

DRAFT TANZANIA STANDARDS

TBS/MMDC 2 (5178) P3 Glossary of mining terms- part 1: Surveying

TANZANIA BUREAU OF STANDARDS

Glossary of Mining terms.

Part 1: Surveying

Foreword

This draft Tanzania Standard is being prepared by the Mining Technical Committee (MMDC 2), under the supervision of the Mining and Minerals Standards Divisional Committee (MMDC).

This draft Tanzania Standard consists of the following parts, under the general title Glossary of Mining terms:

Part 1: Surveying.

Part 2: Boring and exploration.

Part 3: Drilling and blasting.

Part 4: Ventilation

Part 5: Shafts and associated equipment.

Part 6: Transport.

Part 7: Drainage.

Part 8: Strata control.

Part 9: Geology.

Part 10: Winning and working.

Part 11: Electrical engineering and lighting.

In preparation of this draft Tanzania standard assistance was derived from Indian national standard IS 15838:2008 Mining – Glossary of terms and British standard BS 3618-1:1969 Glossary of mining terms, Part 1: Planning and surveying

Scope

This part of draft Tanzania standard covers the definition of terms used in mining industry in connection with mine surveying.

Terms and definitions

For the purposes of this draft Tanzania standard, the following definitions apply to the terms related to mine surveying.

- 1.1 **Abandonment Plans** — Up-to-date plans, drawings and sections of the abandoned mines submitted to the concerned Government departments or institutions dealing with mines within the specified period of the abandonment of the mine.

- 1.2 **Abney clinometer** — A hand held instrument for measuring inclinations.
- 1.3 **Abney Level** — See 'Abney clinometer'
- 1.4 **Alignment** — The process of moving the head of an angle measuring instrument laterally until the vertical axes lies in the produced vertical plane common to two plumb lines.
- 1.5 **Anaglyph** — A map so drawn in two colours that a three-dimensional picture is obtained when seen through a special viewing device.
- 1.6 **Arbitrary Line** — A reference line, the direction of which does not necessarily coincide with cardinal direction.
- 1.7 **Assumed North** — A direction assumed to be north for reference purposes.
- 1.8 **Auxiliary Telescope** — A telescope, fitted parallel to the main telescope of angle measuring instrument for measuring and setting out horizontal and vertical angle where the main telescope cannot be used.
- 1.9 **Azimuth of a Line** — The angle measured clockwise from the northerly direction of the geographic meridian to the direction of the line.
- 1.10 **Barrier** — Mineral or ground left unworked so as to separate workings from each other or from a natural hazard.
- 1.11 **Baseline**
- a) A line established underground, usually in an area where ground movement is negligible, the length and bearing of which is determined with precision. Such lines are used for the control of traverses through unstable areas where it is impossible to establish permanent surveying stations, or
 - b) A line, the horizontal length of which has been determined with great precision. Such lines are used to control the linear scale of a triangulation system.
- 1.12 **Base Plate** — A metal plate used to provide a stable measuring point of a temporary nature.
- 1.13 **Borehole Map** — A map prepared from holes usually drilled on a square grid pattern for investigation of a target mining area giving their number, hole collar elevation, thickness of overburden/waste and deposit, elevation of top/hanging wall or floor/foot wall of individual deposits.
- 1.14 **Borehole Survey**
- a) A survey to obtain technical, geological, physical and mineralogical information above the strata intersected by a borehole, or
 - b) A survey to Ascertain the amount and direction of deviation of axis of a borehole from the vertical.
- 1.15 **Bore Journal** — A tabular record of the characteristics and thicknesses of strata intersected by a borehole log.

- 1.16 Boundary** — The limit of working of a mine.
- 1.17 Cautionary zone** — A zone in which source of danger can be found such as unworked coal lies at or less than a specified distance from unconsolidated deposits.
- 1.18 Catalogue of abandoned mines** — A record of plans of abandoned mines which gives the location of the workings, the minerals worked, the custodian of the plans, and references as to the approximate extent of the workings within specified six inch ordnance sheets.
- 1.19 Centre Line (of roadway)** — A line marked on the roof of a roadway to indicate the direction of the central axis of the roadway.
- 1.20 Chainman** — An assistant to a surveyor.
- 1.21 Check Survey** — A survey made to confirm the positions of established survey stations and main roadways in the mine.
- 1.22 Closure plan** — see 'Abandonment plan'.
- 1.23 Colliery surveyor** — A surveyor appointed to carry out surveying work and to prepare plans and sections of a mine, but who is not the surveyor for the mine.
- 1.24 Compressed Air Distribution Plan** — A plan showing the position and details of compressed air equipment and air lines in a mine.
- 1.25 Compressed Air Plan** — See 'Compressed Air Distribution Plan'.
- 1.26 Continuous Azimuth Method** — A method of traversing by which the azimuth of the survey lines is obtained from the instrument.
- 1.27 Co-planning** — See 'Alignment'.
- 1.28 Correlation** — The process of establishing true relationship between surface and underground surveys with reference to the local grid.
- 1.29 Density (of Seams)** — An indication of the spacing of seams in the strata; the seam density is said to be high if the seams are close together, or low if they are widely separated. The ratio of the sum of the thickness of a number of adjacent seams to the thickness of an arbitrarily chosen sequence of strata.
- 1.30 Development Plan** — A plan showing the proposed development of the mine workings, and kept for operational purposes.
- 1.31 Disused Workings** — Workings which are no longer in operation but which are not classified as abandoned.
- 1.32 Double Setting** — A Leveling procedure whereby observations are duplicated by resetting the instrument to detect errors of measurement immediately.
- 1.33 Draft** — A survey line in a traverse.

- 1.34 Dust Sampling Plan** — A plan required by law, showing the zones in a mine from which samples of deposited dust are collected and the area of such deposited dust identified for their adequate treatment.
- 1.35 Dual setting** — See 'Double Setting'.
- 1.36 Easting** — The easterly component of a local grid co-ordinates.
- 1.37 Electrical Plan** — The plan required by law, which shows the required locations and information of cables, light fittings, telephones, large haulages, etc., on the master plan.
- 1.38 Electronic level** — A precise levelling instrument in which a pendulous device (bubble or pendulum) forms part of an electrical alternating current bridge. The deviation from vertical is indicated on a millimeter.
- 1.39 Electronic Distance Meter (EDM)** — An electronic device capable of measuring distances quickly and accurately based on emission of the invisible infrared light pulses. The device can be mounted on a standard theodolite to facilitate angle measurement as well.
- 1.40 Electronic Theodolite Intersection System (ETIS)** — Combination of two or more electronic theodolites linked to an online computer with associated hardware and suitable software, used for determination of non-contact three dimensional coordinates in real time with very high accuracy and suitable for monitoring the deformation of underground openings, slope hanging walls and slope stability.
- 1.41 Electronic Total Station (ETS)** — A fully integrated electronic device capable of measuring distances, angles, automatic survey data recording and reducing them to three dimensional co-ordinates quickly and accurately. Setting out in the field can also be performed by the instrument.
- 1.42 Fire-Fighting Plan** — A plan required by law, which shows location of mine workings of all water lines, taps, fire stations, pumping stations, ventilation system, escape routes, firefighting equipment, fire proof zones, fire stoppings, compressed air lines, etc.
- 1.43 Floor Station** — A survey station secured in the floor of a mine roadway or working face.
- 1.44 Geographic or True North** — The northerly direction of the geographic meridian at any terrestrial point.
- 1.45 Geological Map** — A plan prepared of an area on a suitable contour interval wherein different geological formations with their geological succession, structural features, other geological features and contour are indicated.
- 1.46 Global Positioning System (GPS)** — An all weather and worldwide satellite based system which provides three-dimensional position accurately, used in open cast mines for excavation monitoring, vehicle tracking or dispatch system, Heavy Earth Moving Machinery control etc. It is used in various survey activities. However, it cannot be used in underground mines.
- 1.47 Grade Lines** — Lines which define the intended grade of a roadway which is being driven (such lines are used to control the gradient of a roadway).

- 1.48 Graphic section** — A drawing which shows the sequence of strata.
- 1.49 Gyroscopic compass** — An instrument which indicates the direction of geographic true north, using the properties of a rapidly rotating mass, one of whose axes is constrained by the earth's gravitational field (this instrument has been developed in its most precise form for application in correlation and true north determination).
- 1.50 Gyroscopic theodolite** — See 'gyroscopic compass'.
- 1.51 Holding** — A mineral bearing area which a mine is permitted to work.
- 1.52 Holing** — The meeting of two roadways driven expressly to intersect each other.
- 1.53 Improved dial** — A miner's dial in which a telescope replaces the usual sighting vanes.
- 1.54 Isoclinic lines** — Imaginary lines joining places on the earth's surface at which magnetic dip is same.
- 1.55 Isogonic Lines** — Imaginary lines joining places on the earth's surface whose declinations are equal at any given time.
- 1.56 Isopachytes** — Lines drawn on a map showing equal vertical thicknesses of a stratum or strata.
- 1.57 Lamp Cup** — A means for supporting a flame safety lamp on a tripod to provide a sight for surveying.
- 1.58 Laser Indicator** — A light projector with a laser device which forms a narrow directed beam of red light used for assigning the direction to the underground mine working.
- 1.59 Laser Profiler** — An instrument based on pulse laser technology for measuring distances and three dimensional co-ordinates without any reflector to most types of surfaces including earth, coal rock and vegetation. It can be used in slope monitoring of an open cast mine benches and also in OB dumps monitoring.
- 1.60 Layover tracing** — A tracing on which the workings in a seam shown. A series of such tracings allows the workings in several seams to be seen in their correct horizontal relationship.
- 1.61 Leg** — See 'Draft'.
- 1.62 Legend of Strata** — A drawing which shows the sequence of strata.
- 1.63 Linesman** — An assistant to a surveyor.
- 1.64 Local grid** — A network composed of two sets of uniformly spaced parallel lines, usually intersecting at right angles and forming squares, superimposed on a map, chart, or aerial photograph, to permit identification of ground locations by means of a system of coordinates and to facilitate computation of direction and distance.
- 1.65 Local grid coordinates** — Co-ordinates, referred to the Local Grid, which are specified in metres and consist of two components, an Easting and a Northing

- 1.66 Loose-Needle Traversing** — A method of traversing in which the magnetic bearings of survey lines are separately obtained by using a magnetic dial.
- 1.67 Magnetic Correlation** — The orientation of an underground survey with respect to surface survey using a magnetic compass or dial.
- 1.68 Mask** — A screen, usually made of tracing cloth, to subdue and diffuse the light behind a plumb line or other sighted object.
- 1.69 Meridian Indicator** — See “Gyroscopic compass”.
- 1.70 Mine Plan** — The plan required by law, which shows all the current workings, disused or abandoned workings within a stipulated zone adjacent to the boundaries of the mine.
- 1.71 Miner’s Dial** — A surveying instrument for measuring and setting out angles, bearings and determined magnetic north.
- 1.72 Mine Surveyors** — A surveyor recognized by laws, appointed and responsible for carrying out surveying and levelling works and preparation of plans, drawings and sections of a mine.
- 1.73 Mining Theodolite** — A theodolite having particular features of a design which make it suitable as an underground surveying instrument.
- 1.74 Northing** — Northerly component of a Local Coal Grid Co-ordinates.
- 1.75 Optical Centering Device** — An optical device which enables a theodolite to be accurately positioned over or under a survey station.
- 1.76 Optical Plummet** — An optical device, survey instrument to be accurately positioned over or under a survey station.
- 1.77 Overlay Tracing** — See ‘Layover tracing’.
- 1.78 Pilot Bob** — The weight attached to a shaft plumb line for the purpose of lowering the line down the shaft.
- 1.79 Project Plans** — A series of plans of a proposed new mining project or reconstruction which are drawn up for the purpose of examination and approval of the project.
- 1.80 Pumping Plan** — A plan which shows, in addition to the workings of a mine and the seam contours, the position of pumps, dams and waterlogged areas.
- 1.81 Quarterly Survey** — An underground survey required by law to be undertaken at least once every three months for the purpose of bringing the working plans and other plans up-to-date.
- 1.82 Reconstruction** — Reorganization of the existing mine workings and facilities to improve its efficiency and/or increase output.
- 1.83 Reserves** — The quantity of mineral which is calculated to lie within given boundaries. Depending on the degree of assurance of their existence, they are divided into proved and probable reserves.

- 1.84 Rodman** — see 'Chainman'.
- 1.85 Roof Station** — A survey station fixed in the roof of a mine roadway or working face.
- 1.86 Schmidt Apparatus** — Apparatus used to determine the position of rest of a freely swinging shaft plumb line.
- 1.87 Seam Contour** — A contour drawn on a plan joining points on the floor or top of a seam, which have the same level with reference to a prescribed datum.
- 1.88 Shaft Plumbing** — The suspension of plumb lines in a shaft for the purpose of orientation or for shaft surveying.
- 1.89 Shaft Section** — A drawing or log giving details of the structure and the nature of strata intersected by a shaft.
- 1.90 Shaft Survey** — A detailed survey of vertical shafts in successive stages to determine misalignment or axial distortion and displacement of shaft walls due to rock pressure. A survey conducted to maintain verticality of shafts in course of sinking or to measure depths of shafts.
- 1.91 Sight lines** — The plumb lines, hung from the roof of a mine roadway, used for controlling the direction in which the roadway is driven.
- 1.92 Sketch plan** — A plan required to be posted in covered accommodation at the mine, which shows telephone stations, means of egress from the workings to the surface, and the main roads.
- 1.93 Spad** — A means of marking an underground survey station, which consists of a flat spike in which a hole is drilled for the threading a plumb line.
- 1.94 Spud** — See 'spad'.
- 1.95 Stage Plumbing** — A precise method of orienting underground workings in which plumb lines are transferred down a deep shaft in stages of 120-185 m. While shaft sinking is in progress, the lines can also be employed to orient the shaft itself and to keep it plumb.
- 1.96 Stone-Dust Plan** — A plan maintained at the coal mines showing different zones into which the mine has divided for the purpose of treatment of coal dust with stone dust or any other incombustible material.
- 1.97 Straight Edge Levelling** — A system of levelling using a straight edge and a spirit level in places which are too steep for the convenient use of conventional instruments.
- 1.98 Stretcher Bar** — A telescopic bar used to support survey Instrument when the inclination of the roadway (and sometimes its width) does not permit the use of a tripod.
- 1.99 Subsidiary Survey** — An underground survey made to determine the position of a face line or goaf line or some other specific feature.
- 1.100 Supplementary Plans** — Plans which may be required by law to show in greater detail information not easily depicted on the working plans.

- 1.101 Surface Plan** — A plan of the surface layout of a mine.
- 1.102 Take** — See 'Holding'.
- 1.103 Telescopic Dial** — A miner's dial in which a telescope replaces the usual sighting vanes.
- 1.104 Traverse** — A series of consecutive lines whose lengths and directions are known. In an open traverse, the lines are continuous but do not return to the starting point while in a closed traverse the lines return to the starting point making a complete circuit.
- 1.105 Unconsolidated Surface Deposits** — Surface deposits, such as moss, peat, sand, gravel, silt or mud.
- 1.106 Ventilation Plan** — A plan required by law, which shows the system of ventilation in a mine and the means of controlling them, besides the other information as required by law.
- 1.107 Verification survey** — see 'Check survey'.
- 1.108 Warning Lines** — The lines required to be marked on working plans as to indicate the limit beyond which workings should not extend (means that any advance beyond that line will bring the workings within a distance of 120 meters of the body of water or such greater distance as maybe fixed by the mine authority).
- 1.109 Weisbach Triangle** — The highly attenuated triangle formed by the plan position of two shaft plumb lines and one observation station.
- 1.110 Weiss Quadrilateral** — The quadrilateral formed by the plan position of two shaft plumb lines and one observation stations.
- 1.111 Working plan** — The plan required by law, which shows all the current, disused or abandoned workings within the boundaries of the mine and within a stipulated zone adjacent thereto.
- 1.112 Zenith and Nadir Plummet** — An easy to use instrument for defining plumb plane very accurately used for maintaining verticality of a deep shaft during sinking, transfer of three-dimensional coordinates to underground working in correlation and other upwards and downwards plumbing operations. Latest development in the instrument is automatic zenith and nadir laser plummet.