

DUTIES & RESPONSIBILITIES OF SURVEYORS

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- Surveying duties directly linked to the MSHA are measurements required for accident scenes; monitoring surveys for fluid concentrations, slope stability, subsidence and pillar over- or undermining; high-risk and hazard plans; boundary verification; mine plan updates; and correlating the surface topography with the underground surveys for each level of the mine. The following requirements of Chapters 14 and 17 of the Regulations [5] necessitate specific mine survey input:

- Chapter 14 is concerned with protection of the surface and the workings, ingress of water or other fluid material into workings and risks, such as rock falls, subsidence, cavities and collapse of surface structures at mines. The role of the mine surveyor includes the surveying, monitoring and reporting of these risks to management;

- Chapter 17 of the Regulations deals with the statutory duties of mine surveyors with respect to the appointment of the competent surveyor; general practice relating to accuracy and standards for field surveys, map projection and survey systems, processing of survey data and mapping at mines; safety precautions, procedures and reporting of risks requiring survey input; detailed requirements for the compilation, updating and submission of statutory mine plans and departmental copies; and the survey issues relating to mine closure.

- All physical survey measurements that are taken or observed in the workplace need to be processed in one way or another. Most of the measurements required for the survey function on a mine require error propagation and calculation of accurate coordinates and heights in relation to the survey datum. Health and safety survey measurements, such as monitoring pillar over- or undermining, require additional calculations, such as safety factors, extraction factors and width-to-height ratios. Coordinates and elevations are also the base data for further processing of areas, volumes and mineral reserve reconciliations.

- As is the case with data processing, mapping is normally done electronically using specialised mapping software.
- The mapping duties include the updating of statutory maps, other plans and sections as required by the MHSA (e.g. mine rescue and ventilation plans), the compilation of reticulation plans, rehabilitation design plans, infrastructure plans and check survey plans.

- ◉ Mine surveyors must also give input to the compilation and implementation of COP (Code of Practice). In this regard, they are involved with the installation and management of monitoring systems designed to combat rock falls. Another COP which requires survey input is that for the ingress of water into mine workings.
- ◉ It is also standard practice to have a stand-alone survey COP with detailed operating procedures to guide all survey duties on a particular mine.

- Another important duty is to observe the mine plans for the identification of risks, such as subsidence, collapse of surface buildings and structures resulting from the removal of support, and risks related to mining in the proximity of other underground workings. To ensure that the surveyor knows which parts of the mine to monitor, the MHSa requires the employer to notify the surveyor appointed as competent person of all working mining faces, surface structures affected by mining, workings being abandoned and safety pillars that are being or have been removed.

- In addition to on-mine reporting protocols, the Regulations (Chapter 23) include a guideline document on the reporting of accidents and dangerous occurrences. Other statutes of relevance to mine surveyors include separate guideline documents on the compilation of COP.

- A further duty is the observation and management of the mine boundary lines and pillars. The mine surveyor must indicate boundary pillars on the mine plan, follow instructions from the mine manager and communicate events on both sides of the boundary line. When working faces approach the boundary pillar, the surveyor must give adequate warning and continuously monitor the situation.

- The mine surveyor also gives input to the rehabilitation plan and has to investigate community complaints registered at the mine. Examples of such input and investigation would include the survey of ground movement in the form of cracks, subsidence and sinkholes by establishing the distance from the mine, correlating the incident with the surface and underground mine workings and establishing the scale of the problem.

COAL MINES REGULATION, 1957

- ◉ 49. Duties and responsibilities of surveyors -
 - (1) The surveyor shall -
 - ◉ (a) make such accurate surveys and levellings, and prepare such plans and sections and tracings thereof, as the manager may direct or as may be required by the Act or by the regulations or orders made thereunder, and shall sign the plans, sections and tracings and date his signature; and
 - ◉ (b) be responsible for the accuracy of any plan and section, or tracings thereof that has been prepared and signed by him.

- (2) The surveyor shall record in a bound-paged book kept for the purpose -
- (a) the full facts when workings of the mine have approached to about 75 metres from the mine boundary, or from disused or waterlogged workings;
- (b) any doubts which may exist concerning the accuracy of the plans and sections prepared under these regulations; and
- (c) any other matter relating to the preparation of the plans and sections that he may like to bring to the notice of the manager.

- Every entry in the book shall be signed and dated by the surveyor and countersigned and dated by the manager : 1[Provided that where in any mine two or more surveyors are employed, each of the surveyors shall make the entries aforesaid in respect of the workings in his jurisdiction or of the plans and sections in his charge].
- (3) Nothing in sub-regulation (2) shall absolve the owner, agent or manager of his responsibility under the Act and under these regulations or orders made thereunder.

THICK SEAM WORKING

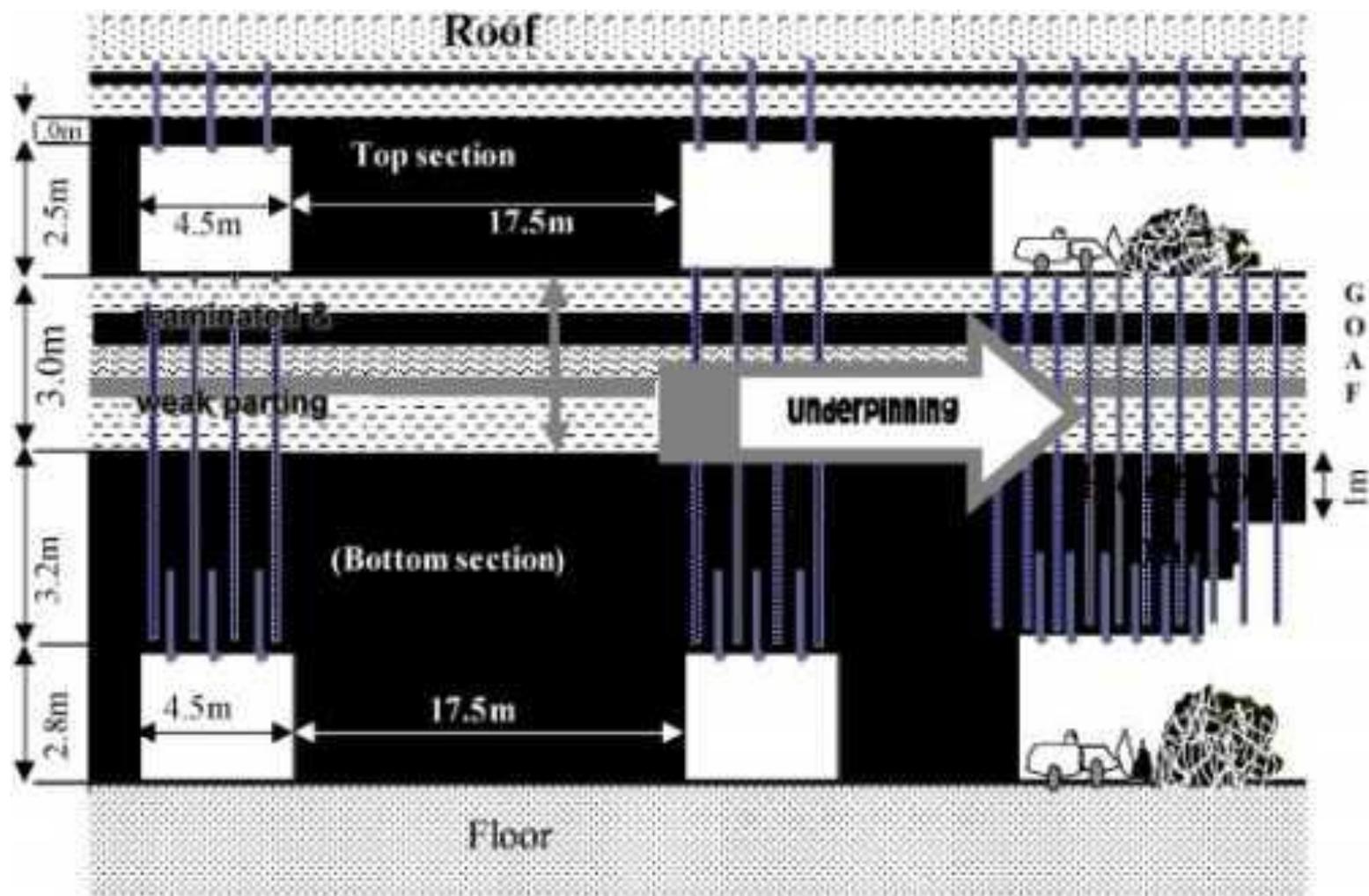
- As per the Coal mines regulations (CMR 1957) no work in a higher seam or section can be done over an area in a lower seam or section which may collapse. Further as any two coal seams or two sections within the same coal seam which are within 9 m from each other are called as contiguous seams/sections. In such contiguous workings, the pillars in one seam or section are vertically above or below the pillars in the other seam or section, unless the strata is inclined at an angle of more than 30 degrees from the horizontal. The parting left between any two such seams or section is not less than three metres.

CONTIGUOUS SEAMS

- The working of contiguous seams is difficult in nature due to the strata control problems like collapse of parting and load transfer on to the pillars. In the normal method of working in contiguous seams the top seam/ section is developed and depillaring completed and the caved goaf area allowed to settle for some time before commencing depillaring in the bottom seam/section. There is no method to estimate the condition of the caved strata and hence the bottom seam or section extraction is generally delayed.

- ⦿ Problems like excessive stresses over the pillars in the bottom seam/section due to the presence of left over stooks in the top seam/section, accumulations of water and/or gas. Chances of spontaneous combustion in the upper seam/section are also very common in this type of working. The presence of thin partings adds to the risk of mining in such multi seam/section workings.

- Several research studies were undertaken to deal with the problems of multi seam/section mining in India by CIMFR and other scientific agencies. Some of the findings are:
- Contiguous coal seams can be safely and economically extracted by stabilizing the parting between the seams through underpinning. The practice was followed at Chirimiri area mine of the state owned south eastern Coal fields. Use of grouted steel ropes for support of the roof coal band improved the safety of the overhanging strata span and successfully applied for the depillaring of the 12.5 thick Zero seam. Installation of full column-grouted 6-6.5 m long rope dowels at a grid pattern of 1.2×1.2 m in the floor of the top section in the development gallery, split and slices consolidated the composite parting of nearly 6.2 m thickness. Underpinning is shown in Figure 54.



- Figure 54 Simultaneous depillaring with underpinning and roof bolts
- In one case at RK-8 mine, The Singareni Collieries Company Ltd, a state owned mining company, simultaneous extraction of pillars was done in three contiguous seams with a parting of 7-9 m and with seam thickness of about 2.5 m with the technical assistance of a government scientific agency, National Institute of Rock mechanics, Kolar. The results showed no significant influence of the abutment loading even at the time of goaf settlement due to the de-stressed zone created by the seam of the above panel.

- ⦿ Extraction of thick seam (10.5 m) in a single lift using Blasting gallery method in a previously developed multi section; posed problems of pillar collapse at GDK -8 incline of The Singareni Collieries. The 10.5 m thick seam was developed along the top section at a height of 3.0 m. In order to extract the entire seam using the blasting gallery method the bottom section is required to be developed.

- ◎ Special permission from the Mining inspectorate allowed the bottom section to be developed in a staggered manner without vertical superimposition of the pillars. The results show that the staggered method of development of bottom section for under winning of roof coal is effective for a thick coal seam already developed along the roof horizon.

(CIR. 20/1966 & CIR. 42/1967)

- ◉ SUMMARY OF LIMITS OF ERROR
- ◉ Plans
- ◉ Plans on the 1/2,000 scale 50 centimetres
- ◉ Plans on the 1/1,000 scale 25 centimetres
- ◉ (i) *Triangulation*
- ◉ Position of stations of the triangulation as determined from initial and verification bases 1/5,000th of the lines horizontal distance of local point of origin.
- ◉ (ii) *Traverses*
- ◉ Total angular error $30\sqrt{n}$ (thirty x square root n) seconds
- ◉ Error of closure 1/3,000th of the horizontal length of the traverse

(CIR. 20/1966 & CIR. 42/1967)

○ **Underground Surveys**

○ (i) *Traverse closed polygonally*

○ Total angular error $(20+X) \sqrt{n}$ seconds

○ Error of closure $1/2,500$ th the horizontal length of the traverse

○ (ii) *Traverse not closed polygonally but closed upon reference points*

○ Error of closure $1/1,500$ th of horizontal length of the traverse

○ (iii) *Subsidiary Surveys*

○ Error of closure by plotting $1/500$ th of horizontal length of the traverse

○ Difference of two or more determinations of any subsidiary points 3 metres

○ **Correlations**

- By shaft wires 2 minutes of arc
- By magnetic observations 2 minutes of arc
- By direct connection 11 minutes of arc **Levels**
- Surface mine bench marks 2 cms. per km.
- Inset bench marks Two or more shaft measurements of established inset bench mark should agree within $1/5,000$.
- Inbye bench marks $1/2,500$ th of the inclined length of the leveling.
- Subsidiary points 50 centimetres.

(CIR. GEM.2/1980)

- ⦿ **Use of polyester film for original mine plans—The original mine plans are required to be prepared on mounted paper and tracings on tracing cloth are prepared from the original plans for various statutory purposes.**
- ⦿ However, the non-availability of good quality drawing paper mounted on cloth, in the Indian market, through indigenous sources, has been causing concern to the mining industry in general.

- The problem was discussed with Director, Survey of India, Eastern Circle, Calcutta, who opined that presently the best medium for preparation and maintenance of plans is the polyester tracing film (which is now being manufactured by some Indian firms), which has better dimensional stability than best of the mounted paper.
- Use should, therefore, be made of polyester tracing film of 125 micron gauge for preparation of original mine plans and of lesser gauge for tracings of various statutory/other plans.

(CIR. 12/1958)

- ◉ Joint Survey Plan—The plan kept under Clause (d) of Reg. 59(1) of CMR 1957 shall also on every occasion that the details required under Clause (a) of Reg. 59(4) are brought up-to-date in compliance with the provision of Reg. 58(3), be signed by the surveyor and the manager of the adjoining mine(s) having workings within 60 metres of the common boundary (or where the boundary is in dispute, within 60 metres of the boundary claimed by the owner of the mine concerned) signifying the correctness of the common boundary, or the disputed boundaries, as the case may be, and of the position of the workings in relation to one another.

(CIR. 44/1959)

- Water Courses to be Re-surveyed— As in several cases the course of jores, nallas and other water courses has shifted to a considerable extent over the past few years from the course shown on the mine plans, it is necessary that every water course is re-surveyed and correlated with the workings belowground. Wherever any large discrepancy is noticed from the known data, it should be intimated to the J.D.M.S. The report should be accompanied by necessary plans explaining the change. If the re-survey indicates that any new danger has arisen, this should also be clearly indicated in the intimation aforesaid.

(D.G.M.S. INSTRUCTION DATED 12.8.59)

- ⦿ Particulars of dams to be shown on plans—
The depth to which the dams are cut into the roof, floor and sides are important dimensions. Similarly, the materials used in the construction of a dam are also important details. These should be shown/indicated on the plan.

(CIR. 13/1958 & 30/1969)

- ◉ Water Danger Plan— The surface contour lines and underground spot levels etc. and the permanent bench-mark required to be shown under Reg. 59(3) of CMR 1957 should be shown on a separate tracing of the underground workings of the mine, which should be kept up-to-date as required under Reg. 58(3)
- ◉ The plan, which may be called 'Water Danger Plan', shall also show surface drainage system of the mine.

(CIR. TECH. 1/1976)

- ◉ **Water Danger Plan : Measures to give warning of danger of inundation—Attention is invited to Circular No. 30 of 1969 regarding maintenance of a separate Water Danger Plan at the mine. This is to amplify that the plan to be so maintained should show the following features to serve the desired purpose of guarding against danger of surface and underground inundation—**
- ◉ (i) the position of the workings below ground; and every borehole and shaft (with depth), including opening, cross-measure drift, goaf, pumping station;
- ◉ (ii) the general direction and rate of dip of the strata;

- ◉ (iii) such sections of the seam as may be necessary to show any substantial variation in the thickness or character thereof and showing the working section;
- ◉ (iv) the position of every dyke, fault and other geological disturbance with the amount and direction of throw;
- ◉ (v) the position and reduced level of permanent bench-mark;
- ◉ (vi) spot levels taken in workings belowground at easily identifiable points e.g.,
 - ◉ (a) along haulage roadways, at every roadway junction except in roadways where tramming is done by manual means in which case spot levels may be shown at points not more than 150 metres apart;
 - ◉ (b) in the case of the headings which have been discontinued either temporarily or permanently also at the end of such headings;

- ◉ (vii) every source of water such as river, stream, watercourse, reservoir, water-logged opencast workings on the surface, and also the outline of all water-logged workings on the belowground lying within 60 metres of any part of the workings measured in any direction;
- ◉ (viii) every reservoir, dam or other structure, either above or belowground, constructed to withstand a pressure of water or to control an inrush of water, along with reference to its design and other details of construction;
- ◉ (ix) surface contour lines drawn at vertical intervals not exceeding five metres (or ten metres in the case of a mine where there are no workings belowground or in case of mines situated in hilly terrain, such other larger interval as the J.D.M.S. may permit by an order in writing and subject to such conditions as he may specify) over the whole area lying within 200 metres of any part of the workings;

- (x) surface drainage system of the mine;
- (xi) the highest flood level of the area;
- (xii) warning lines to draw visual attention to dangers of inundation arising out of (a) surface water (b) unconsolidated strata, (c) water bearing strata and (d) underground water.
- **Note—The distance at which these warning lines may be drawn from the source of danger would vary depending upon the rate of progress of workings in a mine and cannot, therefore, be specifically indicated. This distance should, however, be such as to enable the management to take note of danger well in advance so that necessary permission for working within a statutorily restricted area could be obtained well in time.**

EXTRACT FROM THE CODE OF COAL MINES SURVEYING PRACTICE

ARTICLE 4 : MEASURES TO GIVE WARNING OF DANGER OF INUNDATION

- **4.1 Responsibility**—It is one of the important statutory duties and responsibilities of surveyors to record in a bound paged book 'the full facts when workings of the mine have approached to about 75 metres from the mine boundary or from disused or waterlogged working'. Besides this requirement it is recommended that warning lines should be drawn on plans to draw visual attention to dangers of inundation arising out of—
 - (i) Surface water
 - (ii) Unconsolidated strata
 - (iii) Water-bearing strata, and
 - (iv) Underground water.

- 4.1.2 The distance at which these warning lines may be drawn from the source of danger would vary depending upon the rate of progress of workings in a mine, and cannot therefore be specifically laid down, but this distance should be such as to enable the management to take note of the danger well in advance so that necessary permission for working within a statutorily restricted area could be obtained.

- 4.1.3 The following code of practice requiring measures to be taken for giving warning of danger of inundation are in addition to and not in substitution for any relevant provisions of the Coal Mines Regulations, 1957 or any amendments thereof.

4.2 WORKINGS IN THE PROXIMITY OF BODIES OF WATER ON THE SURFACE OR UNDERGROUND

- ◉ 4.2.1 *Location of Bodies of Water*—Every effort shall be made to locate and to mark on the underground plan, Manager's plan, Overman's plan and on Water Danger plan, the limits of any surface or underground body of water which may constitute a danger within the boundary of a mine or within a distance of 60 metres outside the boundary.
- ◉ 4.2.2 *Water in Old Workings*—Where old workings exist which may constitute a danger, it shall be assumed, for the purpose of marking the above mentioned plans, that they contain water until the contrary is proved.

- ⦿ *4.2.3 Position of Old Workings—All possible steps shall be taken to ensure that the outline of all old workings, in the same seam or in any other seam within 60 metres (being the shortest distance measured on any direction whether horizontal, vertical or inclined) thereof are shown correctly on the underground plan, Manager's plan. Overman's plan and Water Danger plan. Such outline shall be endorsed with the name of seam, reduced level of the water and the date on which such water level was recorded.*
- ⦿ All old plans shall be regarded with suspicion until their accuracy has been verified, and every effort shall be made to obtain all existing information about old workings; if there is doubt about the position of old workings, this fact shall be mentioned on the plans.

- ◉ 4.2.4 *Warning Line*—In addition to showing the outline of any body of water which may constitute a danger, the above plans shall be marked with a green line verged yellow to indicate that any advance beyond that line will bring the workings within a distance of 120 metres of the body of water or such greater distance as may be fixed by the management.
- ◉ 4.2.5 *Large Cautionary Zones*—If the size of the cautionary zone is such that it covers the whole area of the plan, and no warning line can be shown, the words 'SURFACE WATER' or 'UNDERGROUND WATER' whichever are applicable shall be printed in green large type lettering across the plan, together with a note of the depth and reduced level of the water and its pressure if known.

- ◉ 4.2.6 *Statutory Restriction Line*—The underground plan, manager's, overman's and water danger plans shall also be marked with a green line verged green at a distance of 60 metres (being the shortest distance measured in any direction whether horizontal, vertical or inclined) from the edge of any body of water to indicate that any advance beyond that line can only be made with the permission of Chief Inspector of Mines.
- ◉ 4.2.7 *Check Surveys*—When approaching a body of water likely to constitute a danger, check surveys and levelings of the workings shall be carried out when a point has been reached 120 metres, or such greater distance as may be fixed by the management, from the body of water. Wherever possible, there shall be an independent check by a surveyor other than the one normally making surveys at the colliery.

- ⦿ *4.2.8 Undersea Workings and Water Bearing Strata—The foregoing provisions shall not apply to undersea workings ad water-bearing strata which may constitute a danger. These shall receive special consideration by the management.*
- ⦿ *4.2.9 Informing the Management—The surveyor shall inform the manager in writing, of all known facts when approach is being made towards a water cautionary zone. All reservations and doubts which may exist concerning the accuracy of the plans shall be fully explained.*

4.3 WORKINGS IN THE PROXIMITY OF UNCONSOLIDATED SURFACE DEPOSITS

- 'Unconsolidated surface deposits' includes moss, peat, quicksand, and in addition, abandoned opencast workings, sand, gravel, silt, mud and any other fluid matter, other than water, lying above the rock head, and likely to constitute a danger.
- 4.3.2 *Making the Plans*—When the geological maps of the area or any investigation or local knowledge indicates the existence of unconsolidated surface deposits within the boundary of a mine or within 60 metres outside it, the limits and nature of such deposits shall be marked on the geological plan, underground plan, manager's plan, overman's plan & water danger plan. The limits so marked shall be endorsed in green large type lettering with the words 'UNCONSOLIDATED DEPOSITS' together with a note of their thickness.

- ◉ 4.3.3 *Warning Line*— In addition to showing the outline of any body of unconsolidated surface deposit as above, a warning line consisting of a green line verged yellow, drawn in such a position as to indicate that any advance beyond that line will bring the workings within a distance of 120 metres, or ten times the thickness of the seam worked (whichever is the greater) of the unconsolidated surface deposits.
- ◉ 4.3.4 *Large Cautionary Zone*— If the whole area of the plan is overlaid by unconsolidated deposits and no warning line can be shown, the words 'UNCONSOLIDATED DEPOSITS' shall be printed in green large type lettering across the plan and the thickness of the deposit shall be shown.

- ⦿ *4.3.5 Statutory Restriction Line—The underground, manager's overman's, and water danger plans shall also be marked with the green line verged green at a distance of 60 metres (being the shortest distance in any direction whether horizontal, vertical or inclined) from the edge of unconsolidated surface deposits to indicate that any advance beyond that line can only be made with the permission of Chief Inspector of Mines.*
- ⦿ *4.3.6 Informing the Management—The Surveyor shall inform the manager in writing of the full facts when approach is being made towards a cautionary zone for unconsolidated deposits, and all reservations and doubts which may exist concerning the accuracy of the plans shall be fully explained.*

(CIR. TECH. 11/1982)

- ◉ **Maintenance of off-set plans of workings beneath surface features—Permissions under 105 and 126 of Coal Mines Regulations, 1957 have been granted for development of workings under different surface features stipulating inter-alia the dimensions of the galleries which may be driven.**
- ◉ The frequency and type of inspections to be made beneath such surface features have been stipulated in DGMS Circular No. 1 of 1960. It is observed (that with the passage of time and spalling from the pillar sides and some time due to robbing, the dimensions of the galleries increase beyond the permitted limits and the supporting pillars become less in size.

- In view of the above managements are requested to prepare and maintain off-set plans on a scale having a representative factor of 500 : 1 in respect of all existing workings beneath the surface features and within a distance of 45 metres thereof in case of permissions granted under Reg. 105 and within a distance of 15 metres thereof in case of permissions granted under Reg. 126.
- The job of completion of the off-set plans, referred to above, shall be completed within one year and the completion report shall be sent to the concerned Director of Mines Safety of the Region and the D.G.M.S.

(CIR. LEGIS. 1/1987)

*CHECK LIST FOR SUBMISSION A/ABANDONED MINE
PLANS UNDER REG. 61 OF CMR 1957*

- ◉ 1.1 *From DGMS/AMP/I*
- ◉ (i) Two copies of the (printed) forms obtainable from the Dy. Director-General of the concerned Zone shall be submitted, duly filled in along with the plans.
- ◉ (ii) Factual information about all the items in the forms shall be furnished correctly and fully.
- ◉ 1.2 *Plans and Sections :*
- ◉ (1) Two copies of the plans/sections shall be submitted on tracing cloth/ polyester tracing film only.

- (2) The plans/sections shall be true copies of the original plans/sections, which are being maintained at the mine under Reg. 59(1) (b) and (c) and a certificate to this shall be incorporated on both the sets of tracings. The plans shall, however, show as given below :
- 2.1 *Reg. 58(1)* :
- (a) (i) Name of owner :
- (ii) Name of mine :
- (iii) Purpose for which the plan/section is prepared.
- (b) True north or magnetic meridian with date of the latter :
- (c) A scale, at least 25 cms. long and suitably sub-divided.

- ◉ 2.2 Conventions as per second schedule
- ◉ 2.3 Plans to be brought up-to-date before abandonment or at the time of I discontinuance.
- ◉ 3.0 *Reg. 59(1) (b)*:
 - ◉ (i) Position of workings, belowground.
 - ◉ (ii) Position of boreholes and shafts (with depth), incline openings, cross-measure drifts, goaves, fire stoppings or seals.
 - ◉ (iii) Every important surface feature within the boundaries such as Rly., road, river, stream, water course, tank, reservoir, opencast working and building which is within 200 mtrs of any parts of the working measured horizontally and H.F.L. of river(s) and stream(s).
 - ◉ (iv) General direction and rate of dip of strata. (v) Sections of the seam(s).
 - ◉ (vi) The position of every fault, dyke, and other geological disturbances with amount of throw and direction.

- ⦿ (vii) (I) an abstract of all statutory restrictions in respect of the working, if any, with reference to the order imposing the same.
- ⦿ (II) end of the workings marked with dotted lines and last date of survey.
- ⦿ 4.0 Reg. 56 (1) (c) : Vertical mine sections, where average inclination exceeds 30 degrees from the horizontal.
- ⦿ Reg. 59 (2) : Multi-section workings lying within 9 mtrs. to be shown in different colours on a combined plan separately.

- Reg. 59 (3) (a) : Surface contour lines at vertical intervals, not exceeding 5 mtrs.
- Reg. 59 (3) (b) : Spot levels along all important drivages and at the ends of the headings.
- Reg. 59 (3) (c) : Bench mark on the surface in relation to M.S.L.
- Reg. 59 (4) (a) (i) Settled and/or claimed boundary of the mine.
- (ii) Up-to-date working of all the mines situated within 60 mtrs from the boundary.

- ◉ 5.0 Reg. 61 (1) : Distance and bearing of at least one shaft or opening, in relation to T.J.P. (Tri-junction-pillar) or any permanent surface features.
- ◉ Underground spot levels at the end of all workings.
- ◉ Position of water dam(s) with dimensions and particulars of construction.
- ◉ 6.0 Reg. 64 (2) : A certificate of correctness of the plan (as printed in the original plan).

- Reg. 64 (3) : The tracing should bear the index No. of the original plan, from which it is traced and should be certified to be true copy of the original plan by the surveyor and countersigned by the Manager.
- 7.0 If certain particulars as given above are not shown in the plan due to its non existence or non applicability, certificates to this effect shall also be clearly given on the body of the plans.

(CIR.LEGIS. 2/1987)

- ◉ Submission of Abandoned Mine Plans under Regulation 63 of MMR 1961— When any mine or in case of a mine to which Reg. 142 applies, any part thereof, is abandoned or the workings thereof have been discontinued for a period exceeding four months, the owner of the mine must submit, within 30 days of abandonment/five months of discontinuance, to the D.G.M.S. two copies of Abandoned Mine Plans and sections. These are in fact, true copies of up-to-date plan and section of the workings of the mine or part, maintained under clauses (b), (c) & (d) of Reg. 61(1), with additional information regarding location of the mine.

- To cut down procedural delays in processing and recording the AMPs, managements are hereby advised to submit these A.M. Plans to the Dy. Director-General of Mines Safety of the concerned Zone.
- From past experience it can be said that at times the plans and sections submitted lack in vital details which also raise doubts about their accuracy.
- Consequently considerable time and energy has to be spent to get the desired information. To guard against such eventualities in future you are advised to ensure that the plans being submitted are verified for details as per the check list given in the appendix.

CHECK LIST GIVEN IN THE APPENDIX

- ◎ **1.1 From DGMS/AMP/L**
- ◎ (i) Two copies of the (printed) forms obtainable from the Dy. Director General of the concerned Zone/Director General, Dhanbad shall be submitted, duly filled in, along with plans;
- ◎ ii) Factual information about all the items in the form shall be furnished correctly and fully.
- ◎ (iii) The owner/agent/manager shall sign the form with name and his designation.

⦿ 1.2 Plans & Sections :

- ⦿ (1) Two copies of the plans/sections shall be submitted on tracing cloth/ polyester tracing film only.
- ⦿ (2) The plans/sections shall be true copies of the original plans/sections, which are being maintained at the mine under Regulation 61(1) (b) (c) & (d) and certificate to this effect shall be incorporated on both the sets of tracings. The plans shall, however, show as given below :

- ◉ **2.1 Reg. 60 (1)**
- ◉ (a) (i) Name of owner :
- ◉ (ii) Name of Mine
- ◉ (iii) Purpose for which the plan/section is prepared.
- ◉ (b) True north or magnetic meridian with date of the latter :
- ◉ (c) A scale, at least 25 cms long and suitably subdivided.
- ◉ 3.0 The plans to be brought up-to-date before abandonment or at the time of
- ◉ discontinuance.

- ◉ **4.0 Reg. 61 (1) (b) :**
- ◉ (i) Position of workings, belowground.
- ◉ (ii) Position of boreholes and shafts (with depth), drive, cross- cut, winze, rise, excavation (Sloped ground) and every tunnel and air passage connected therewith.
- ◉ (iii) Pillars or blocks of minerals left for support of surface features. (iv) Every important surface feature within the boundaries such as Rly., road, river, stream, water course, tank, reservoir, opencast workings and building within 200 mtrs of any part of the workings measured horizontally.

- (v) General strike of vein and mineral bed.
- (vi) The position of every fault, dyke, and other geological disturbance with amount of throw and direction.
- (vii) (I) an abstract of all statutory restrictions in respect of the workings, if any with reference to the order for imposing the same,
- (II) end of the workings marked with dotted lines and last date of survey.

- ◉ 5.0 Reg. 61 (1) (c) : Transverse sections as per requirement.
- ◉ (d) : Vertical sections as per requirement.
- ◉ (f) (vi) : Surface contour lines at vertical interval not exceeding 5 mtrs.
- ◉ (vii) (I) : the highest flood level.
(II) : bench mark on the surface in relation to M.S.L.
- ◉ (2) : Multi-section workings lying within 10 mtrs. to be shown in different colours on a combined plan.
- ◉ (3) (a) (i) : Settled and/or claimed boundary of the mines.
- ◉ (ii) : Up-to-date workings of all the mines situated within 60 mtrs. from the mine boundary

- ◉ **6.0 Reg. 63 (1) (i) : Distance and bearing of at least one shaft or opening, in relation to T.J.P. or any other permanent surface feature.**
- ◉ (ii) : Underground spot levels at the end of all workings.
- ◉ (iii) : Position of water dam(s) with dimensions and particulars of construction.

- ◉ **7.0 Reg. 66 (2) : A certificate of correctness of the Plan (as printed in the original plan).**

- ⦿ **Reg. 66 (3) :** Every tracing should bear the index No. of the original plan from which it is traced and should be certified to be true copy of the original plan by the surveyor and countersigned by the Manager.
- ⦿ **8.0** If certain particulars as given above are not shown on the plan due to its non existence or non applicability, certificates to this effect shall also be clearly given on the body of the plans.

◎ Thank You!!!