



Department of Minerals and Energy  
Mine Health and Safety  
The Mine Surveyor's Certificate of Competency examinations

**SYLLABUS  
TRIAL SURVEY**

**Framed in accordance with Regulation 28.6 in force in terms of  
Schedule 4 of the Mine Health and Safety Act (Act 29 of 1996) as amended**

29 March 2006

Every candidate shall be required to perform a survey of a portion of a mining property and from such survey to compile a plan on draughting material.

All survey work, calculations, and the plan drawn therefrom, shall –

- Include the necessary checks to eliminate errors and ensure the required accuracy and standards.
- Be within the allowable limits of error as is prescribed in the regulations.
- Be done in accordance with the specifications, conventions and standards laid down in the regulations.

**PROJECT REPORT**

A report of approximately two pages is required in which an overview of the trial survey project as a whole is given. This report should contain short notes on the following subjects:

- Planning of the Project.
- Reconnaissance of the chosen terrain.
- Sketches, survey routes, observed rays, etc. (if not indicated in field- or calculation books).
- Instruments and equipment used.
- Measuring and calculation of the base line (corrections applied).
- Other aspects of the survey which may be of interest such as the Resection, Triangulation, Survey and Level Traverse methods used for the location and description of features and other detail of the terrain, Tachometric survey, etc.
- Reductions and Calculations in connection with above (error figure, closing errors and corrections/adjustments).

- Time spent on the various aspects of the Project.
- Labour.
- Problems encountered.
- Any other interesting features or comments on the Project.

The Report must be submitted together with all the Field Book(s), Calculation Book(s) and Plan.

Marks will be given for the Report to a Maximum of 10% of the total Trial Survey marks.

#### **REQUIREMENTS FOR THE SURVEY:**

- Area – approximately (ten) 10 hectares.
- Objects: the piece of ground chosen shall contain sufficient of the surface detail found on a mine to make the plan interesting e.g. buildings, roads, railways, dumps, slimes dams, hostels, shafts, trenches and launders.
- Each candidate shall establish his own base line. It must not be less than 150 meters in length and the direction must be determined by trigonometric observations.
- The co-ordinates and elevation of one end must be determined by triangulation from at least three (3) trigonometrical or recognised established survey beacons. Use must be made of an error figure and a direction sheet to select the final co-ordinates of this point.
- At least two (2) survey points must be established from the above base line, or the extension of the base line, by triangulation or trilateration.
- One additional point must be co-ordinated by resection using the above-established point together with trigonometrical or other beacons. An error figure and direction sheet are required.
- At least six (6) of the tache stations, reasonably distributed around the area chosen, must be fixed by means of traverse, the elevations of which must be obtained by trigonometrical heighting. These elevations must be checked by means of a closed-level survey.
- A sufficient number of ground elevations must be established by means of a tachometric survey so that at least 50% of the area covered by the plan has contour lines.
- The allowable error in elevation of these check points shall be, at most, 0.02% of the length between them. Elevations of such points to be shown on the plan thus:
  - 229.086 (level)
  - 229.090 (Trig)
- The traverse must start at one end of the base line and close at the point fixed by resection. If the closure so obtained is not within the limits of error

as laid down for class C surveys of the Land Survey Act, Act No.9 of 1927 as amended, the traverse should be adjusted using a recognised method.

- An EDM may be used for the tachometry and the traverse, provided it is checked against the base line as set out by taping. The EDM should be calibrated against the base line. All distances should be reduced to mean sea level and the trigonometric heighting should be corrected for curvature and refraction.
- The method used to locate surface objects is left to the discretion of the candidate but it should be unmistakably recorded in the field book.

#### **REQUIREMENTS FOR THE PLAN:**

- The scale of the Plan must be 1:500
- It must be drawn by hand in accordance with Chapter 17 of the Regulations of the Mine Health and Safety Act, 1996 (Act 29 of 1996), as amended, and in accordance the Regulation 17(4)(e).
- It shall incorporate a sworn statement to the effect that the plan has been compiled by the candidate from his own original field notes and calculations.
- Computer Aided Draughting (CAD) and data recording (Dataloggers) are not allowed.

#### **PLAN, FIELD NOTES AND CALCULATIONS:**

- The original field notes and calculations used in compiling the plan must be submitted with the plan. These notes and calculations shall contain no erasures. Any mistakes must be neatly crossed out.
- The field notes, calculations and plan shall become the property of the Commission of Examiners and will not be returned.

#### **CHECK SURVEY:**

The Commission of Examiners reserves the right to ask any candidate, within a reasonable time after the submission of his plan, to show them the area of ground surveyed so that, if deemed necessary, a check survey may be made.

#### **CAUTION:**

Every candidate must conduct their own independent trial survey and no other candidates may knowingly use the same base line and specific area for their trial survey.