretariat (MPAS)

Revision Date: 31 August 2023

- Approved costs with respect to the hosting of the practical examination may be claimed from SANIRE Council within limits.
- Examinations will be held twice annually in May and October, barring any unforeseen circumstances (or the nearest available date).

3. Examination Costs

The following shall apply:

- The registration process and fees payable will be managed through SANIRE's Education Fund by SANIRE's Administrators.
- Cost of R1000 per candidate per examination attempt (no refunds) for a SANIRE members.
- Cost of R2000 per candidate per examination attempt (no refunds) for non-SANIRE members.

4. Registration Process

When registering for the practical assessment, candidates must apply to sit for the examination via the SANIRE website prior to the closing date for the given examination. Such examination dates will be set by SANIRE Council and communicated via the SANIRE website www.sanire.co.za and/or other relevant channels.

The full registration process comprising 5 steps to apply for the Rock Engineering Practical Examination is detailed in Figure 1 below:

President: Kevin LeBron

Secretariat: Mines Professional Associations' Secretariat (MPAS)

Revision Date: 31 August 2023

Rock Engineering Practical Registration Process

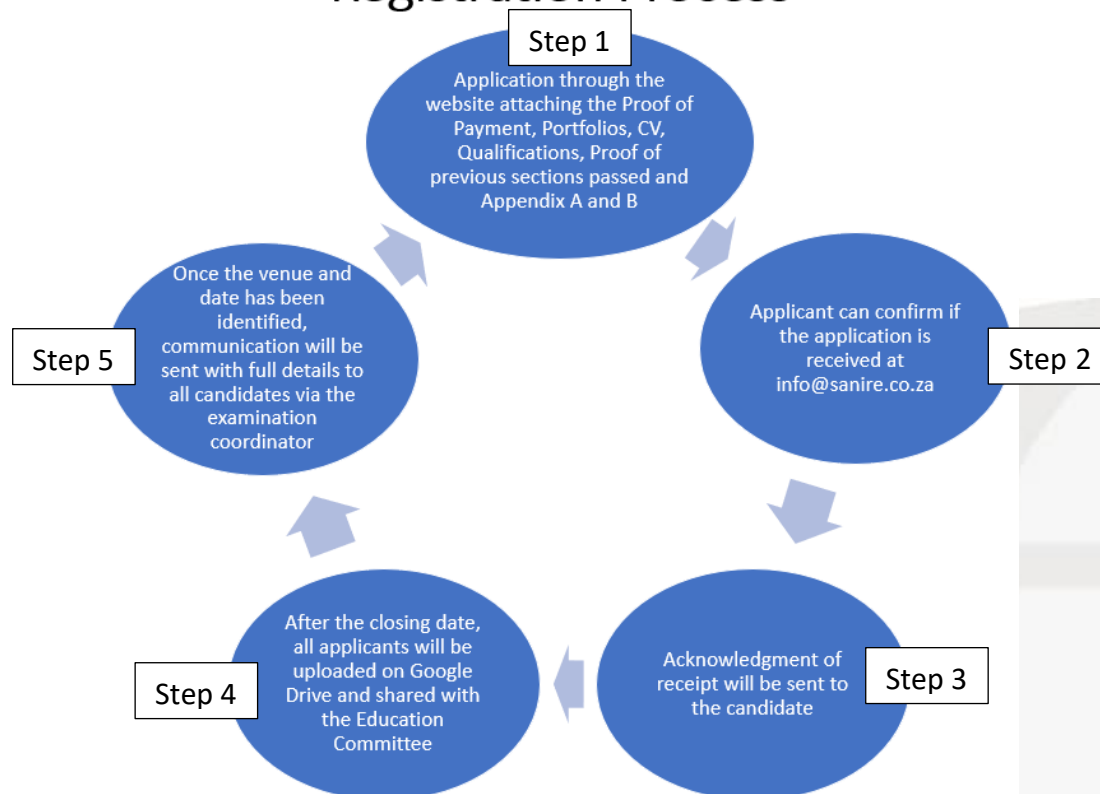


Figure 1: 5 step application for the Rock Engineering Practical Examination

4.1. Registration Process – Step 1

Candidates must apply via the SANIRE website, ensuring that the application includes all relevant documentation together with the proof of payment. Banking details and costs of the examination are displayed on the application web page.

President: Kevin LeBron

Secretariat: Mines Professional Associations' Secretariat (MPAS)

Revision Date: 31 August 2023

List of relevant documentation that must be included as part of the formal application via the website:

- CV (Curriculum Vitae) of applicant/candidate
- Certificates / qualifications of applicant / candidate
- Proof of passing all 3 Theory Examinations for the given commodity of the practical examination of which is being applied for
- Portfolio of Evidence – Three (3) Projects with accompanying project outlines.
- The date of the exam will be set at least two months before the exam.
- Valid proof of payment for the practical examination
- Appendix A – Mentor’s Report (not more than 6 months old)
- Appendix B – Plagiarism Declaration

Please note:

For uploads must be according to the following naming conventions:

- The name must start with either a letter or number.
- Make sure that the name does not contain: exclamation marks (!), bracket ([]), quotation mark ("), apostrophe ('), forward slash (/), backslash (\), colon (:), and vertical bar (|), percent sign (%), tilde (~), semicolon (;), question mark (?), or an at sign (@).
- The file name may contain any uppercase or lowercase characters (file names aren't case-sensitive).
- The file name may contain spaces.

File extension types allowed:

- Portable Document Format (.pdf)

Note – all submitted files must be in .pdf format.

President: Kevin LeBron

Secretariat: Mines Professional Associations’ Secretariat (MPAS)

Revision Date: 31 August 2023

The information required under the project outline (200 – 400 words) must include the rock engineering responsibilities and duties of the candidate during the particular project as well as a full summary of the project.

4.2. Registration Process – Step 2 (Optional but advised)

Following the online registration by the candidate, a follow up may be made by the candidate to confirm the submission of the examination application. Such queries should be directed to the SANIRE Council secretary.

4.3. Registration Process – Step 3

Acknowledgement of receipt of the candidate's application to the Rock Engineering Practical examination will be provided by the SANIRE Council Secretary to the candidate within three (3) working days.

Should candidates not receive confirmation within the given timeframe, it is the responsibility of the candidate to follow up with the SANIRE Council Secretary. Applications not received before the deadline for whatever reason, will be classified as unsuccessful.

The SANIRE Council Secretary will keep and distribute an updated list of registrations on behalf of the Rock Engineering examination committee.

4.4. Registration Process – Step 4

Following the completion of Steps 1 to 3 above, the SANIRE Council Secretary will share the final candidate list via the **Google Drive** (link to be sent) with the Rock Engineering Practical Education Committee.

4.5. Registration Process – Step 5

The Education Committee will then arrange a suitable venue to host the candidates and ensure that letters of admission are sent to successfully registered candidates providing full details regarding the examination arrangements. If deemed necessary, remote online examinations may be conducted in place of face-to-face examinations.

President: Kevin LeBron

Secretariat: Mines Professional Associations' Secretariat (MPAS)

Revision Date: 31 August 2023

5. Portfolio of Evidence Projects

The portfolio of evidence to be submitted with the application must comprise three (3) technical project reports. The projects will provide the examiner with a good representation of the candidate's rock engineering ability.

The purpose of the assessment is "to assess the candidate's ability to practice as an independent rock engineer" as required by the MHSR regulation 14.1(8).

The intent of the assessment is for the candidate's professional peers (assisted by independent assessors if required) to evaluate the following competencies:

- Written communication.
- Verbal communication.
- Logical and analytical thinking.
- Relate theory to practice.
- Identify rock-related risks, analyse, and quantify associated risks and propose suitable recommendations to address the hazards and risks.
- Defend and/or justify analysis, decisions, and recommendations.

The three (3) technical project reports, relevant to the commodity and at the technical level of a Rock Engineering Practitioner, as written to your mine management or supervisor, within the past twenty-four (24) months. These reports should be in the same format as your employer/company normally uses.

The three (3) project reports may cover a range of the following potential topics, but should include design aspects:

- Rock-related incident or accident investigation (which must be a proper report and not a tick-box checklist or group work, including a back analysis of the main causes).
- Geotechnical site investigations, analysis of data, assessment of geotechnical risks, and recommendations based on the stability evaluation.
- Mine design or layouts, preferably including some numerical modelling.
- Monitoring of rock mass behaviour or support performance with detailed analysis of data (note: back-analysis of the support performance or predicted/modelled rock mass

President: Kevin LeBron

Secretariat: Mines Professional Associations' Secretariat (MPAS)

Revision Date: 31 August 2023

behaviour vs measured should be included – merely presenting a data collection and analysis report does not constitute a complete project report if it does not contain any design aspects).

- Geotechnical/rock property investigation and/or analysis (a candidate must be able to show how this information is used as part of a geotechnical design process – merely presenting a data collection and analysis report does not constitute a complete project report if it does not contain any design aspects).
- Support design / investigation / testing / analysis.
- Risk assessment (may not be tick box documents or group work) - a candidate must be able to show how this information is used as part of the geotechnical design process.

A description of the candidate's mine, mining method, support, etc. (relating to each report) should be included.

What the examiners are looking for is a variety of reports, which candidates can explain/defend. The reports must contain a problem statement, analysis of the situation / technical data, (e.g. numerical modelling and calculations) as well as conclusions and recommendations. Reports should vary between eight (8) and a maximum of twenty (20) pages and should not exceed 3MB in size. *Do not submit more than one version of a specific type of report* (e.g. modelling reports, geotechnical investigations) and refrain from submitting group work (such as issue-based risk assessments), company template forms (e.g. fall of ground template report) and purely geological reports (core logging or mapping).

As per the online registration, candidates must briefly summarize the project reports as well as list specific rock engineering functions, duties, and responsibilities for each project. Should you fail to adequately supply this information, the Education Committee or representative thereof may recommend that an additional project be handed in for evaluation prior to the oral evaluation date.

Please note: Where the Education Committee or representative thereof is not convinced by the candidate's necessary experience, an additional project report may be requested on selected topics eight to twenty (8 – 20 pages).

Each portfolio report must have a signed declaration at the end that states that the portfolio was the candidate's own, unaided work. No portfolio report will be accepted if not reviewed and the declaration is not signed off by a suitable Mentor.

President: Kevin LeBron

Secretariat: Mines Professional Associations' Secretariat (MPAS)

Revision Date: 31 August 2023

6. Planning Section of the Practical Examination

Planning sessions will be arranged according to the mining method/commodity as follows:

- Part 4.1 = Metalliferous (this will comprise 2 parts i.e. narrow tabular + bord and pillar)
- Part 4.2 = Coal (this will comprise of two parts i.e. surface and underground)
- Part 4.3 = Massive Mining
- Part 4.4 = Surface Mining

The nature of the particular planning sessions may vary for different commodities, but assessors should strive to ensure continuity in the assessment format.

7. Marking of Examinations

Only mark-based systems will be allowed, with the portfolio review and planning sessions carrying equal weighting. As in the recent past, the recommended pass mark for the assessment (and the individual sections) **is at least 80%. It is up to the examiners to determine the pass mark, but should not be less than 60% and not more than 80%.** Candidates need to pass both sections to pass the assessment.

Examiners reviewing the portfolios of evidence require additional time between the receipt of portfolios and the actual assessment date. Review and critique of each candidate's portfolio require many hours if it is to be done properly. A four (4) week period must be allowed for.

Candidates who passed one section of the assessment (i.e. either the portfolio review or one or more of the planning sessions) would not be required to repeat that section at subsequent assessments. This will however require the Education Committee to keep records of candidates' performance.

Each portfolio examiner will evaluate every report individually using a standard template (Appendix C) provided by the Education Committee. The results for the reports are to be submitted to the Education Committee within a week after the examination.

An average period of two (2) hours should be allowed for each assessment session (i.e. portfolio as well as planning sessions), even if this means that additional assessments need to be held.

Where the candidate is examined by two (2) or more examiners, the examiners must on completion of the test supply a mark (i.e. 59%) to the Education Committee. The set of examiners for each section **must unanimously agree on the candidate's marks and in case of a pass,** that the candidate has demonstrated the minimum standard of knowledge required to practice as a rock engineer in industry. **Competencies will form the basis of mark allocation i.e. the candidate's**

President: Kevin LeBron

Secretariat: Mines Professional Associations' Secretariat (MPAS)

Revision Date: 31 August 2023

portfolio of evidence must show that he/she is competent in specific tasks e.g. data gathering, geotechnical mine layout/slope design, support design, use of numerical modelling, geotechnical risk assessment, defining clear and concise problem statement and practical, clear and concise recommendations, etc.

The following will apply as far as practically possible:

1. Examiners from the commodity type and mining method will examine candidates from those same commodity types and mining methods e.g. open pit candidates will be examined by open pit certificate holders, etc.
2. A Senior Examiner and/or Moderator will be appointed for each examination, who will oversee the examinations to ensure fairness, impartiality and consistency.
3. All the examiners and moderators must sign-off each examination, before submitting the results to the SANIRE Council Education Committee, via the portfolio holder.
4. Where the examiners and moderators cannot agree on a single mark for the candidate, the examiners will leave the judgment up to the Education Committee who will have the final say. The coordinator may re-interview the candidate while assessing the candidate's portfolio should it be required, based on his findings the coordinator will have the final vote on the candidate's end result. The pass rate for the full exam will be guided by the recommended pass mark decided upon by examiners before the examination. The results are final, and no changes or re-evaluations/re-marks will be allowed.
5. The results will be released to the candidate by SANIRE Council Secretary within two (2) weeks from the date of the examination.

7.1. Perusal of Examinations

The exam scripts may be perused at a time and the venue communicated on the date of the release of the marks. No communications and inquiries will be entertained after the perusal. The purpose of allowing perusal will be to gain insight into the mistakes made and better prepare for the next round.

8. Responsibilities

8.1. Chair

President: Kevin LeBron

Secretariat: Mines Professional Associations' Secretariat (MPAS)

Revision Date: 31 August 2023

South African National Institute of Rock Engineering (SANIRE) appoints the Chair of the Education and the Examinations Committee as being the holder of the SANIRE Council's Education Portfolio. The Chair of Education is elected, delegated and replaced according to the constitution of SANIRE.

Roles and responsibilities:

- The Chair of Education is neither an examiner nor a moderator.
- The Chair of Education, via Council, sets and modifies governing rules of examination for the competency assessment of candidate RE practitioners.
- The Chair of Education, via the Examinations Committee, sets the examination schedule and key dates for all examinations in consultation with the SANIRE council and Minerals Council.
- The Chair of Education, via the administration team, can check application credentials for acceptance or otherwise. Queries may be levelled at Sponsors / Mentors. Correspondence may be entered into if deemed justified. The Chair of Education may consult with examination committee members or SANIRE Council members.
- The Chair of Education resolves discrepancies / differences of opinion between examiners and moderators as well as any other examination-related issues that may arise.
- The Chair of Education authorises final marks and results for distribution to all candidates.
- The Chair of Education may withhold or withdraw marks based on discrepancies that may occur until such time that the issues are appropriately resolved.

The Chair of Education is not remunerated for his / her efforts.

8.2. Education Committee

The following shall apply:

- The SANIRE Education Portfolio Holder will call for the examination before the date of the exam.
- The SANIRE Education Portfolio Holder is responsible for adding the event to the website.
- Members of the committee must assist the SANIRE Education Portfolio Holder with a suitable venue for the examination.
- Before the examination, the SANIRE Education Portfolio Holder must appoint an Exams Committee who will be responsible for setting the examination. The Exams Committee must comprise people with suitable experience for the mining method/commodity (metalliferous / coal/surface mining / massive mining) and be holders of the COM / Minerals Council Rock Mechanics Certificate with a minimum of five (5) years of experience in the specific mining area being tested or COM / Minerals Council Advanced Rock Mechanics Certificate.

President: Kevin LeBron

Secretariat: Mines Professional Associations' Secretariat (MPAS)

Revision Date: 31 August 2023

- Examiners qualified according to a specific mining method/commodity may only examine candidates who are attempting the examination of the same mining method.
- The Exams Committee may only utilize non-certificated Rock Engineering individuals with the day-to-day Practical Examination arrangements. They are not allowed to be examiners.
- During the setting of the planning session examination, the exam is to be moderated by all members of the exams committee to check relevance and level.
- On the day of the examination, examiners are to be paired up such that there are a minimum of two (2) examiners that examine a candidate at a time for any section(s) of the examination.
- Candidates must not be examined by examiners of the same company or where a conflict of interest may exist.
- The examiners will be expected to conduct themselves in a professional manner during any stage of the evaluation. The examiner must exercise good judgment and make every effort to encourage a positive and constructive evaluation. The examiners will be expected to keep notes for later feedback to identify focus areas for future development.
- The examiners can during the preparation of the oral evaluation, use the submitted portfolio as an aid in their preparation for the candidate's evaluation. The proper evaluation of the candidate's portfolio with the examiners' comments is an integral part of the candidate evaluation.

After each assessment session, the assessment coordinator Education Committee or representative thereof must:

- Distribute the list of assessment results, showing on the final mark and Pass/Fail, to all candidates, examiners, mentors, and the Education Committee members.
- Provide each candidate and his/her mentor with a confidential breakdown of marks per assessment area, as well as useful comments relating to the candidate's performance.
- The breakdown of marks per question and performance comments must NOT be made available in the public domain but may be made available to the relevant portfolio review assessor on request (together with the comments and shortcomings noted on individual reports) prior to the next assessment session.

8.3. Candidates

President: Kevin LeBron

Secretariat: Mines Professional Associations' Secretariat (MPAS)

Revision Date: 31 August 2023

The following shall apply:

- Successfully register for the examination on time.
- Keep in contact with the branch regarding the examination.
- Be well prepared for the examination.
- Do not be late for the examination. Candidates who are late without a valid reason will not be allowed to attempt the examination; will forfeit their examination (including the examination fee) and only be able to attempt the following practical examination following full re-application.
- Candidates are to bring a copy of their portfolios for themselves for the portfolio section of the examination.
- Candidates are to bring their stationery for the examination.
- Candidates are responsible for their own safety during the examination.
- Any concerns about the examination must be brought forward to the Education Committee within the following two (2) working days of the examination.
- To attempt a maximum of two (2) times per year and only one attempt per six (6) months.
- Ensure that any work not conducted by the candidate in the portfolio project reports is appropriately referenced as such.
- It is the candidates' responsibility to ensure that their examination fees are paid and received by the administrative body before the cut-off registration date of the examination.

9. Plagiarism or Dishonesty

Any plagiarism or dishonesty will bar a candidate from further examination for a period of up to two (2) years. This includes attempts to take examinations without having registered and paid for it. Such occurrences must be elevated in writing to the Education Committee Portfolio Holder (Chair) which must then be taken to the Examination Committee for review/investigation. Each candidate must fill in and submit the Plagiarism declaration (Appendix B) as part of registration. All mentors and candidates will be required to sign plagiarism declarations at the end of all reports submitted as part of the portfolio.

President: Kevin LeBron

Secretariat: Mines Professional Associations' Secretariat (MPAS)

Revision Date: 31 August 2023