

SUBSIDENCE PREDICTION REPORT
(THROUGH 3-D NUMERICAL MODEL)

MANDAMARRI SHAFT BLOCK
(SECTORS “D-E”)
MANDAMARRI AREA

SINGARENI COLLIERIES COMPANY LIMITED
TELANGANA (INDIA)



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1.0 INTRODUCTION

The Singareni Collieries Company Limited, (A Govt. company) is the sole lessee of Godavari Valley Coal Field. An underground coal mine has been carved out of Sector D and Sector E blocks of Mandamarri Shaft Block (MMSB) in Mandamarri Revenue Village of Adilabad district of Telangana in Godavari Valley Coal Field.

Mandamarri Shaft Block is lying between 300 m to 600 m depth range, on the dip side of KK -2 Inc. to KK -5 Inc. The present block falls almost in the Northern part of Somagudem-Indaram coal belt and comes under Mandamarri division of Belampalli region.

1.1 LOCATION & COMMUNICATION

The Mandamarri Shaft Block is located on the dip side of KK -2 Inc. to KK -5 Inc. It covers an area of about 13.089 Sq.Km, lying between the north latitudes 18°37'47" to 19°01' 56" and east longitudes 79° 28' 53" to 79° 31' 44" and falls in the Survey of India Topo sheet No. 56/ N/5 and 56/N/9.

The communication system of the area is fairly well developed. The Hyderabad-Nagpur State highway is running NNE-SSW and is passing through the block in the Northwestern side. An all weather Coal road joining Bellampalli with Godavarikhani is passing close by connecting all SCCL mines. Mandamarri Railway Station on the Kazipet - Balharshah rail line of the South Central Railways is the nearest railhead to the block, which is situated about 4 kms South-west of the block. A railway siding extends up-to the KK -5 coal handling plant, which is about one km from the block.

1.2 **PHYSIOGRAPHY**

The area is mostly occupied by gently sloping (2.7 m/km) plains with local undulations. The local relief varies from 180m above MSL in the Southern part to 220m above MSL in the Northern part of the block. In the hilly area it is as high as 368m above MSL in the Northwestern part of the area. The erosional hills are of beveled cuesta type with intervening depressions while the undulating plains are dotted with hillocks and sandy patches that are imperfectly drained along the Godavari River. The plains are periodically flooded and well to imperfectly drained with unconsolidated fluvial material.

1.3 **DRAINAGE**

The area is mainly drained by four major streams viz. Ralla vagu, Pala vagu, Devapur vagu and Tekumatla vagu. All these streams are tributaries of the perennial river Godavari. Pala vagu, a tributary to Ralla vagu flows South-Westerly and passes through the south-eastern part of the block and joins with it near Bokkalagutta village. The drainage is of dendritic to sub-parallel type, indicating the plain terrain and structural control in its development. The drainage density of the area is 1.88 km//km², indicating the high infiltration in the Sandy soil cover.

1.4 **FOREST COVER AND LAND FORM**

Of the 13.089-sq.km of the block area, 2.85 sq.km area is covered by Indaram Reserved Forest. Mango gardens and agricultural area is about 0.347sq.km. The existing villages/hamlets are occupying 0.67 sq.km. One tank exists in the block, Palavagu and other small stream/nalas are flowing towards west in the block. NTPC HT line is passing through the block in the SE side. State highway and SC Railway line are passing through NW part of the block. The villages within and around the block are connected by unmetalled roads and cart tracks.

2.0 GEOLOGY

Mandamarri Shaft Block is located in the Northern part of Somagudem-Indaram coal belt and it is in the dip side of KK-2 inc. to KK-5 inc. Sullavai Formation is the basement rock for the Gondwana Formations. The block is covered by coal bearing Barakar Formation and exposures are scanty. The Barren Measures exposures traced throughout the block. No other formation is exposed on the surface. The general seam gradient of KK-6 Incline mine is about 1 in 5.5 and the minimum and maximum depth is 107 m and 565 m respectively. Further the minimum depth of Sector –D, in particular is about 300 m. As per “Geo-Mining Parameters and selection of Mining Technology”, it is proposed to work No.1A & No.1 seams by Continuous Miner Technology.

3.0 METHOD OF WORKING

The method of working proposed is underground bord and pillar mining with caving. It is proposed to extract No.1A and No.1 seam deploying continuous miner technology.

4.0 PERIOD OF PREDICTION

The time period for the prediction of subsidence required is 17 years as given by the company.

Stage-I	5 years (2017-21 years)
Stage-II	10 years (2021-26 years)
Stage-III	15 years (2026-31 years)
Stage-IV	17 years (2031-33 years)

4.1 SIMULATION FOR PREDICTION

The natural mining has to be simulated before it can lend itself to the numerical modeling. As the first step, Fig. 1 is a simulated grid map of the proposed mining area of Mandmarri Shaft Block in terms of contours of the surface profile. Fig. 2 and Fig 3 is the simulated grid map of the workings of the seam 1A and seam 1. The simulated mine plan has a scale of 1:5000, same as that provided by the mining company.

Table 4.1 gives the co-ordinates of few boreholes on the simulated grid maps, which can be used for the studying, and analyzing of all the maps provided by us.

Table 4.1: Co-ordinates of some boreholes on the simulated grid map.

S.L. No.	Bore hole No.	X-Co-ordinate (m)	Y-Co-ordinate (m)
1	KKBH-84-84	1093	1782
2	MEM-18	2350	1085
3	MEM-20	731	1346
4	MEM-37	1157	976
5	MEM-47	2387	688

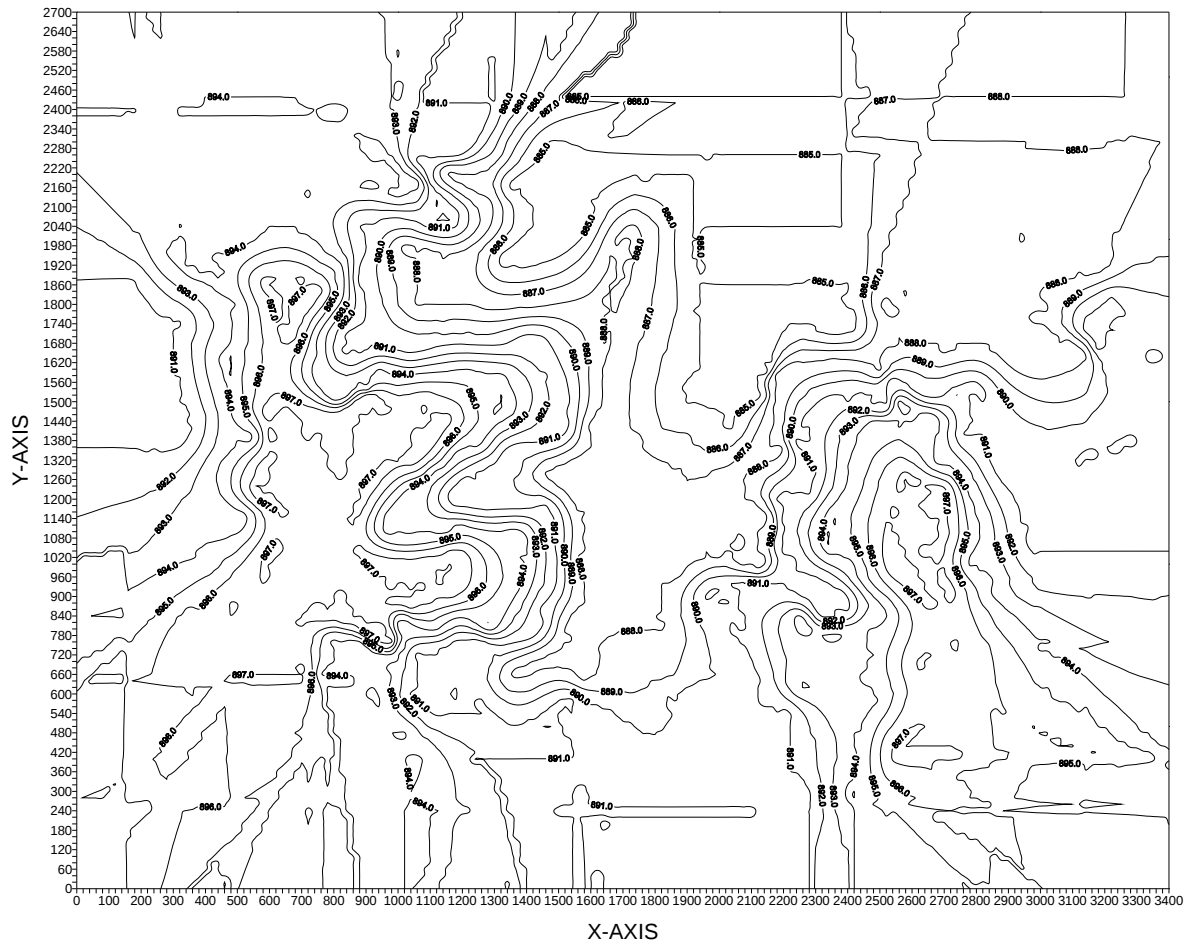
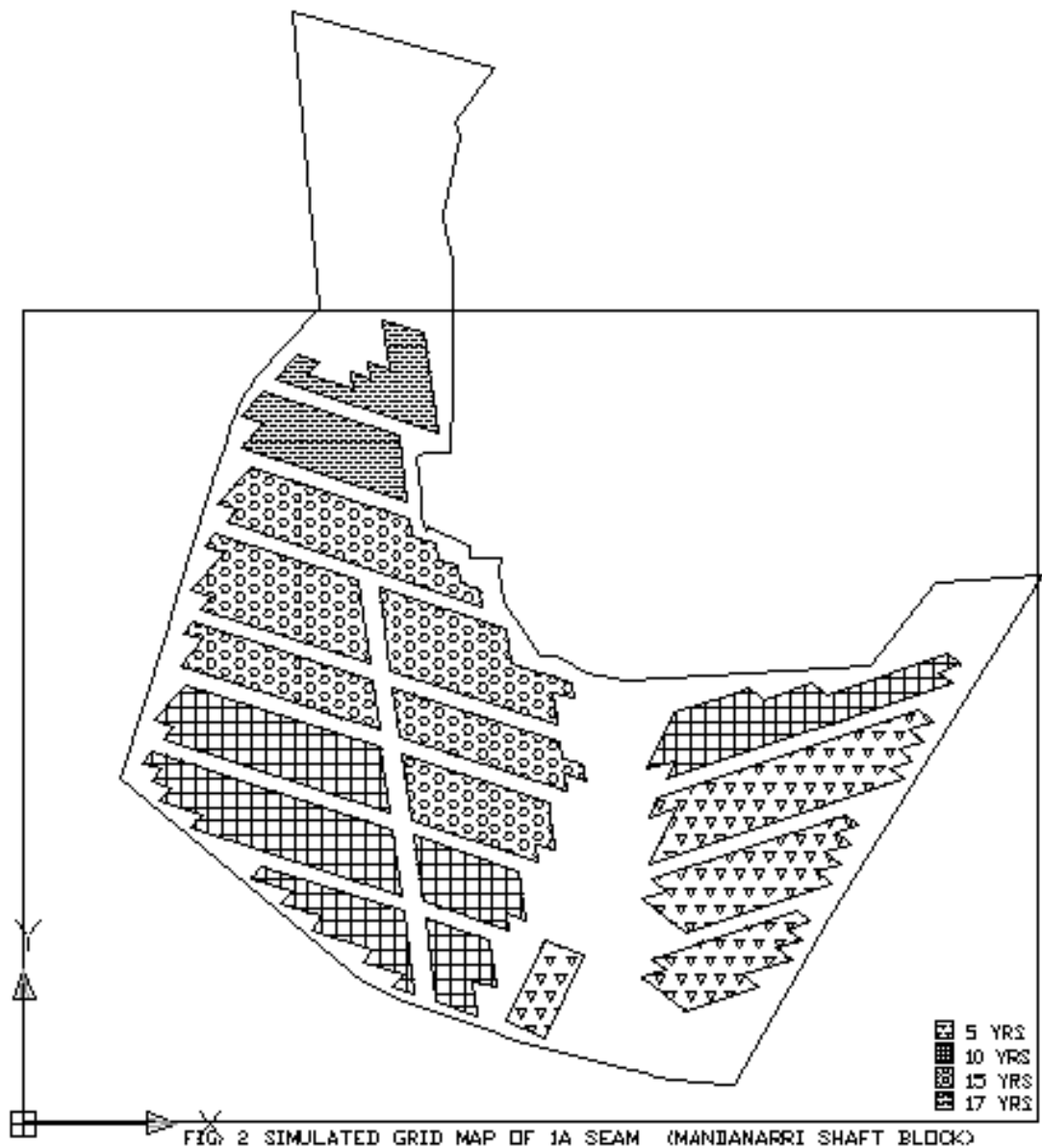
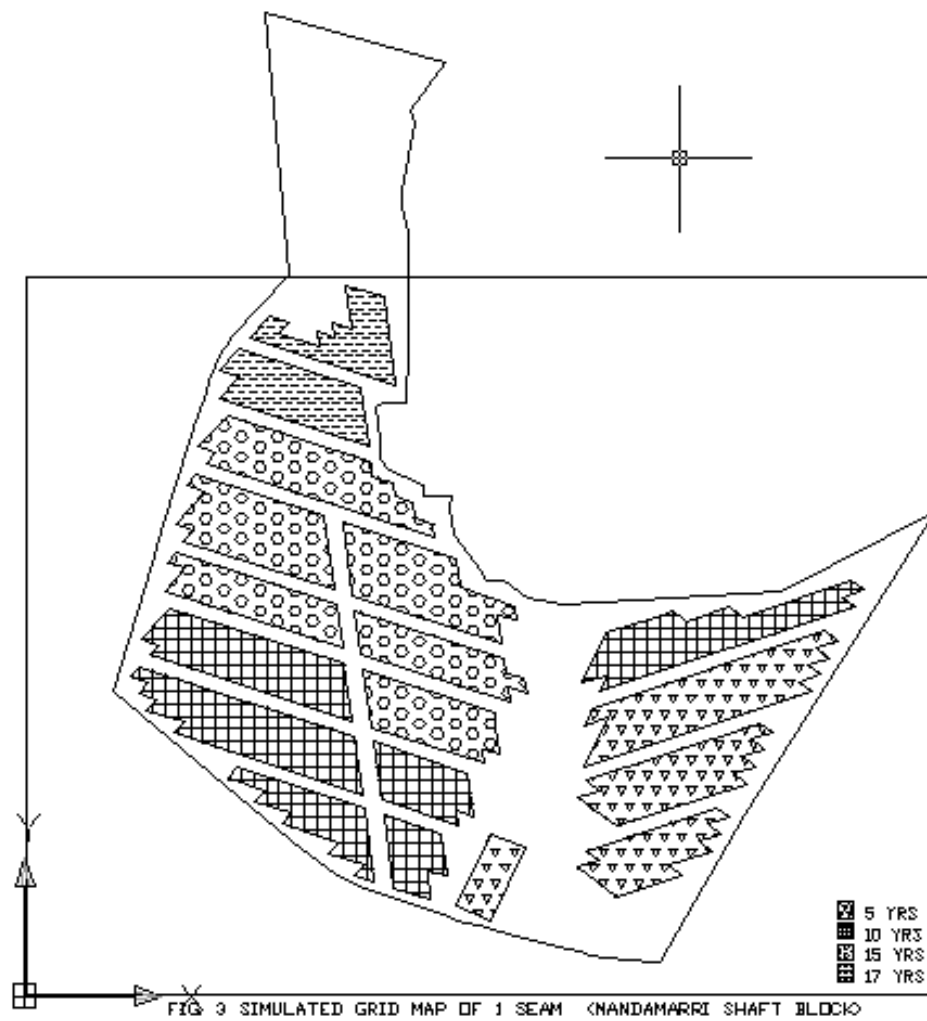


FIG.1 SURFACE CONTOURS BEFORE MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")





4.2 REQUISITE GEOTECHNICAL PARAMETERS FOR THE PREDICTION

The numerical prediction of subsidence requires following basic data:

- 1) Geotechnical parameters of the seam and surrounding rock mass upto the surface,
- 2) Mathematical model and computer programs (software)
- 3) Major structural features of the strata,
- 4) Details of the mine excavation
- 5) Sequence of extraction and size of panels, and
- 6) Important features on the surface.

The information on the above mentioned parameters were provided by the company. The company also provided the data for the physico-mechanical properties used in the simulation. The above properties were taken for various panels as per their proximity to the above boreholes in the block. The boreholes nearest to the panels were considered to be representative one and hence selected for the simulation.

4.3 PREDICTION TECHNIQUE

The computer-simulated model was developed for the prediction of subsidence and alterations in the resulting profile of the surface, keeping in mind the total area, the mining sequence and geo-technical properties and above all, depth of each mining panel, which varies significantly from panel to panel. The grid map for simulation is based on 20 m grid on the surface having about 25000 points for calculation process using finite element method (FEM) – a numerical simulation technique. The computation for prediction of subsidence of the area is based on the grid pattern. The

3-D mathematical model, thus simulated was subjected to the finite element analysis. The model also takes care of the non-linear behaviour of the rock mass (if any), bed separation and its recontact.

5.0 RESULT

5.1 PREDICTED SUBSIDENCE CONTOURS

Fig. 4 shows the subsidence contours after 5 years of mining. Similarly, Fig. 5, Fig. 6 and Fig. 7 give the subsidence contours at the end of 5, 10, 15 and 17 years of mining, respectively. The maximum values of the subsidence predicted at the end of each time blocks are given in Table 5.1.

Table 5.1: Maximum values of predicted subsidence at the end of mining.

Sl. No.	Year	Subsidence values, m
1.	5	0.345
2.	10	0.373
3.	15	0.898
4.	17	1.019

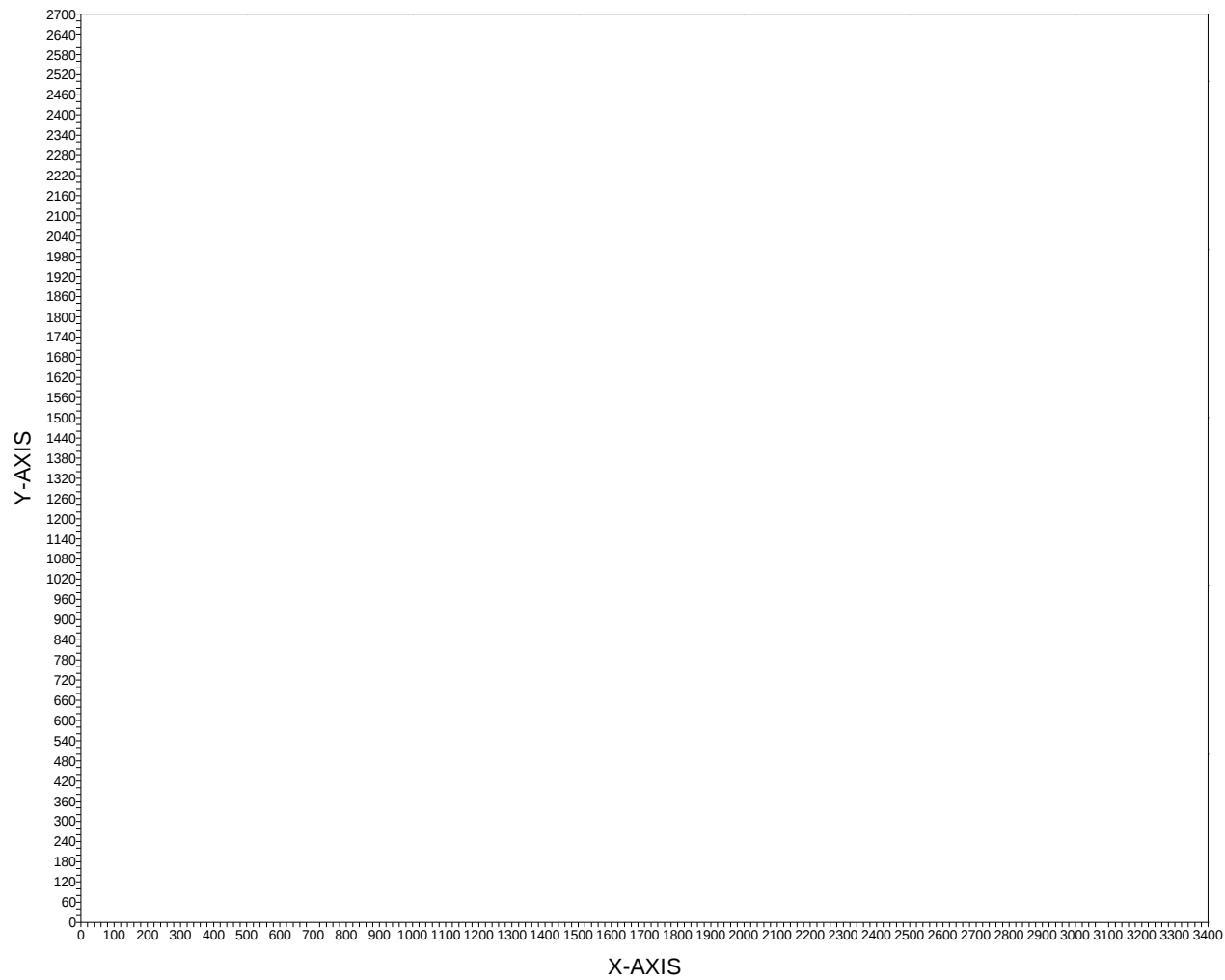


FIG.4 SUBSIDENCE CONTOURS AFTER 5 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

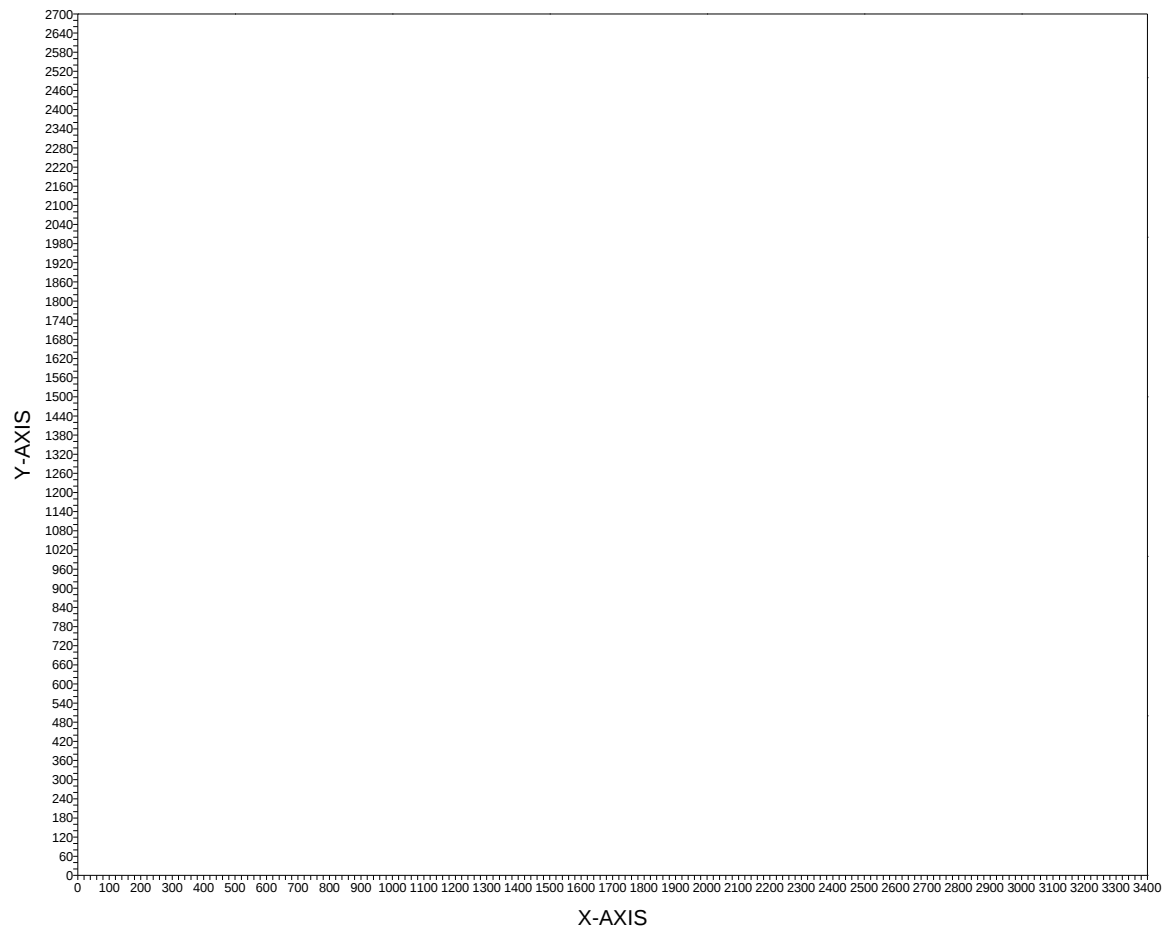


FIG.5 SUBSIDENCE CONTOURS AFTER 10 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

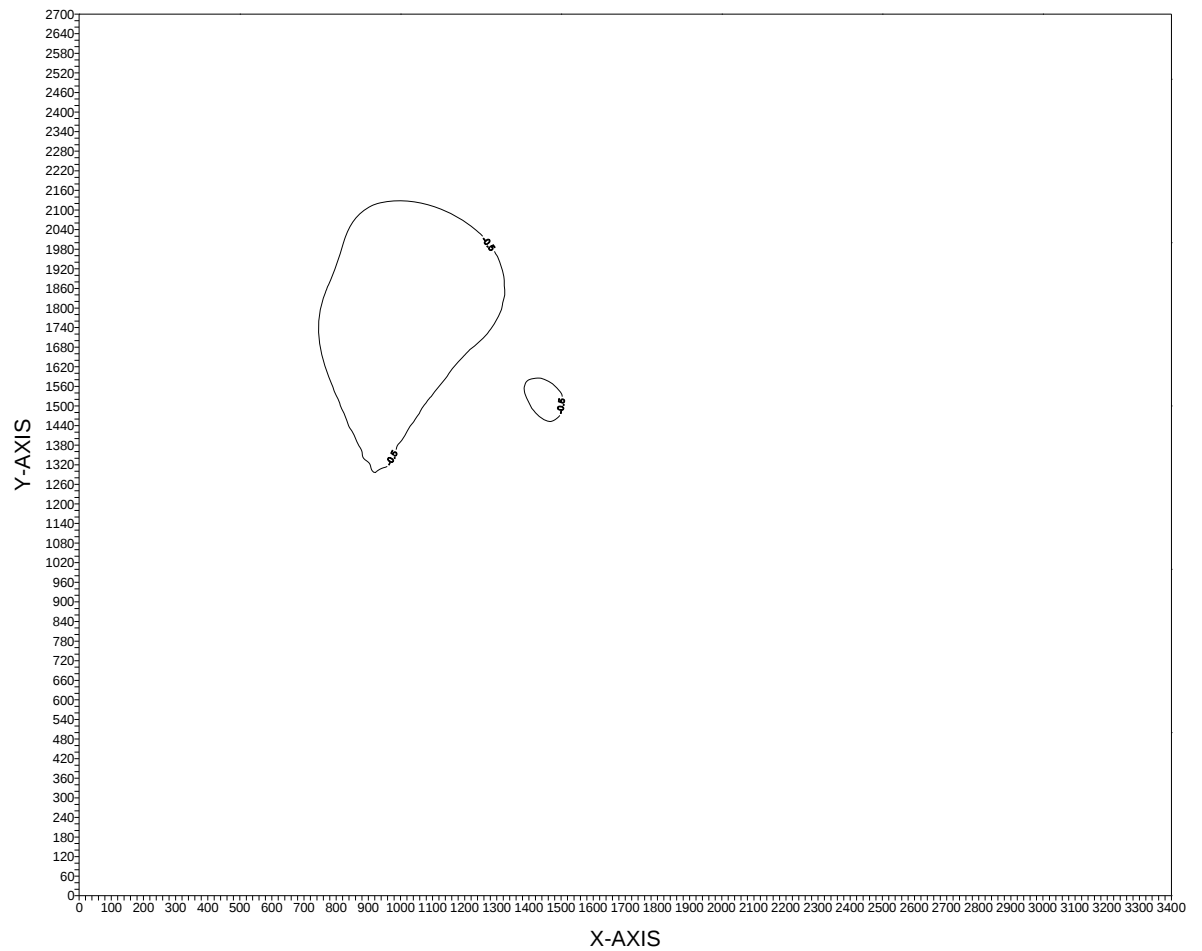


FIG.6 SUBSIDENCE CONTOURS AFTER 15 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

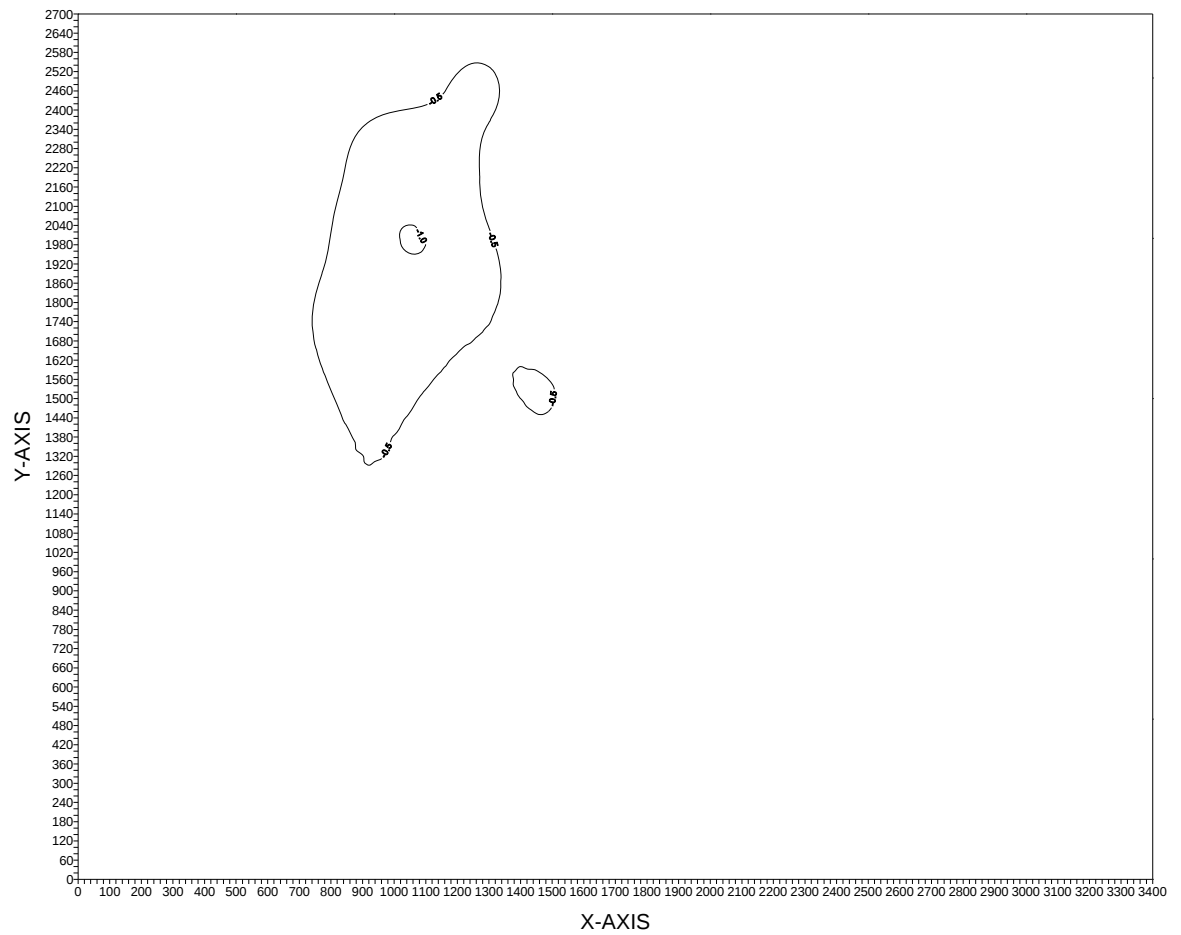


FIG.7 SUBSIDENCE CONTOURS AFTER END OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

.2 THREE DIMENSIONAL PROJECTIONS OF SUBSIDENCE

To give a 3-dimensional impact of the subsidence, the predicted subsidence has been projected on the surface for each of the mining period based on X and Y coordinate defining the horizontal plane and 'Z' coordinate, the depth of the surface. It may be noted that the 'Z' coordinate has been exaggerated (20 times) to have a better visual appreciation of the impact of subsidence.

Figs. 8 though 11 give prediction of the subsidence at the end of 5, 10, 15 and 17 years of mining respectively, considering the surface to be horizontal, before mining. These figures give a real feel of the impact of subsidence as a result of the progression of mining with time. Two sets of subsidence figures are provided for each stage. These are having opposite viewing directions, *i.e.* 45° and 225° . It may be pointed out at this stage that the 3-dimensional projections shown in the Figures 8 through 11 should not be used to pin point the maximum subsidence area because all the points may not be visible on the map. However, these drawings provide fairly accurate idea about ground behavior after mining.

It is worth noting that the troughs shown in the figures should be viewed in the proper perspective as the scale in 'Z' direction has been enlarged to 20 times to have appreciable viewing impact.

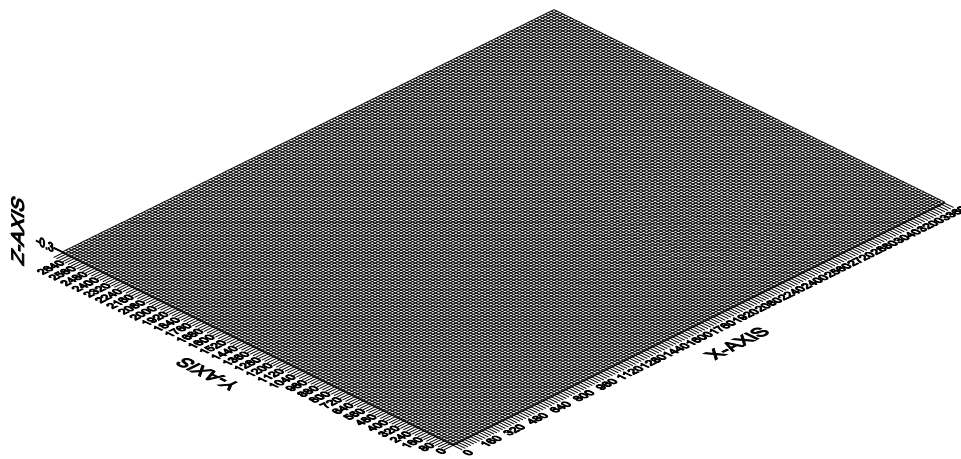


FIG.8a SUBSIDENCE PROFILE AFTER 5 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

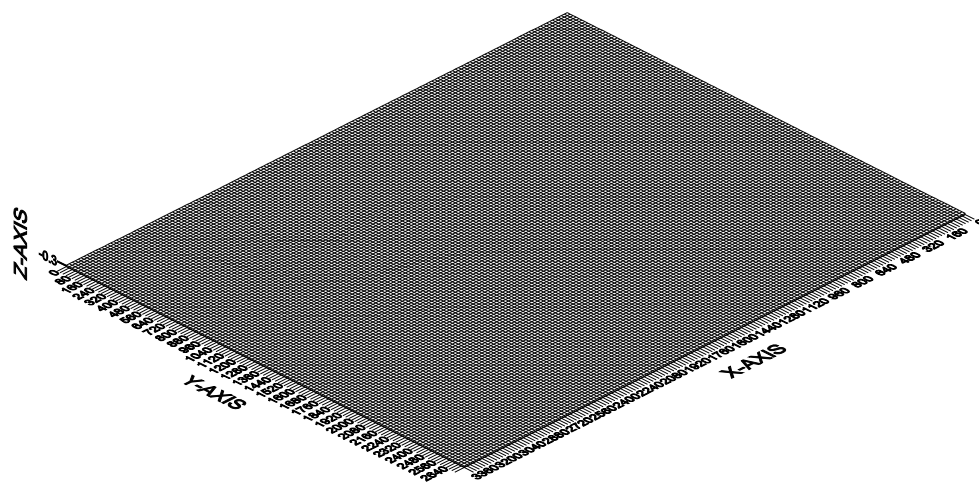


FIG.8b SUBSIDENCE PROFILE AFTER 5 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

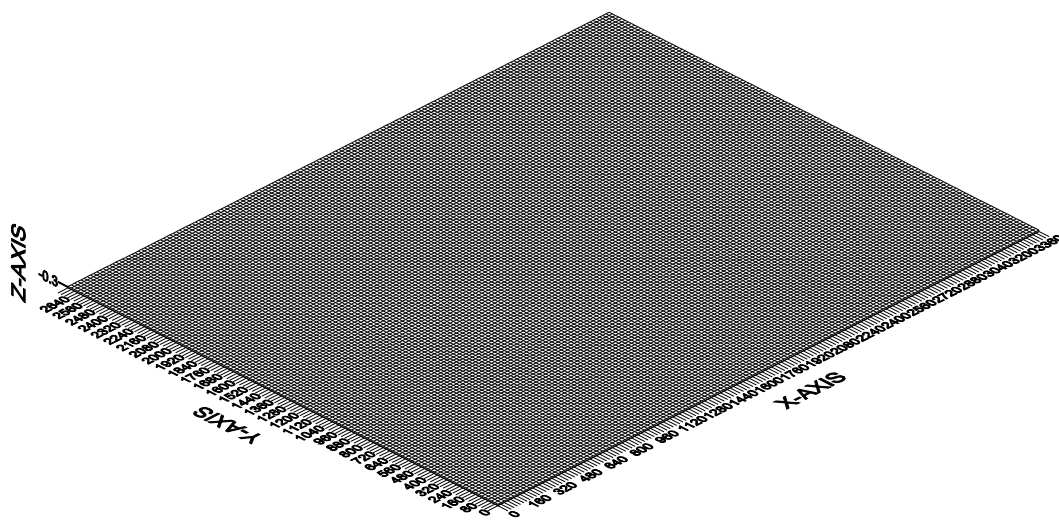


FIG.9a SUBSIDENCE PROFILE AFTER 10 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

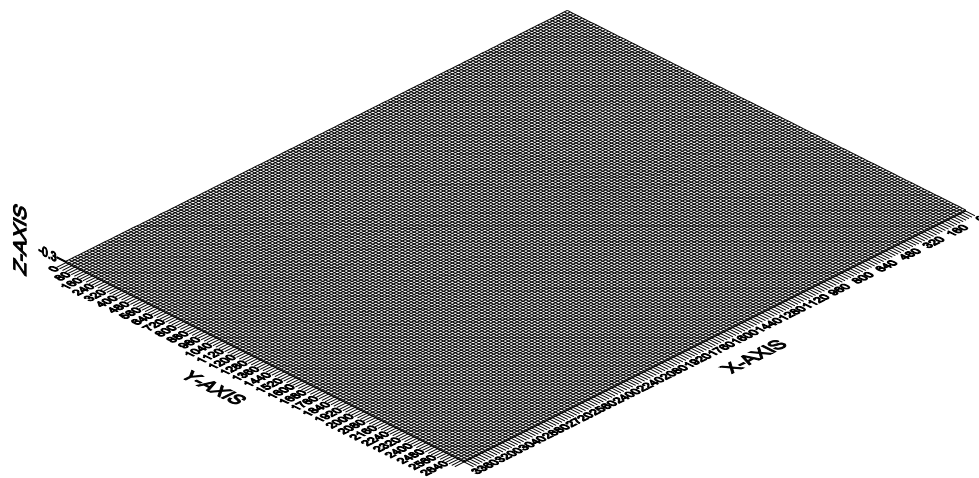


FIG.9b SUBSIDENCE PROFILE AFTER 10 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

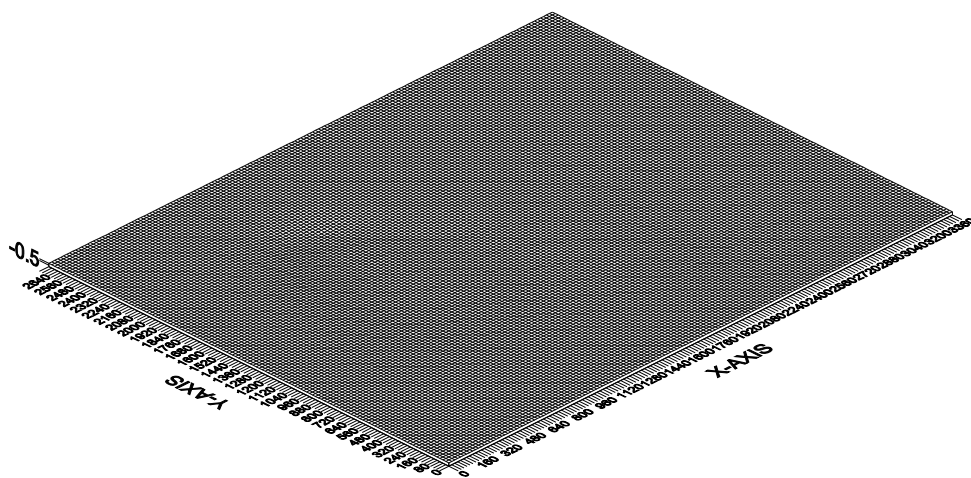


FIG.10a SUBSIDENCE PROFILE AFTER 15 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

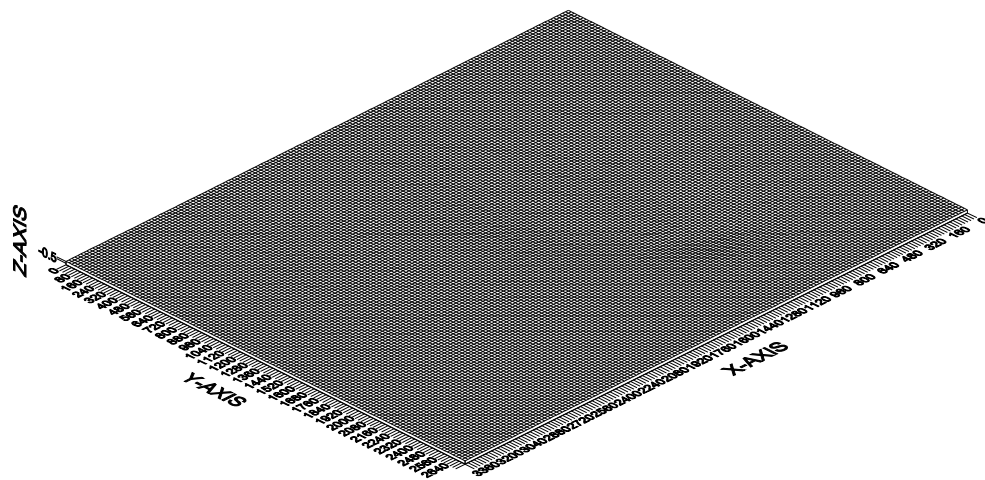


FIG.10b SUBSIDENCE PROFILE AFTER 15 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

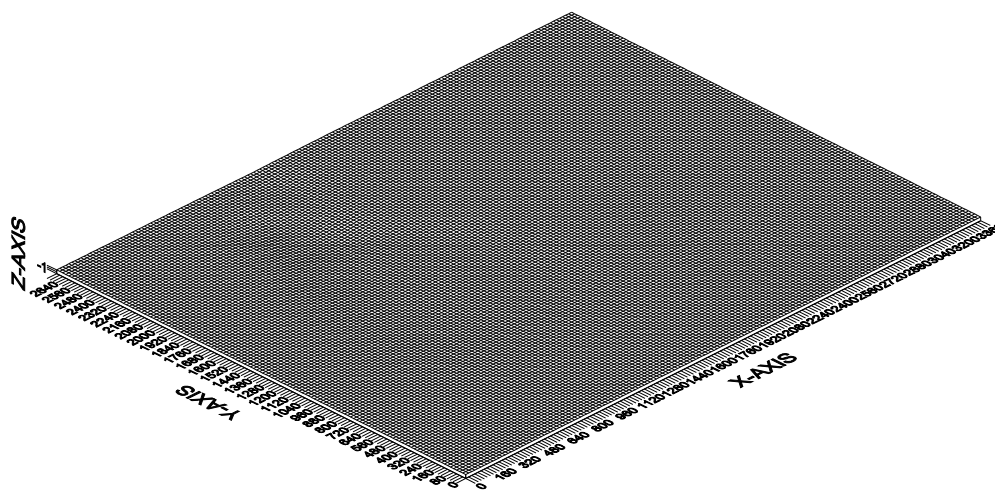


FIG.11a SUBSIDENCE PROFILE AFTER END OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

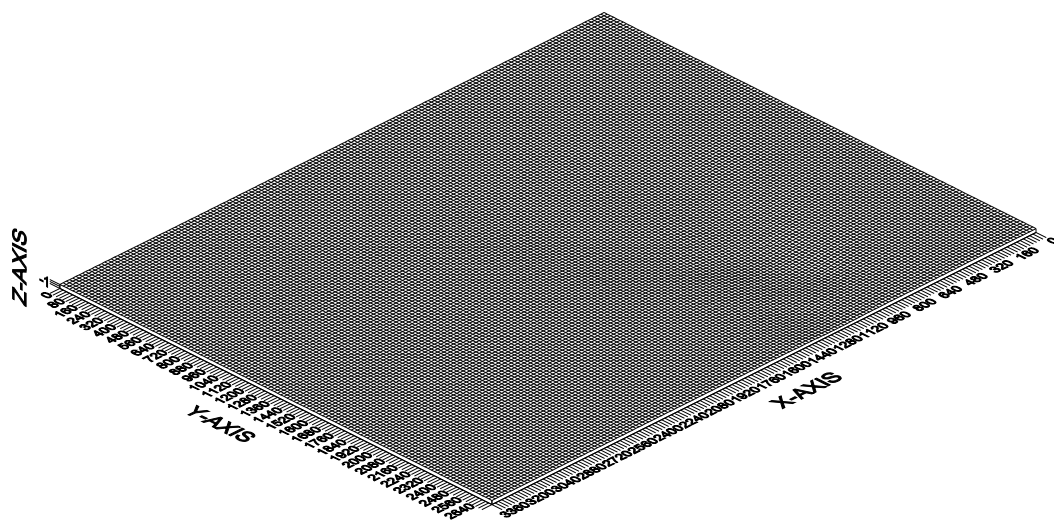


FIG.11b SUBSIDENCE PROFILE AFTER END OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

5.3 SURFACE PROFILE

The surface profiles of the mining block after each stage of mining have also been predicted. These profiles have been obtained by superimposing subsidence with pre-mining surface profile after each mining sequence for different time blocks. Fig. 1 gives the surface profile of the mining block before mining. The contour maps which would finally emerge as a result of mining after 5, 10, 15 and 17 years have been predicted and are shown in Fig. 12 through Fig. 15.

Fig. 16 shows the 3-dimensional prediction of surface profile before mining for the Mandmarri Shaft Block. Figs. 17 through 20 give the 3-dimensional prediction of surface profile at the end of each mining sequence (the 'Z' axis has been exaggerated to 10 times for having better visual appearance of the impact of subsidence). A set of figures showing surface subsidence and surface profile at the end of each stage of mining is also being provided in larger sizes at a scale of 1:5000. The surface contours along with the panels of the seam are also being provided in larger sizes *i.e.*, at a scale of 1:5000.

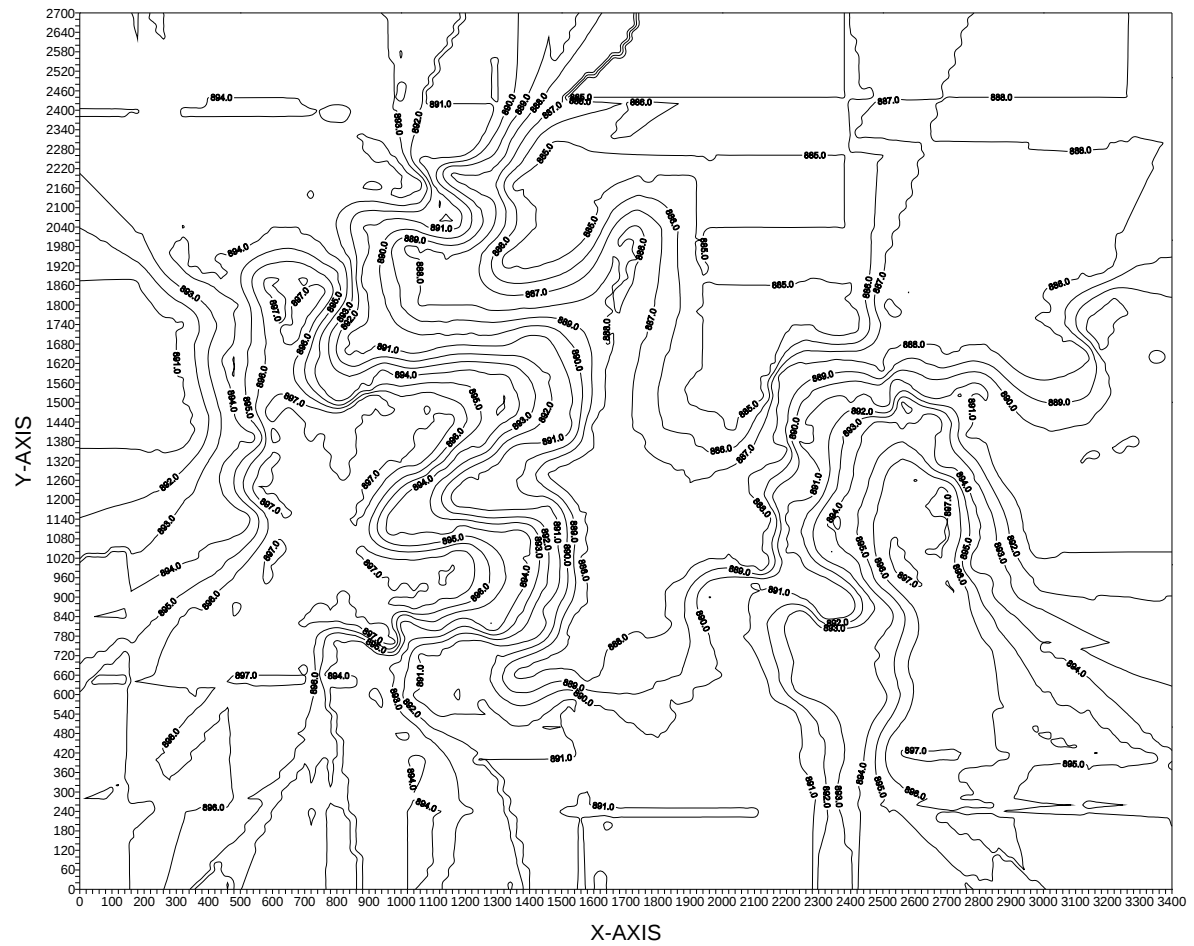


FIG.12 SURFACE CONTOURS AFTER 5 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

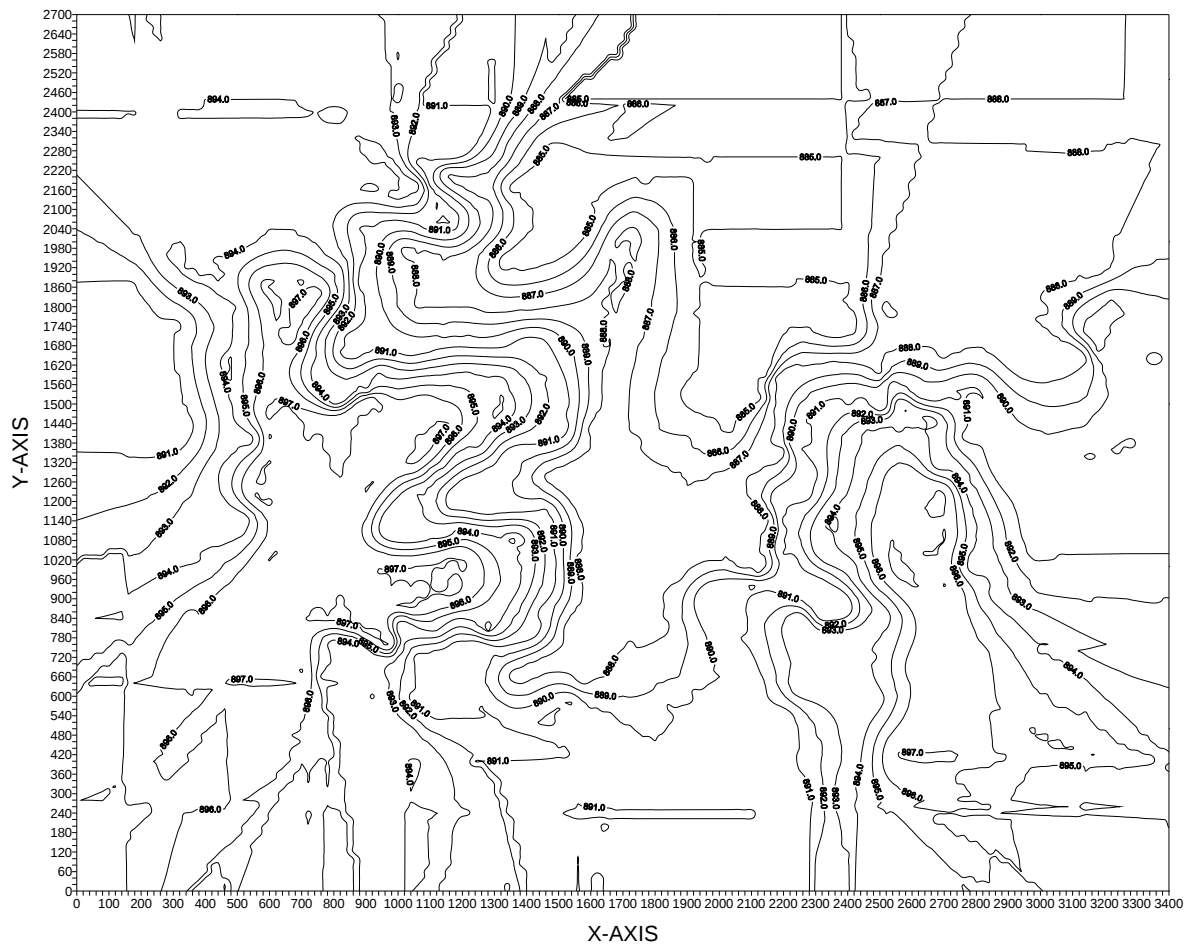


FIG.13 SURFACE CONTOURS AFTER 10 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

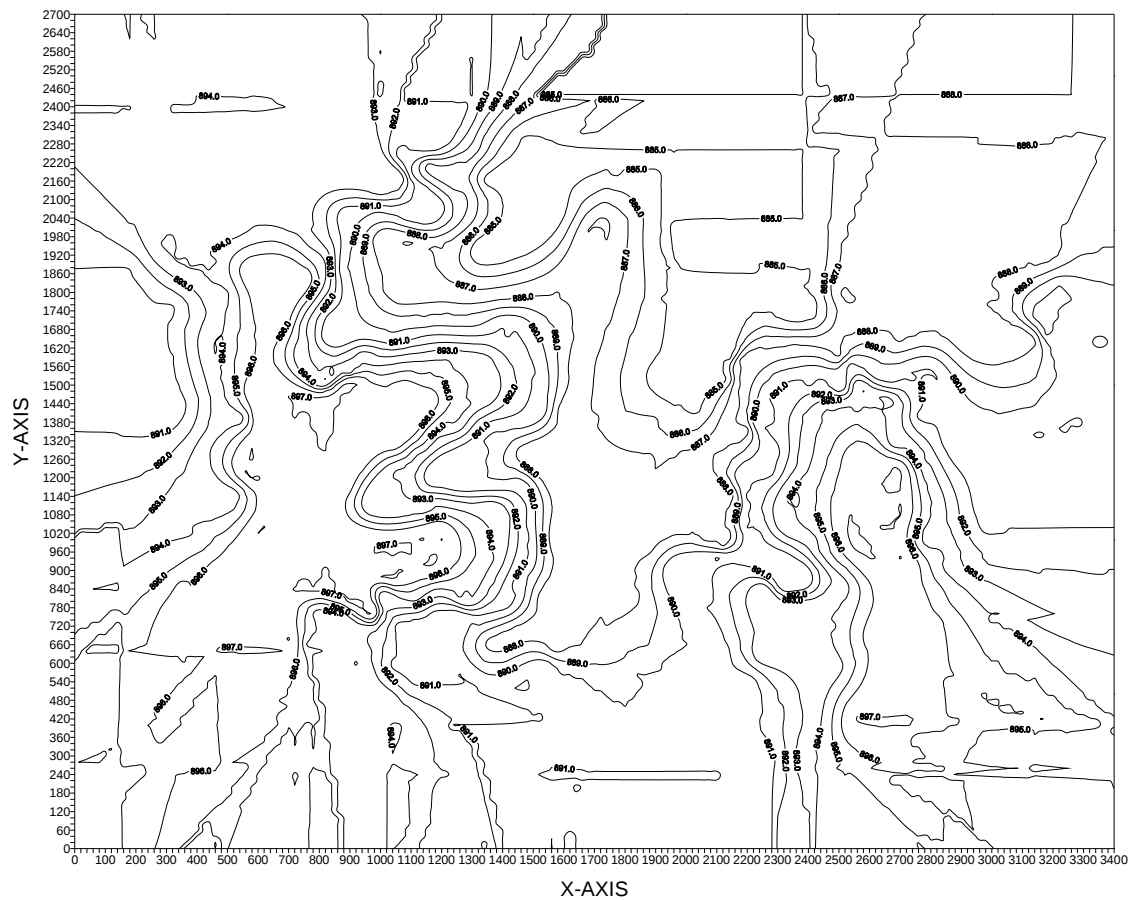


FIG.14 SURFACE CONTOURS AFTER 15 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

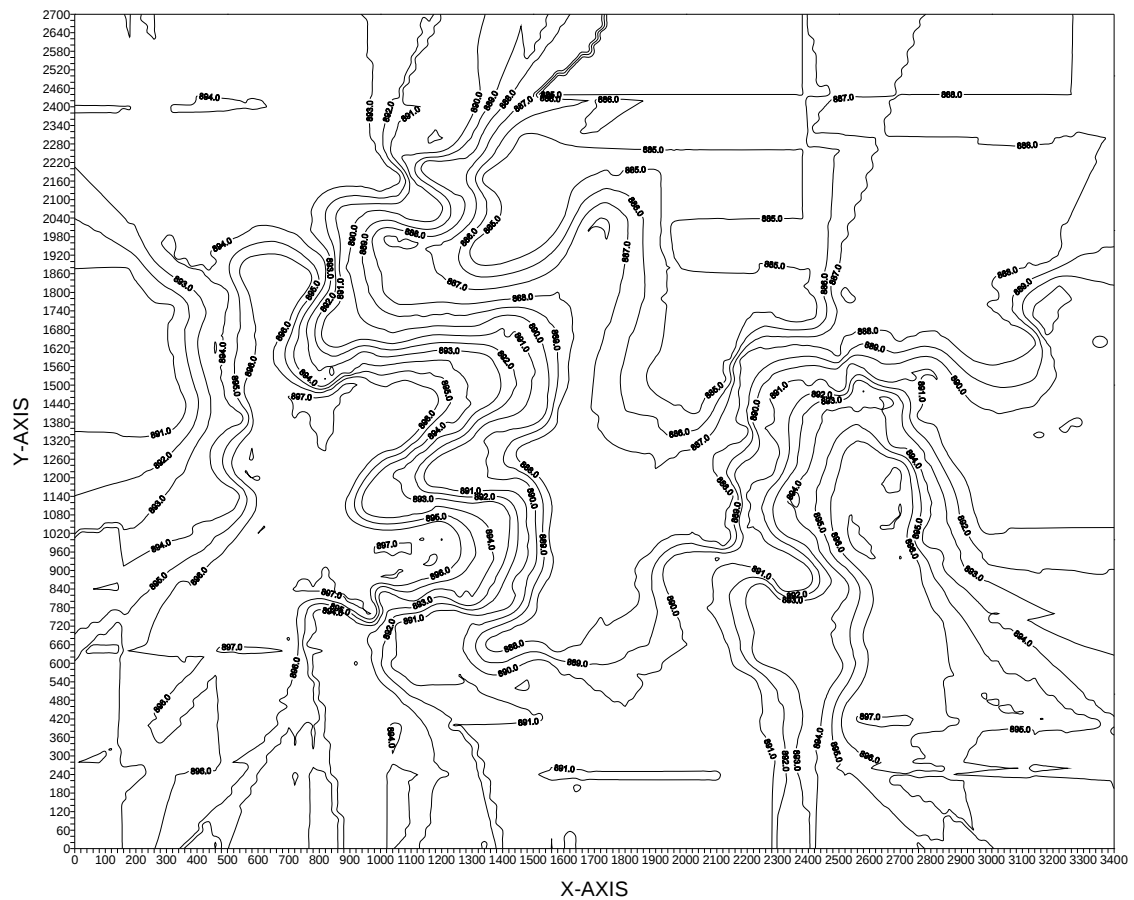


FIG.15 SURFACE CONTOURS AFTER END OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

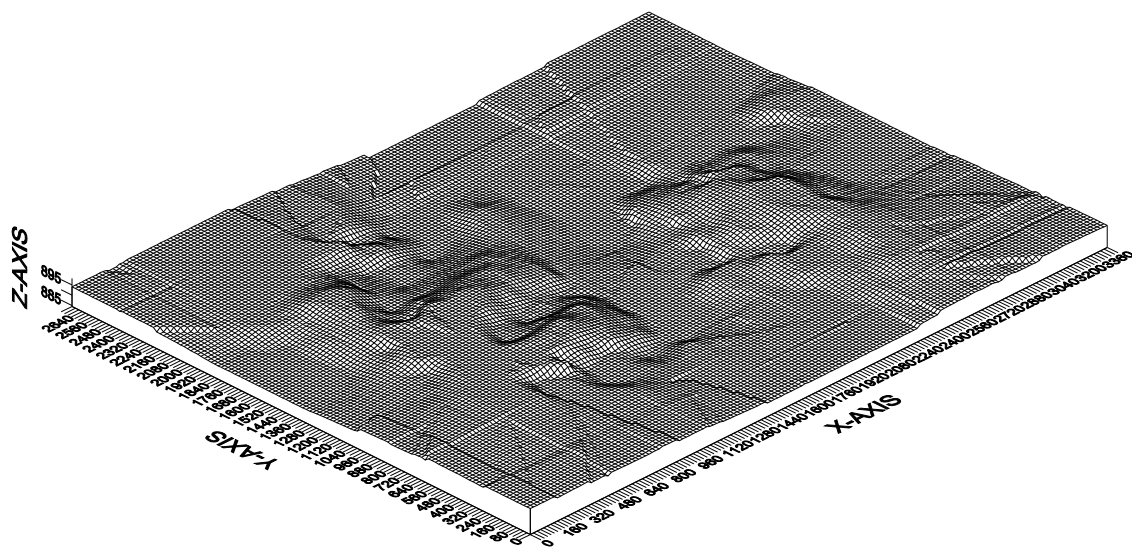


FIG.16a SURFACE PROFILE BEFORE OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

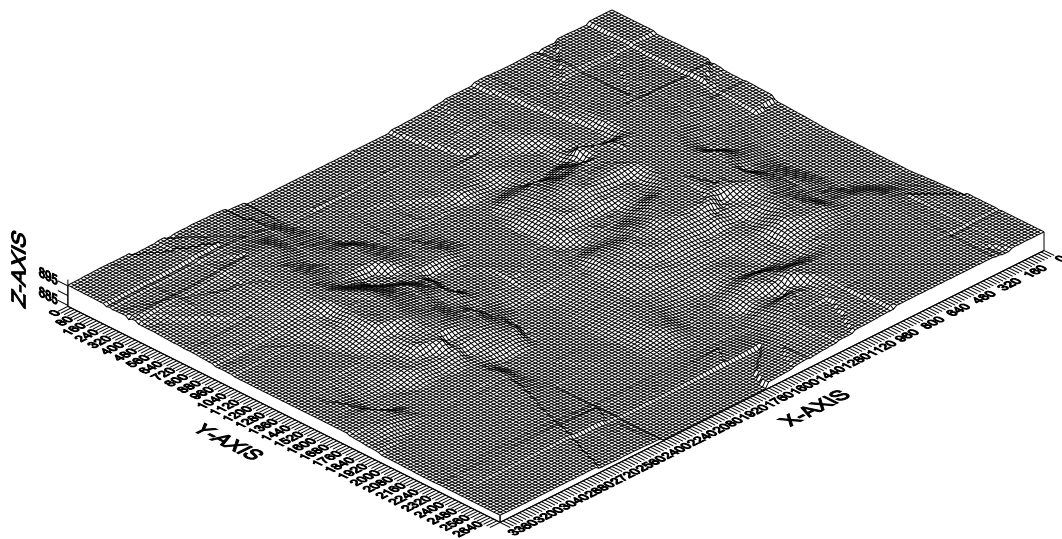


FIG.16b SURFACE PROFILE BEFORE OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

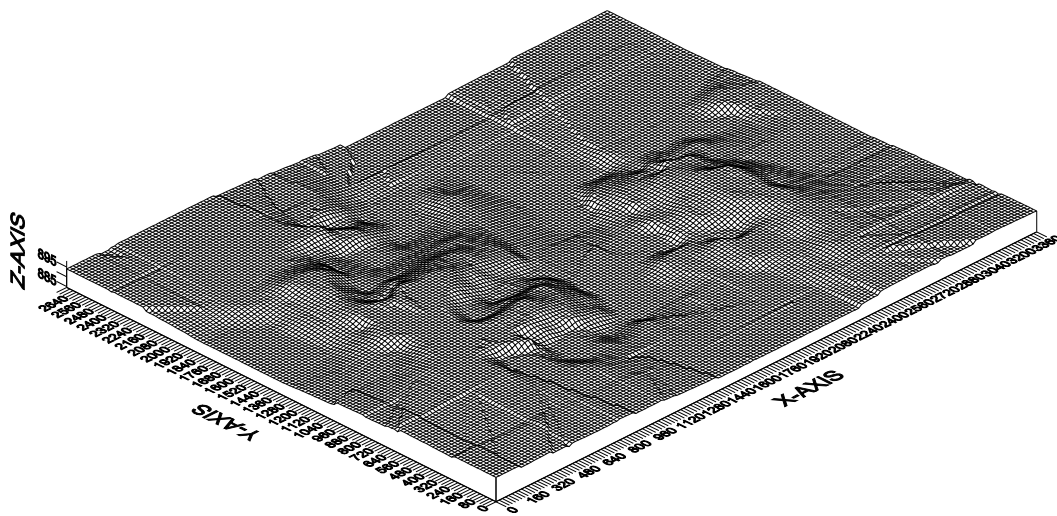


FIG.17a SURFACE PROFILE AFTER 5 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

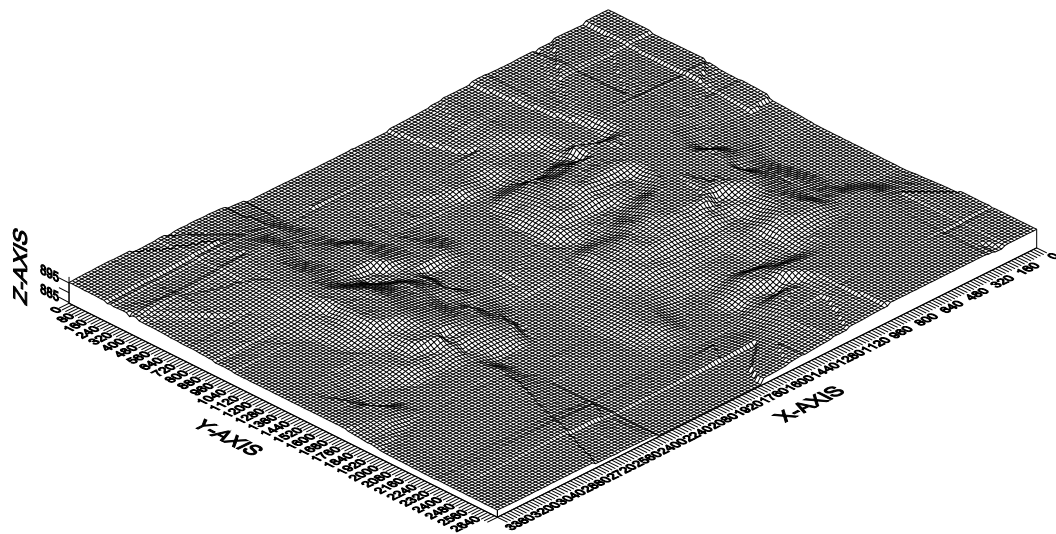


FIG.17b SURFACE PROFILE AFTER 5 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

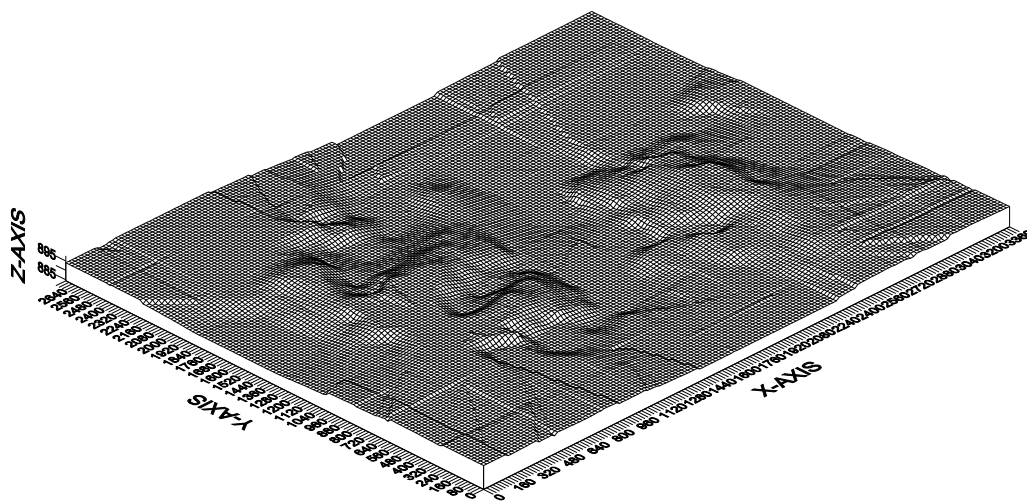


FIG.18a SURFACE PROFILE AFTER 10 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

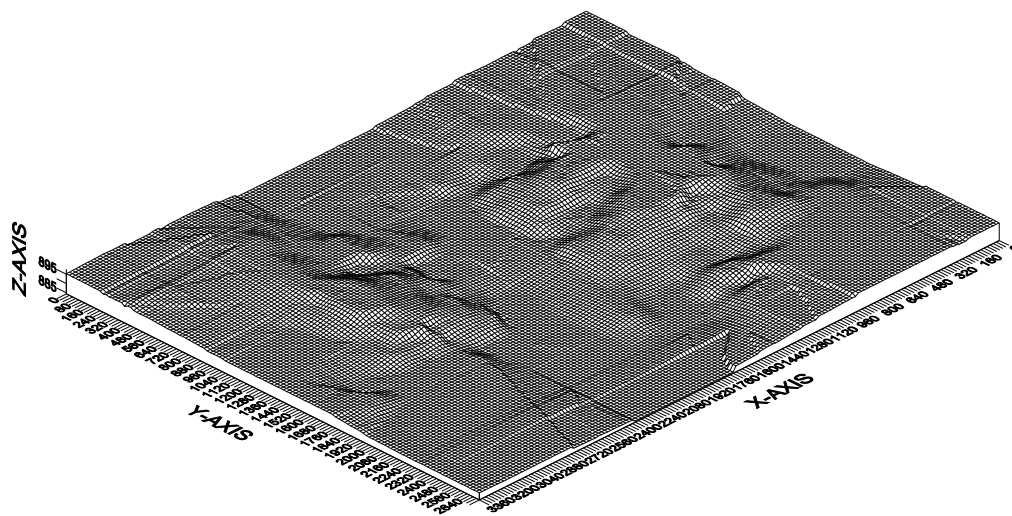


FIG.18b SURFACE PROFILE AFTER 10 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

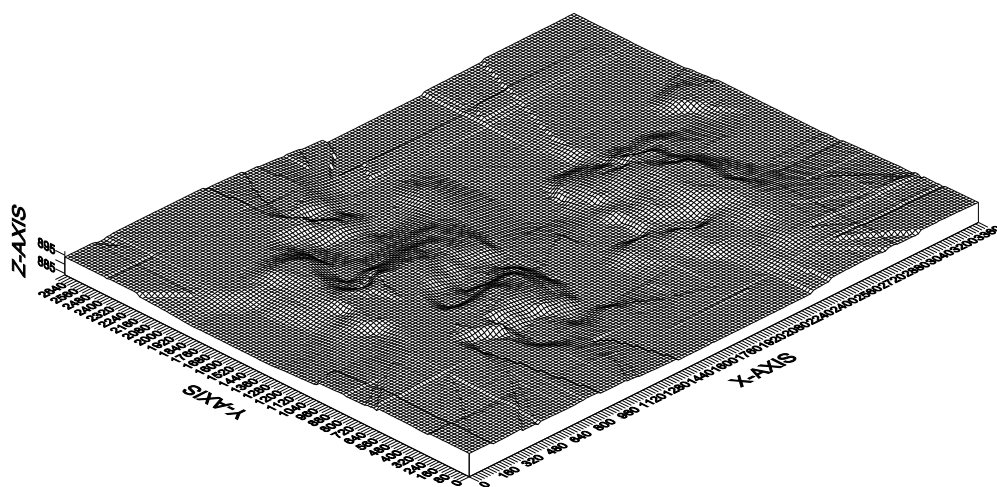


FIG.19a SURFACE PROFILE AFTER 15 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

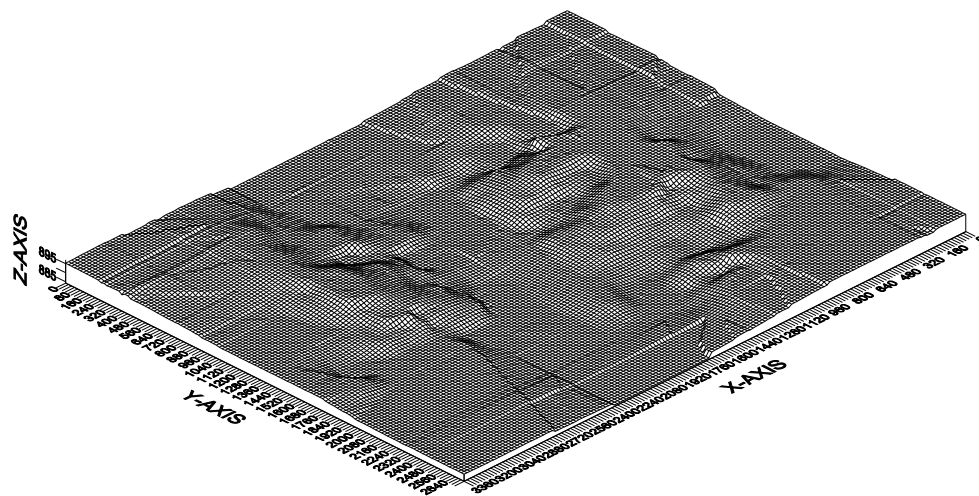


FIG.19b SURFACE PROFILE AFTER 15 YRS OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

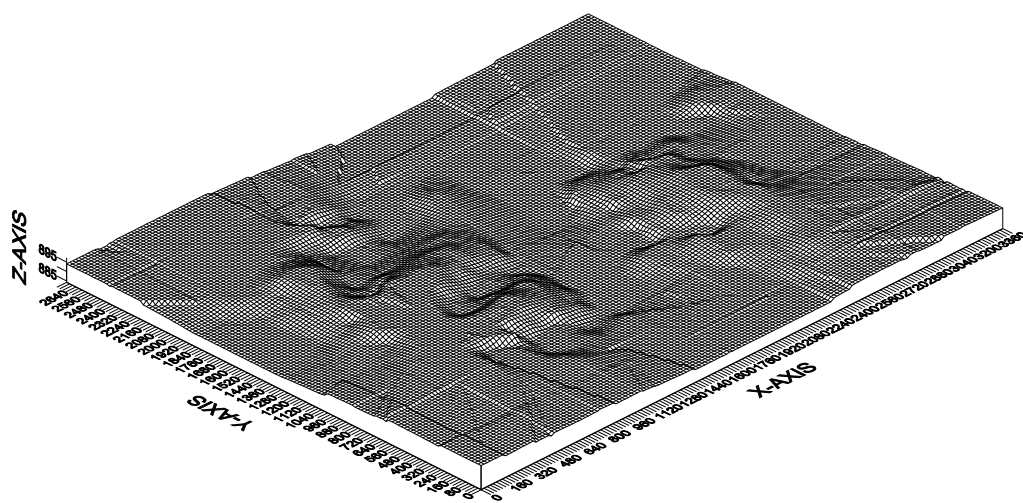


FIG.20a SURFACE PROFILE AFTER END OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

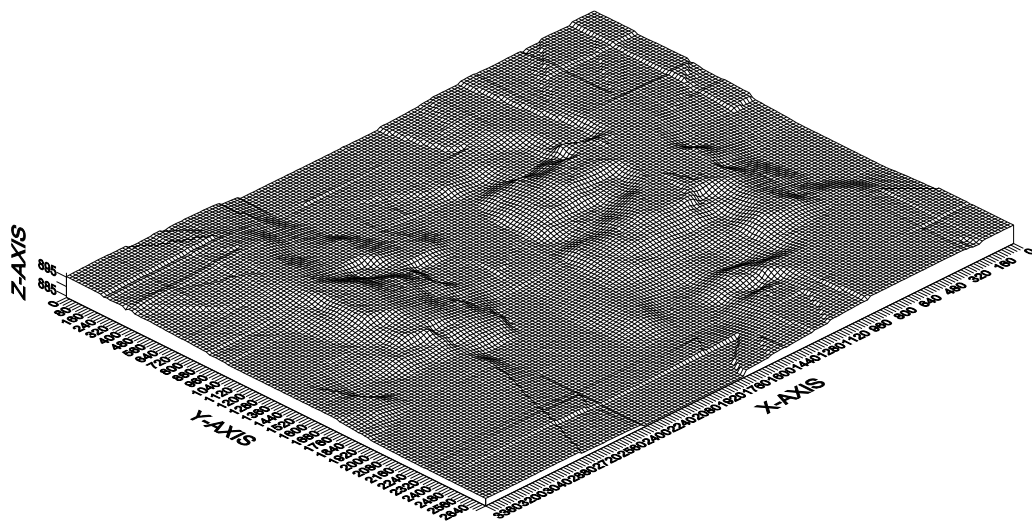


FIG.20b SURFACE PROFILE AFTER END OF MINING
MANDMARRI SHAFT BLOCK (SECTORS "D"-"E")

.0 TENSILE STRAIN AND CRACK WIDTH

6.1 MAXIMUM TENSILE STRAIN

The maximum predicted tensile strain for Mandmarri Shaft Block for various time blocks has been given below in table 6.1.

Table 6.1: Predicted maximum tensile strain for Mandmarri Shaft Block at various time blocks

I. No.	Time Block (in years)	Tensile Strain (mm/m)
1.	5	3.693
2.	10	3.693
3.	15	6.335
4.	17	6.335

The maximum predicted tensile strain has been predicted for each time block separately and is 6.335 mm/m at the end of mining.

6.2 CRACK

It is well established from the field experience that the cracks may occur under the condition of high tension and weak rock. The prediction of cracks width is associated with high degree of uncertainty. Zones of possible cracks will be in the vicinity of weak rocks and near fault planes under high tensile strain. To have accurate prediction, the strain maps should be superimposed over the detailed geological plan with geotechnical data. Cracks are not likely to be formed due to extraction of the panels.

7.0 DISCUSSION

No important surface features, except 440 KV NTPC power transmission line, abandoned small Pranahita- Chevella irrigation tank and Palla Vagu, lie over the project area. It is proposed to leave solid coal pillars exactly beneath the towers of 440 KV power lines un-extracted and to divert Pala Vagu for a length of about 400 M to minimize blockage of reserves. Further the irrigation tank would be backfilled to surface level to prevent accumulation of water.

The predicted subsidence has been shown in Fig.4 through Fig. 7. The peak predicted subsidence value at the end of 5 years, 10 years, 15 years and 17 years (i.e., at the end of mining) has been summarised in table 5.1. The peak predicted subsidence is 0.354 m and 0.373 m at the end of 5 years of mining and 10 years of mining respectively. This peak predicted subsidence value increases to 0.898 m at end of 15 year of mining and 1.019 m end of 17 year of mining. The impact of deeper working in term of subsidence is negligible. Comparatively shallow workings show some subsidence. However, subsidence trough thus formed are likely to be gentle in nature.

Table 6.1 summarised the predicted the predicted peak horizontal tensile strain of the surface. it shows that horizontal tensile strain will be 3.69 mm/m at end of 10 year of mining. This will slightly increase to 6.335 mm/m at end of mining. Fig. 21 shows the subsidence contours at end mining superimposed with surface structure. This figure shows that are two power line passing through the surface. one power line crosses the subsidence contour of 0.5 m (between 11-17 year of mining) and the other will not experience any significant impact of subsidence. The horizontal tensile strain is very low and it will not cause any significant damage.

The maximum horizontal tensile strain will be always less than 10mm/m. Therefore, are may safely conclude that there will not be any effect of subsidence on the forest.

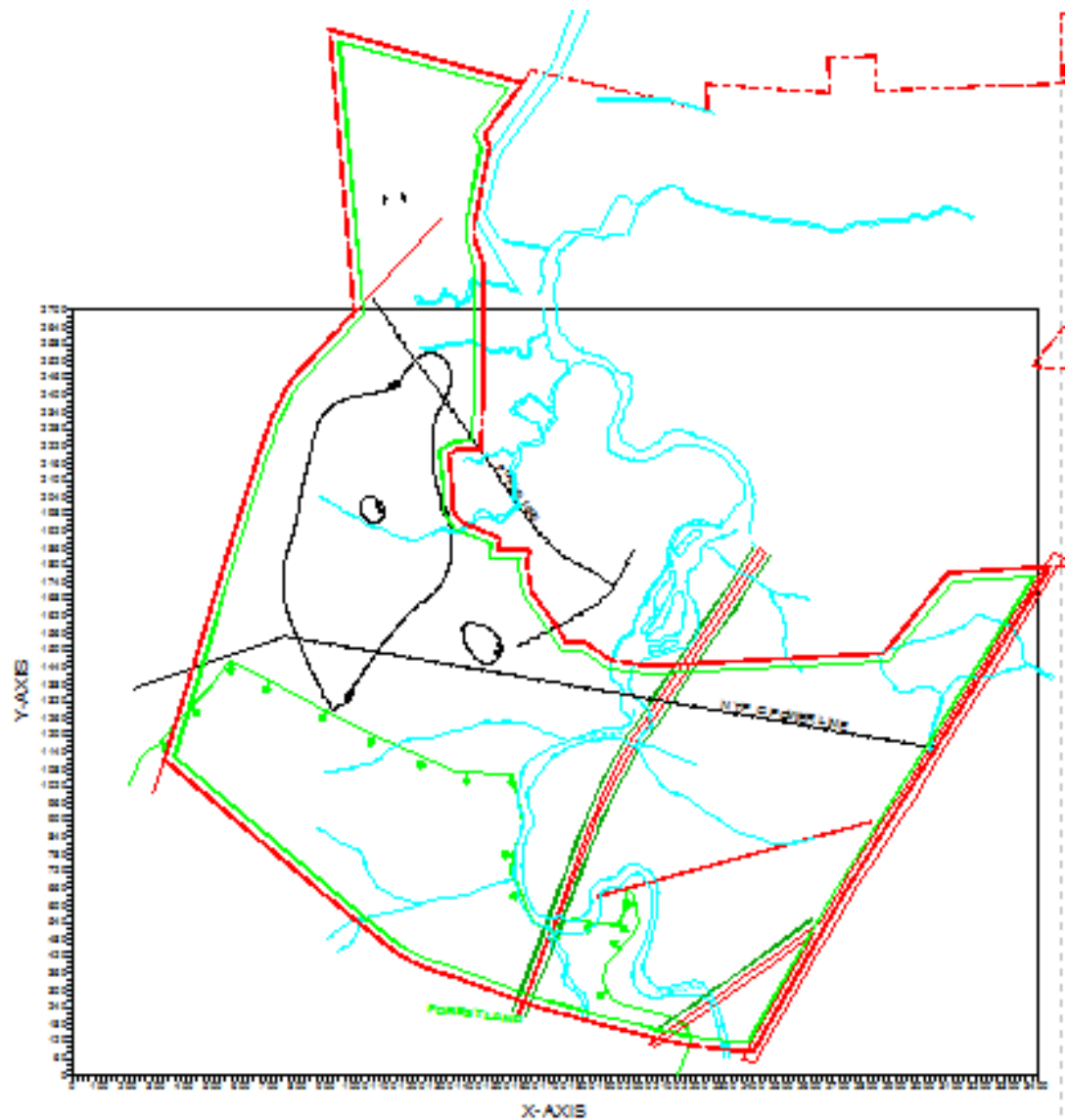


FIG.21 SUBSIDENCE CONTOURS AFTER END OF MINING SUPERIMPOSED WITH
SURFACE STRUCTURES, MANDAMARRI SHAFT BLOCK (SECTORS "D"- "E")

The vagu will also not be affected by the surface subsidence. Therefore, it may be safely concluded that underground mining will not damage the surface structure. However, care should be taken of the power line above the shallower underground working that has be shown in Fig. 21 as cutting subsidence contour between 11 to 17 years of mining.

8.0 SUBSIDENCE MANAGEMENT PLAN

The predicted surface subsidence, horizontal tensile strain and crack width are negligible for Mandamarri Shaft Block “Sector D & E”. It is not likely to have any impact on surface structures. However, care should be taken of the power line above the shallower underground working that has be shown in Fig. 21 as cutting subsidence contour between 11 to 17 years of mining.

9.0 CONCLUSION

Mandmarri Shaft Block is proposed to be excavated by underground bord & pillar system of mining with continuous miner. The total of life of the mine is proposed to be 17 year.

No important surface features, except 440 KV NTPC power transmission line, abandoned small Pranahita- Chevella irrigation tank and Palla Vagu, lie over the project area. It is proposed to leave solid coal pillars exactly beneath the towers of 440 KV power lines un-extracted and to divert Pala Vagu for a length of about 400 M to minimize blockage of reserves. Further the irrigation tank would be backfilled to surface level to prevent accumulation of water.

The predicted peak subsidence at the surface is 1.019 m and peak predicted horizontal tensile strain is 6.335 mm/m. The subsidence trough likely to be formed on the surface will be gentle in nature. There will not be any significant impact of subsidence on the forest and vagu. However, care should be taken of the power line

above the shallower underground working that has be shown in Fig. 21 as cutting subsidence contour between 11 to 17 years of mining.

(B.K. SHRIVASTVA)
Professor of Mining Engineering
PRINCIPAL CONSULTANT

APPENDIX

TABLE-I
Subsidence values (above 0.5 m) alongwith
coordinates after end of mining

<u>x-coordinate</u>	<u>y-coordinate</u>	<u>subsidence (predicted)</u>	x-coordinate	y-coordinate	subsidence (predicted)
			860.000	1460.000	-0.519
			880.000	1460.000	-0.527
			900.000	1460.000	-0.535
			920.000	1460.000	-0.537
			940.000	1460.000	-0.537
			960.000	1460.000	-0.535
			980.000	1460.000	-0.531
			1000.000	1460.000	-0.525
			1020.000	1460.000	-0.516
			1040.000	1460.000	-0.507
			1460.000	1460.000	-0.504
			1480.000	1460.000	-0.502
			840.000	1480.000	-0.514
			860.000	1480.000	-0.529
			880.000	1480.000	-0.537
			900.000	1480.000	-0.543
			920.000	1480.000	-0.545
			940.000	1480.000	-0.548
			960.000	1480.000	-0.545
			980.000	1480.000	-0.540
			1000.000	1480.000	-0.532
			1020.000	1480.000	-0.524
			1040.000	1480.000	-0.514
			1060.000	1480.000	-0.503
			1420.000	1480.000	-0.502
			1440.000	1480.000	-0.510
			1460.000	1480.000	-0.508
			1480.000	1480.000	-0.506
			1500.000	1480.000	-0.501
			820.000	1500.000	-0.509
			840.000	1500.000	-0.524
			860.000	1500.000	-0.537
			880.000	1500.000	-0.547
			900.000	1500.000	-0.553
			920.000	1500.000	-0.558
			940.000	1500.000	-0.559
			960.000	1500.000	-0.556
			980.000	1500.000	-0.551
			1000.000	1500.000	-0.542
			1020.000	1500.000	-0.534
			1040.000	1500.000	-0.524
			1060.000	1500.000	-0.510
			1420.000	1500.000	-0.509
			1440.000	1500.000	-0.512
			1460.000	1500.000	-0.512
			1480.000	1500.000	-0.511
			1500.000	1500.000	-0.503
			820.000	1520.000	-0.516
			840.000	1520.000	-0.534
			860.000	1520.000	-0.548
			880.000	1520.000	-0.557
			900.000	1520.000	-0.566
			920.000	1520.000	-0.571
			940.000	1520.000	-0.570
			960.000	1520.000	-0.570
920.000	1300.000	-0.502			
920.000	1320.000	-0.506			
940.000	1320.000	-0.504			
960.000	1320.000	-0.502			
900.000	1340.000	-0.504			
920.000	1340.000	-0.507			
940.000	1340.000	-0.505			
960.000	1340.000	-0.504			
880.000	1360.000	-0.501			
900.000	1360.000	-0.506			
920.000	1360.000	-0.508			
940.000	1360.000	-0.510			
960.000	1360.000	-0.506			
980.000	1360.000	-0.503			
880.000	1380.000	-0.505			
900.000	1380.000	-0.510			
920.000	1380.000	-0.513			
940.000	1380.000	-0.512			
960.000	1380.000	-0.510			
980.000	1380.000	-0.505			
860.000	1400.000	-0.501			
880.000	1400.000	-0.508			
900.000	1400.000	-0.515			
920.000	1400.000	-0.517			
940.000	1400.000	-0.517			
960.000	1400.000	-0.514			
980.000	1400.000	-0.512			
1000.000	1400.000	-0.505			
860.000	1420.000	-0.506			
880.000	1420.000	-0.514			
900.000	1420.000	-0.519			
920.000	1420.000	-0.522			
940.000	1420.000	-0.525			
960.000	1420.000	-0.519			
980.000	1420.000	-0.517			
1000.000	1420.000	-0.510			
1020.000	1420.000	-0.502			
840.000	1440.000	-0.503			
860.000	1440.000	-0.514			
880.000	1440.000	-0.521			
900.000	1440.000	-0.526			
920.000	1440.000	-0.528			
940.000	1440.000	-0.530			
960.000	1440.000	-0.526			
980.000	1440.000	-0.522			
1000.000	1440.000	-0.517			
1020.000	1440.000	-0.507			
840.000	1460.000	-0.508			

x-coordinate	y-coordinate	subsidence (predicted)	x-coordinate	y-coordinate	subsidence (predicted)
980.000	1520.000	-0.564	1440.000	1560.000	-0.513
1000.000	1520.000	-0.560	1460.000	1560.000	-0.510
1020.000	1520.000	-0.548	1480.000	1560.000	-0.504
1040.000	1520.000	-0.535	780.000	1580.000	-0.503
1060.000	1520.000	-0.522	800.000	1580.000	-0.528
1080.000	1520.000	-0.508	820.000	1580.000	-0.550
1400.000	1520.000	-0.505	840.000	1580.000	-0.572
1420.000	1520.000	-0.512	860.000	1580.000	-0.590
1440.000	1520.000	-0.515	880.000	1580.000	-0.603
1460.000	1520.000	-0.517	900.000	1580.000	-0.611
1480.000	1520.000	-0.510	920.000	1580.000	-0.619
1500.000	1520.000	-0.504	940.000	1580.000	-0.621
800.000	1540.000	-0.507	960.000	1580.000	-0.621
820.000	1540.000	-0.526	980.000	1580.000	-0.614
840.000	1540.000	-0.543	1000.000	1580.000	-0.606
860.000	1540.000	-0.560	1020.000	1580.000	-0.593
880.000	1540.000	-0.571	1040.000	1580.000	-0.579
900.000	1540.000	-0.581	1060.000	1580.000	-0.564
920.000	1540.000	-0.585	1080.000	1580.000	-0.547
940.000	1540.000	-0.586	1100.000	1580.000	-0.531
960.000	1540.000	-0.584	1120.000	1580.000	-0.516
980.000	1540.000	-0.582	1140.000	1580.000	-0.503
1000.000	1540.000	-0.572	1380.000	1580.000	-0.501
1020.000	1540.000	-0.562	1400.000	1580.000	-0.503
1040.000	1540.000	-0.550	1420.000	1580.000	-0.505
1060.000	1540.000	-0.535	1440.000	1580.000	-0.505
1080.000	1540.000	-0.520	1460.000	1580.000	-0.501
1100.000	1540.000	-0.507	780.000	1600.000	-0.513
1380.000	1540.000	-0.501	800.000	1600.000	-0.541
1400.000	1540.000	-0.507	820.000	1600.000	-0.566
1420.000	1540.000	-0.514	840.000	1600.000	-0.589
1440.000	1540.000	-0.517	860.000	1600.000	-0.607
1460.000	1540.000	-0.513	880.000	1600.000	-0.622
1480.000	1540.000	-0.509	900.000	1600.000	-0.630
1500.000	1540.000	-0.502	920.000	1600.000	-0.638
800.000	1560.000	-0.517	940.000	1600.000	-0.642
820.000	1560.000	-0.539	960.000	1600.000	-0.641
840.000	1560.000	-0.558	980.000	1600.000	-0.633
860.000	1560.000	-0.574	1000.000	1600.000	-0.625
880.000	1560.000	-0.585	1020.000	1600.000	-0.613
900.000	1560.000	-0.595	1040.000	1600.000	-0.597
920.000	1560.000	-0.603	1060.000	1600.000	-0.581
940.000	1560.000	-0.604	1080.000	1600.000	-0.565
960.000	1560.000	-0.601	1100.000	1600.000	-0.545
980.000	1560.000	-0.597	1120.000	1600.000	-0.529
1000.000	1560.000	-0.588	1140.000	1600.000	-0.514
1020.000	1560.000	-0.576	1160.000	1600.000	-0.501
1040.000	1560.000	-0.565	780.000	1620.000	-0.524
1060.000	1560.000	-0.549	800.000	1620.000	-0.553
1080.000	1560.000	-0.532	820.000	1620.000	-0.580
1100.000	1560.000	-0.518	840.000	1620.000	-0.603
1120.000	1560.000	-0.504	860.000	1620.000	-0.624
1380.000	1560.000	-0.501	880.000	1620.000	-0.641
1400.000	1560.000	-0.508	900.000	1620.000	-0.649
1420.000	1560.000	-0.513	920.000	1620.000	-0.658

x-coordinate	y-coordinate	subsidence (predicted)	x-coordinate	y-coordinate	subsidence (predicted)
940.000	1620.000	-0.660	1180.000	1660.000	-0.523
960.000	1620.000	-0.659	1200.000	1660.000	-0.510
980.000	1620.000	-0.653	760.000	1680.000	-0.523
1000.000	1620.000	-0.642	780.000	1680.000	-0.555
1020.000	1620.000	-0.631	800.000	1680.000	-0.589
1040.000	1620.000	-0.614	820.000	1680.000	-0.620
1060.000	1620.000	-0.595	840.000	1680.000	-0.646
1080.000	1620.000	-0.580	860.000	1680.000	-0.668
1100.000	1620.000	-0.561	880.000	1680.000	-0.688
1120.000	1620.000	-0.543	900.000	1680.000	-0.702
1140.000	1620.000	-0.525	920.000	1680.000	-0.711
1160.000	1620.000	-0.509	940.000	1680.000	-0.716
760.000	1640.000	-0.504	960.000	1680.000	-0.713
780.000	1640.000	-0.535	980.000	1680.000	-0.708
800.000	1640.000	-0.566	1000.000	1680.000	-0.700
820.000	1640.000	-0.594	1020.000	1680.000	-0.684
840.000	1640.000	-0.619	1040.000	1680.000	-0.670
860.000	1640.000	-0.640	1060.000	1680.000	-0.651
880.000	1640.000	-0.657	1080.000	1680.000	-0.630
900.000	1640.000	-0.669	1100.000	1680.000	-0.608
920.000	1640.000	-0.676	1120.000	1680.000	-0.587
940.000	1640.000	-0.679	1140.000	1680.000	-0.570
960.000	1640.000	-0.680	1160.000	1680.000	-0.552
980.000	1640.000	-0.674	1180.000	1680.000	-0.534
1000.000	1640.000	-0.661	1200.000	1680.000	-0.523
1020.000	1640.000	-0.648	1220.000	1680.000	-0.511
1040.000	1640.000	-0.633	1240.000	1680.000	-0.504
1060.000	1640.000	-0.612	760.000	1700.000	-0.530
1080.000	1640.000	-0.594	780.000	1700.000	-0.565
1100.000	1640.000	-0.576	800.000	1700.000	-0.601
1120.000	1640.000	-0.556	820.000	1700.000	-0.631
1140.000	1640.000	-0.538	840.000	1700.000	-0.657
1160.000	1640.000	-0.523	860.000	1700.000	-0.682
1180.000	1640.000	-0.510	880.000	1700.000	-0.701
760.000	1660.000	-0.513	900.000	1700.000	-0.715
780.000	1660.000	-0.546	920.000	1700.000	-0.725
800.000	1660.000	-0.578	940.000	1700.000	-0.728
820.000	1660.000	-0.607	960.000	1700.000	-0.728
840.000	1660.000	-0.632	980.000	1700.000	-0.723
860.000	1660.000	-0.654	1000.000	1700.000	-0.715
880.000	1660.000	-0.673	1020.000	1700.000	-0.703
900.000	1660.000	-0.686	1040.000	1700.000	-0.688
920.000	1660.000	-0.694	1060.000	1700.000	-0.667
940.000	1660.000	-0.699	1080.000	1700.000	-0.649
960.000	1660.000	-0.697	1100.000	1700.000	-0.628
980.000	1660.000	-0.691	1120.000	1700.000	-0.605
1000.000	1660.000	-0.681	1140.000	1700.000	-0.585
1020.000	1660.000	-0.667	1160.000	1700.000	-0.568
1040.000	1660.000	-0.652	1180.000	1700.000	-0.553
1060.000	1660.000	-0.633	1200.000	1700.000	-0.536
1080.000	1660.000	-0.612	1220.000	1700.000	-0.525
1100.000	1660.000	-0.590	1240.000	1700.000	-0.514
1120.000	1660.000	-0.571	1260.000	1700.000	-0.504
1140.000	1660.000	-0.556	760.000	1720.000	-0.535
1160.000	1660.000	-0.536	780.000	1720.000	-0.572

x-coordinate	y-coordinate	subsidence (predicted)	x-coordinate	y-coordinate	subsidence (predicted)
800.000	1720.000	-0.608	800.000	1760.000	-0.612
820.000	1720.000	-0.640	820.000	1760.000	-0.646
840.000	1720.000	-0.666	840.000	1760.000	-0.675
860.000	1720.000	-0.692	860.000	1760.000	-0.701
880.000	1720.000	-0.711	880.000	1760.000	-0.723
900.000	1720.000	-0.728	900.000	1760.000	-0.741
920.000	1720.000	-0.737	920.000	1760.000	-0.752
940.000	1720.000	-0.742	940.000	1760.000	-0.761
960.000	1720.000	-0.743	960.000	1760.000	-0.764
980.000	1720.000	-0.737	980.000	1760.000	-0.761
1000.000	1720.000	-0.730	1000.000	1760.000	-0.759
1020.000	1720.000	-0.717	1020.000	1760.000	-0.749
1040.000	1720.000	-0.702	1040.000	1760.000	-0.737
1060.000	1720.000	-0.682	1060.000	1760.000	-0.722
1080.000	1720.000	-0.664	1080.000	1760.000	-0.708
1100.000	1720.000	-0.645	1100.000	1760.000	-0.689
1120.000	1720.000	-0.626	1120.000	1760.000	-0.670
1140.000	1720.000	-0.606	1140.000	1760.000	-0.652
1160.000	1720.000	-0.587	1160.000	1760.000	-0.633
1180.000	1720.000	-0.570	1180.000	1760.000	-0.618
1200.000	1720.000	-0.552	1200.000	1760.000	-0.598
1220.000	1720.000	-0.541	1220.000	1760.000	-0.581
1240.000	1720.000	-0.526	1240.000	1760.000	-0.565
1260.000	1720.000	-0.519	1260.000	1760.000	-0.548
1280.000	1720.000	-0.504	1280.000	1760.000	-0.530
760.000	1740.000	-0.538	1300.000	1760.000	-0.511
780.000	1740.000	-0.576	760.000	1780.000	-0.535
800.000	1740.000	-0.611	780.000	1780.000	-0.575
820.000	1740.000	-0.643	800.000	1780.000	-0.609
840.000	1740.000	-0.673	820.000	1780.000	-0.644
860.000	1740.000	-0.699	840.000	1780.000	-0.675
880.000	1740.000	-0.718	860.000	1780.000	-0.701
900.000	1740.000	-0.735	880.000	1780.000	-0.724
920.000	1740.000	-0.745	900.000	1780.000	-0.742
940.000	1740.000	-0.754	920.000	1780.000	-0.758
960.000	1740.000	-0.754	940.000	1780.000	-0.765
980.000	1740.000	-0.750	960.000	1780.000	-0.773
1000.000	1740.000	-0.744	980.000	1780.000	-0.774
1020.000	1740.000	-0.733	1000.000	1780.000	-0.773
1040.000	1740.000	-0.717	1020.000	1780.000	-0.766
1060.000	1740.000	-0.704	1040.000	1780.000	-0.756
1080.000	1740.000	-0.687	1060.000	1780.000	-0.745
1100.000	1740.000	-0.666	1080.000	1780.000	-0.731
1120.000	1740.000	-0.647	1100.000	1780.000	-0.715
1140.000	1740.000	-0.628	1120.000	1780.000	-0.696
1160.000	1740.000	-0.608	1140.000	1780.000	-0.680
1180.000	1740.000	-0.590	1160.000	1780.000	-0.661
1200.000	1740.000	-0.573	1180.000	1780.000	-0.646
1220.000	1740.000	-0.560	1200.000	1780.000	-0.627
1240.000	1740.000	-0.545	1220.000	1780.000	-0.607
1260.000	1740.000	-0.532	1240.000	1780.000	-0.588
1280.000	1740.000	-0.516	1260.000	1780.000	-0.566
1300.000	1740.000	-0.504	1280.000	1780.000	-0.546
760.000	1760.000	-0.537	1300.000	1780.000	-0.526
780.000	1760.000	-0.575	1320.000	1780.000	-0.502

x-coordinate	y-coordinate	subsidence (predicted)	x-coordinate	y-coordinate	subsidence (predicted)
760.000	1800.000	-0.528	1280.000	1820.000	-0.583
780.000	1800.000	-0.567	1300.000	1820.000	-0.555
800.000	1800.000	-0.604	1320.000	1820.000	-0.520
820.000	1800.000	-0.639	760.000	1840.000	-0.508
840.000	1800.000	-0.670	780.000	1840.000	-0.547
860.000	1800.000	-0.698	800.000	1840.000	-0.585
880.000	1800.000	-0.723	820.000	1840.000	-0.623
900.000	1800.000	-0.744	840.000	1840.000	-0.657
920.000	1800.000	-0.761	860.000	1840.000	-0.692
940.000	1800.000	-0.772	880.000	1840.000	-0.719
960.000	1800.000	-0.781	900.000	1840.000	-0.746
980.000	1800.000	-0.788	920.000	1840.000	-0.768
1000.000	1800.000	-0.789	940.000	1840.000	-0.788
1020.000	1800.000	-0.786	960.000	1840.000	-0.804
1040.000	1800.000	-0.779	980.000	1840.000	-0.817
1060.000	1800.000	-0.770	1000.000	1840.000	-0.826
1080.000	1800.000	-0.758	1020.000	1840.000	-0.831
1100.000	1800.000	-0.744	1040.000	1840.000	-0.833
1120.000	1800.000	-0.729	1060.000	1840.000	-0.830
1140.000	1800.000	-0.711	1080.000	1840.000	-0.823
1160.000	1800.000	-0.692	1100.000	1840.000	-0.814
1180.000	1800.000	-0.674	1120.000	1840.000	-0.800
1200.000	1800.000	-0.653	1140.000	1840.000	-0.781
1220.000	1800.000	-0.632	1160.000	1840.000	-0.764
1240.000	1800.000	-0.613	1180.000	1840.000	-0.742
1260.000	1800.000	-0.590	1200.000	1840.000	-0.718
1280.000	1800.000	-0.564	1220.000	1840.000	-0.692
1300.000	1800.000	-0.539	1240.000	1840.000	-0.663
1320.000	1800.000	-0.513	1260.000	1840.000	-0.634
760.000	1820.000	-0.519	1280.000	1840.000	-0.601
780.000	1820.000	-0.559	1300.000	1840.000	-0.567
800.000	1820.000	-0.595	1320.000	1840.000	-0.532
820.000	1820.000	-0.631	780.000	1860.000	-0.536
840.000	1820.000	-0.666	800.000	1860.000	-0.573
860.000	1820.000	-0.694	820.000	1860.000	-0.612
880.000	1820.000	-0.722	840.000	1860.000	-0.649
900.000	1820.000	-0.744	860.000	1860.000	-0.683
920.000	1820.000	-0.763	880.000	1860.000	-0.717
940.000	1820.000	-0.780	900.000	1860.000	-0.746
960.000	1820.000	-0.793	920.000	1860.000	-0.770
980.000	1820.000	-0.799	940.000	1860.000	-0.796
1000.000	1820.000	-0.805	960.000	1860.000	-0.816
1020.000	1820.000	-0.807	980.000	1860.000	-0.835
1040.000	1820.000	-0.805	1000.000	1860.000	-0.847
1060.000	1820.000	-0.799	1020.000	1860.000	-0.856
1080.000	1820.000	-0.789	1040.000	1860.000	-0.863
1100.000	1820.000	-0.778	1060.000	1860.000	-0.865
1120.000	1820.000	-0.763	1080.000	1860.000	-0.859
1140.000	1820.000	-0.747	1100.000	1860.000	-0.852
1160.000	1820.000	-0.725	1120.000	1860.000	-0.838
1180.000	1820.000	-0.706	1140.000	1860.000	-0.823
1200.000	1820.000	-0.686	1160.000	1860.000	-0.801
1220.000	1820.000	-0.661	1180.000	1860.000	-0.778
1240.000	1820.000	-0.639	1200.000	1860.000	-0.750
1260.000	1820.000	-0.613	1220.000	1860.000	-0.724

x-coordinate	y-coordinate	subsidence (predicted)	x-coordinate	y-coordinate	subsidence (predicted)
1240.000	1860.000	-0.689	1220.000	1900.000	-0.770
1260.000	1860.000	-0.655	1240.000	1900.000	-0.728
1280.000	1860.000	-0.617	1260.000	1900.000	-0.683
1300.000	1860.000	-0.575	1280.000	1900.000	-0.635
1320.000	1860.000	-0.536	1300.000	1900.000	-0.588
780.000	1880.000	-0.522	1320.000	1900.000	-0.541
800.000	1880.000	-0.563	800.000	1920.000	-0.541
820.000	1880.000	-0.601	820.000	1920.000	-0.584
840.000	1880.000	-0.639	840.000	1920.000	-0.629
860.000	1880.000	-0.676	860.000	1920.000	-0.671
880.000	1880.000	-0.712	880.000	1920.000	-0.715
900.000	1880.000	-0.746	900.000	1920.000	-0.756
920.000	1880.000	-0.780	920.000	1920.000	-0.793
940.000	1880.000	-0.806	940.000	1920.000	-0.832
960.000	1880.000	-0.830	960.000	1920.000	-0.867
980.000	1880.000	-0.854	980.000	1920.000	-0.897
1000.000	1880.000	-0.872	1000.000	1920.000	-0.923
1020.000	1880.000	-0.885	1020.000	1920.000	-0.944
1040.000	1880.000	-0.895	1040.000	1920.000	-0.955
1060.000	1880.000	-0.899	1060.000	1920.000	-0.967
1080.000	1880.000	-0.898	1080.000	1920.000	-0.964
1100.000	1880.000	-0.890	1100.000	1920.000	-0.957
1120.000	1880.000	-0.876	1120.000	1920.000	-0.941
1140.000	1880.000	-0.858	1140.000	1920.000	-0.919
1160.000	1880.000	-0.835	1160.000	1920.000	-0.891
1180.000	1880.000	-0.811	1180.000	1920.000	-0.859
1200.000	1880.000	-0.784	1200.000	1920.000	-0.822
1220.000	1880.000	-0.749	1220.000	1920.000	-0.779
1240.000	1880.000	-0.713	1240.000	1920.000	-0.734
1260.000	1880.000	-0.673	1260.000	1920.000	-0.687
1280.000	1880.000	-0.629	1280.000	1920.000	-0.639
1300.000	1880.000	-0.587	1300.000	1920.000	-0.586
1320.000	1880.000	-0.540	1320.000	1920.000	-0.536
780.000	1900.000	-0.511	800.000	1940.000	-0.531
800.000	1900.000	-0.551	820.000	1940.000	-0.578
820.000	1900.000	-0.591	840.000	1940.000	-0.623
840.000	1900.000	-0.632	860.000	1940.000	-0.671
860.000	1900.000	-0.672	880.000	1940.000	-0.717
880.000	1900.000	-0.713	900.000	1940.000	-0.762
900.000	1900.000	-0.750	920.000	1940.000	-0.806
920.000	1900.000	-0.784	940.000	1940.000	-0.846
940.000	1900.000	-0.819	960.000	1940.000	-0.885
960.000	1900.000	-0.849	980.000	1940.000	-0.917
980.000	1900.000	-0.876	1000.000	1940.000	-0.948
1000.000	1900.000	-0.899	1020.000	1940.000	-0.968
1020.000	1900.000	-0.917	1040.000	1940.000	-0.985
1040.000	1900.000	-0.928	1060.000	1940.000	-0.992
1060.000	1900.000	-0.933	1080.000	1940.000	-0.988
1080.000	1900.000	-0.931	1100.000	1940.000	-0.978
1100.000	1900.000	-0.924	1120.000	1940.000	-0.960
1120.000	1900.000	-0.911	1140.000	1940.000	-0.937
1140.000	1900.000	-0.894	1160.000	1940.000	-0.905
1160.000	1900.000	-0.869	1180.000	1940.000	-0.870
1180.000	1900.000	-0.838	1200.000	1940.000	-0.829
1200.000	1900.000	-0.805	1220.000	1940.000	-0.784

x-coordinate	y-coordinate	subsidence (predicted)	x-coordinate	y-coordinate	subsidence (predicted)
1240.000	1940.000	-0.736	1260.000	1980.000	-0.661
1260.000	1940.000	-0.686	1280.000	1980.000	-0.607
1280.000	1940.000	-0.632	1300.000	1980.000	-0.550
1300.000	1940.000	-0.580	800.000	2000.000	-0.507
1320.000	1940.000	-0.525	820.000	2000.000	-0.561
800.000	1960.000	-0.523	840.000	2000.000	-0.616
820.000	1960.000	-0.571	860.000	2000.000	-0.671
840.000	1960.000	-0.623	880.000	2000.000	-0.726
860.000	1960.000	-0.672	900.000	2000.000	-0.781
880.000	1960.000	-0.721	920.000	2000.000	-0.831
900.000	1960.000	-0.769	940.000	2000.000	-0.878
920.000	1960.000	-0.816	960.000	2000.000	-0.917
940.000	1960.000	-0.860	980.000	2000.000	-0.952
960.000	1960.000	-0.898	1000.000	2000.000	-0.981
980.000	1960.000	-0.936	1020.000	2000.000	-1.002
1000.000	1960.000	-0.963	1040.000	2000.000	-1.016
1020.000	1960.000	-0.988	1060.000	2000.000	-1.019
1040.000	1960.000	-1.002	1080.000	2000.000	-1.012
1060.000	1960.000	-1.007	1100.000	2000.000	-0.995
1080.000	1960.000	-1.005	1120.000	2000.000	-0.970
1100.000	1960.000	-0.993	1140.000	2000.000	-0.938
1120.000	1960.000	-0.971	1160.000	2000.000	-0.901
1140.000	1960.000	-0.946	1180.000	2000.000	-0.858
1160.000	1960.000	-0.913	1200.000	2000.000	-0.808
1180.000	1960.000	-0.873	1220.000	2000.000	-0.754
1200.000	1960.000	-0.830	1240.000	2000.000	-0.701
1220.000	1960.000	-0.783	1260.000	2000.000	-0.643
1240.000	1960.000	-0.732	1280.000	2000.000	-0.588
1260.000	1960.000	-0.679	1300.000	2000.000	-0.533
1280.000	1960.000	-0.622	820.000	2020.000	-0.554
1300.000	1960.000	-0.568	840.000	2020.000	-0.611
1320.000	1960.000	-0.512	860.000	2020.000	-0.670
800.000	1980.000	-0.513	880.000	2020.000	-0.726
820.000	1980.000	-0.566	900.000	2020.000	-0.781
840.000	1980.000	-0.617	920.000	2020.000	-0.833
860.000	1980.000	-0.673	940.000	2020.000	-0.879
880.000	1980.000	-0.725	960.000	2020.000	-0.919
900.000	1980.000	-0.776	980.000	2020.000	-0.953
920.000	1980.000	-0.824	1000.000	2020.000	-0.979
940.000	1980.000	-0.870	1020.000	2020.000	-1.002
960.000	1980.000	-0.912	1040.000	2020.000	-1.010
980.000	1980.000	-0.946	1060.000	2020.000	-1.010
1000.000	1980.000	-0.977	1080.000	2020.000	-1.002
1020.000	1980.000	-0.999	1100.000	2020.000	-0.985
1040.000	1980.000	-1.012	1120.000	2020.000	-0.960
1060.000	1980.000	-1.015	1140.000	2020.000	-0.925
1080.000	1980.000	-1.013	1160.000	2020.000	-0.883
1100.000	1980.000	-1.000	1180.000	2020.000	-0.838
1120.000	1980.000	-0.976	1200.000	2020.000	-0.788
1140.000	1980.000	-0.946	1220.000	2020.000	-0.736
1160.000	1980.000	-0.909	1240.000	2020.000	-0.680
1180.000	1980.000	-0.867	1260.000	2020.000	-0.625
1200.000	1980.000	-0.821	1280.000	2020.000	-0.568
1220.000	1980.000	-0.770	1300.000	2020.000	-0.513
1240.000	1980.000	-0.716	820.000	2040.000	-0.546

x-coordinate	y-coordinate	subsidence (predicted)	x-coordinate	y-coordinate	subsidence (predicted)
840.000	2040.000	-0.606	980.000	2080.000	-0.924
860.000	2040.000	-0.665	1000.000	2080.000	-0.949
880.000	2040.000	-0.724	1020.000	2080.000	-0.966
900.000	2040.000	-0.779	1040.000	2080.000	-0.974
920.000	2040.000	-0.829	1060.000	2080.000	-0.972
940.000	2040.000	-0.875	1080.000	2080.000	-0.959
960.000	2040.000	-0.916	1100.000	2080.000	-0.941
980.000	2040.000	-0.949	1120.000	2080.000	-0.914
1000.000	2040.000	-0.973	1140.000	2080.000	-0.878
1020.000	2040.000	-0.991	1160.000	2080.000	-0.836
1040.000	2040.000	-1.000	1180.000	2080.000	-0.788
1060.000	2040.000	-1.001	1200.000	2080.000	-0.734
1080.000	2040.000	-0.992	1220.000	2080.000	-0.679
1100.000	2040.000	-0.971	1240.000	2080.000	-0.621
1120.000	2040.000	-0.941	1260.000	2080.000	-0.567
1140.000	2040.000	-0.909	1280.000	2080.000	-0.511
1160.000	2040.000	-0.868	820.000	2100.000	-0.512
1180.000	2040.000	-0.820	840.000	2100.000	-0.570
1200.000	2040.000	-0.769	860.000	2100.000	-0.630
1220.000	2040.000	-0.715	880.000	2100.000	-0.688
1240.000	2040.000	-0.660	900.000	2100.000	-0.744
1260.000	2040.000	-0.602	920.000	2100.000	-0.795
1280.000	2040.000	-0.547	940.000	2100.000	-0.842
820.000	2060.000	-0.536	960.000	2100.000	-0.879
840.000	2060.000	-0.596	980.000	2100.000	-0.914
860.000	2060.000	-0.657	1000.000	2100.000	-0.936
880.000	2060.000	-0.716	1020.000	2100.000	-0.952
900.000	2060.000	-0.771	1040.000	2100.000	-0.961
920.000	2060.000	-0.821	1060.000	2100.000	-0.960
940.000	2060.000	-0.867	1080.000	2100.000	-0.949
960.000	2060.000	-0.908	1100.000	2100.000	-0.932
980.000	2060.000	-0.938	1120.000	2100.000	-0.904
1000.000	2060.000	-0.965	1140.000	2100.000	-0.868
1020.000	2060.000	-0.978	1160.000	2100.000	-0.825
1040.000	2060.000	-0.986	1180.000	2100.000	-0.776
1060.000	2060.000	-0.983	1200.000	2100.000	-0.723
1080.000	2060.000	-0.974	1220.000	2100.000	-0.667
1100.000	2060.000	-0.956	1240.000	2100.000	-0.609
1120.000	2060.000	-0.927	1260.000	2100.000	-0.553
1140.000	2060.000	-0.891	840.000	2120.000	-0.555
1160.000	2060.000	-0.850	860.000	2120.000	-0.613
1180.000	2060.000	-0.803	880.000	2120.000	-0.672
1200.000	2060.000	-0.751	900.000	2120.000	-0.729
1220.000	2060.000	-0.696	920.000	2120.000	-0.781
1240.000	2060.000	-0.640	940.000	2120.000	-0.826
1260.000	2060.000	-0.583	960.000	2120.000	-0.868
1280.000	2060.000	-0.527	980.000	2120.000	-0.900
820.000	2080.000	-0.524	1000.000	2120.000	-0.926
840.000	2080.000	-0.584	1020.000	2120.000	-0.943
860.000	2080.000	-0.643	1040.000	2120.000	-0.952
880.000	2080.000	-0.703	1060.000	2120.000	-0.952
900.000	2080.000	-0.758	1080.000	2120.000	-0.942
920.000	2080.000	-0.809	1100.000	2120.000	-0.923
940.000	2080.000	-0.856	1120.000	2120.000	-0.895
960.000	2080.000	-0.891	1140.000	2120.000	-0.859

x-coordinate	y-coordinate	subsidence (predicted)	x-coordinate	y-coordinate	subsidence (predicted)
1160.000	2120.000	-0.817	940.000	2180.000	-0.794
1180.000	2120.000	-0.768	960.000	2180.000	-0.838
1200.000	2120.000	-0.716	980.000	2180.000	-0.875
1220.000	2120.000	-0.659	1000.000	2180.000	-0.908
1240.000	2120.000	-0.600	1020.000	2180.000	-0.930
1260.000	2120.000	-0.543	1040.000	2180.000	-0.942
840.000	2140.000	-0.540	1060.000	2180.000	-0.943
860.000	2140.000	-0.599	1080.000	2180.000	-0.934
880.000	2140.000	-0.657	1100.000	2180.000	-0.917
900.000	2140.000	-0.713	1120.000	2180.000	-0.889
920.000	2140.000	-0.766	1140.000	2180.000	-0.855
940.000	2140.000	-0.814	1160.000	2180.000	-0.810
960.000	2140.000	-0.854	1180.000	2180.000	-0.761
980.000	2140.000	-0.890	1200.000	2180.000	-0.704
1000.000	2140.000	-0.916	1220.000	2180.000	-0.648
1020.000	2140.000	-0.934	1240.000	2180.000	-0.589
1040.000	2140.000	-0.945	1260.000	2180.000	-0.531
1060.000	2140.000	-0.946	860.000	2200.000	-0.556
1080.000	2140.000	-0.936	880.000	2200.000	-0.617
1100.000	2140.000	-0.921	900.000	2200.000	-0.676
1120.000	2140.000	-0.893	920.000	2200.000	-0.732
1140.000	2140.000	-0.859	940.000	2200.000	-0.784
1160.000	2140.000	-0.813	960.000	2200.000	-0.832
1180.000	2140.000	-0.764	980.000	2200.000	-0.872
1200.000	2140.000	-0.711	1000.000	2200.000	-0.902
1220.000	2140.000	-0.652	1020.000	2200.000	-0.925
1240.000	2140.000	-0.594	1040.000	2200.000	-0.935
1260.000	2140.000	-0.536	1060.000	2200.000	-0.938
840.000	2160.000	-0.523	1080.000	2200.000	-0.930
860.000	2160.000	-0.582	1100.000	2200.000	-0.912
880.000	2160.000	-0.640	1120.000	2200.000	-0.884
900.000	2160.000	-0.698	1140.000	2200.000	-0.849
920.000	2160.000	-0.753	1160.000	2200.000	-0.804
940.000	2160.000	-0.800	1180.000	2200.000	-0.755
960.000	2160.000	-0.846	1200.000	2200.000	-0.700
980.000	2160.000	-0.883	1220.000	2200.000	-0.644
1000.000	2160.000	-0.912	1240.000	2200.000	-0.584
1020.000	2160.000	-0.933	1260.000	2200.000	-0.529
1040.000	2160.000	-0.944	860.000	2220.000	-0.543
1060.000	2160.000	-0.945	880.000	2220.000	-0.604
1080.000	2160.000	-0.935	900.000	2220.000	-0.664
1100.000	2160.000	-0.918	920.000	2220.000	-0.721
1120.000	2160.000	-0.890	940.000	2220.000	-0.775
1140.000	2160.000	-0.858	960.000	2220.000	-0.823
1160.000	2160.000	-0.814	980.000	2220.000	-0.862
1180.000	2160.000	-0.763	1000.000	2220.000	-0.892
1200.000	2160.000	-0.708	1020.000	2220.000	-0.914
1220.000	2160.000	-0.650	1040.000	2220.000	-0.927
1240.000	2160.000	-0.591	1060.000	2220.000	-0.927
1260.000	2160.000	-0.531	1080.000	2220.000	-0.920
840.000	2180.000	-0.510	1100.000	2220.000	-0.901
860.000	2180.000	-0.569	1120.000	2220.000	-0.874
880.000	2180.000	-0.628	1140.000	2220.000	-0.839
900.000	2180.000	-0.687	1160.000	2220.000	-0.797
920.000	2180.000	-0.743	1180.000	2220.000	-0.747

x-coordinate	y-coordinate	subsidence (predicted)	x-coordinate	y-coordinate	subsidence (predicted)
1200.000	2220.000	-0.694	1060.000	2280.000	-0.844
1220.000	2220.000	-0.638	1080.000	2280.000	-0.835
1240.000	2220.000	-0.581	1100.000	2280.000	-0.818
1260.000	2220.000	-0.525	1120.000	2280.000	-0.794
860.000	2240.000	-0.534	1140.000	2280.000	-0.765
880.000	2240.000	-0.592	1160.000	2280.000	-0.733
900.000	2240.000	-0.653	1180.000	2280.000	-0.696
920.000	2240.000	-0.710	1200.000	2280.000	-0.656
940.000	2240.000	-0.762	1220.000	2280.000	-0.613
960.000	2240.000	-0.809	1240.000	2280.000	-0.571
980.000	2240.000	-0.847	1260.000	2280.000	-0.525
1000.000	2240.000	-0.877	880.000	2300.000	-0.534
1020.000	2240.000	-0.898	900.000	2300.000	-0.586
1040.000	2240.000	-0.909	920.000	2300.000	-0.636
1060.000	2240.000	-0.909	940.000	2300.000	-0.683
1080.000	2240.000	-0.899	960.000	2300.000	-0.721
1100.000	2240.000	-0.883	980.000	2300.000	-0.753
1120.000	2240.000	-0.856	1000.000	2300.000	-0.777
1140.000	2240.000	-0.821	1020.000	2300.000	-0.791
1160.000	2240.000	-0.780	1040.000	2300.000	-0.798
1180.000	2240.000	-0.733	1060.000	2300.000	-0.797
1200.000	2240.000	-0.683	1080.000	2300.000	-0.789
1220.000	2240.000	-0.630	1100.000	2300.000	-0.776
1240.000	2240.000	-0.577	1120.000	2300.000	-0.757
1260.000	2240.000	-0.524	1140.000	2300.000	-0.731
860.000	2260.000	-0.519	1160.000	2300.000	-0.704
880.000	2260.000	-0.578	1180.000	2300.000	-0.673
900.000	2260.000	-0.636	1200.000	2300.000	-0.640
920.000	2260.000	-0.692	1220.000	2300.000	-0.605
940.000	2260.000	-0.742	1240.000	2300.000	-0.567
960.000	2260.000	-0.787	1260.000	2300.000	-0.529
980.000	2260.000	-0.824	880.000	2320.000	-0.504
1000.000	2260.000	-0.853	900.000	2320.000	-0.554
1020.000	2260.000	-0.872	920.000	2320.000	-0.599
1040.000	2260.000	-0.882	940.000	2320.000	-0.639
1060.000	2260.000	-0.879	960.000	2320.000	-0.675
1080.000	2260.000	-0.870	980.000	2320.000	-0.703
1100.000	2260.000	-0.855	1000.000	2320.000	-0.724
1120.000	2260.000	-0.828	1020.000	2320.000	-0.738
1140.000	2260.000	-0.797	1040.000	2320.000	-0.745
1160.000	2260.000	-0.760	1060.000	2320.000	-0.745
1180.000	2260.000	-0.716	1080.000	2320.000	-0.737
1200.000	2260.000	-0.670	1100.000	2320.000	-0.727
1220.000	2260.000	-0.622	1120.000	2320.000	-0.712
1240.000	2260.000	-0.572	1140.000	2320.000	-0.695
1260.000	2260.000	-0.523	1160.000	2320.000	-0.674
880.000	2280.000	-0.557	1180.000	2320.000	-0.649
900.000	2280.000	-0.614	1200.000	2320.000	-0.625
920.000	2280.000	-0.668	1220.000	2320.000	-0.597
940.000	2280.000	-0.716	1240.000	2320.000	-0.568
960.000	2280.000	-0.758	1260.000	2320.000	-0.536
980.000	2280.000	-0.792	900.000	2340.000	-0.514
1000.000	2280.000	-0.819	920.000	2340.000	-0.556
1020.000	2280.000	-0.836	940.000	2340.000	-0.593
1040.000	2280.000	-0.844	960.000	2340.000	-0.625

x-coordinate	y-coordinate	subsidence (predicted)	x-coordinate	y-coordinate	subsidence (predicted)
980.000	2340.000	-0.648	1080.000	2400.000	-0.523
1000.000	2340.000	-0.668	1100.000	2400.000	-0.532
1020.000	2340.000	-0.679	1120.000	2400.000	-0.542
1040.000	2340.000	-0.685	1140.000	2400.000	-0.552
1060.000	2340.000	-0.686	1160.000	2400.000	-0.562
1080.000	2340.000	-0.685	1180.000	2400.000	-0.574
1100.000	2340.000	-0.677	1200.000	2400.000	-0.583
1120.000	2340.000	-0.667	1220.000	2400.000	-0.588
1140.000	2340.000	-0.656	1240.000	2400.000	-0.586
1160.000	2340.000	-0.643	1260.000	2400.000	-0.577
1180.000	2340.000	-0.629	1280.000	2400.000	-0.561
1200.000	2340.000	-0.612	1300.000	2400.000	-0.535
1220.000	2340.000	-0.593	1320.000	2400.000	-0.501
1240.000	2340.000	-0.571	1120.000	2420.000	-0.506
1260.000	2340.000	-0.544	1140.000	2420.000	-0.522
1280.000	2340.000	-0.514	1160.000	2420.000	-0.540
920.000	2360.000	-0.508	1180.000	2420.000	-0.557
940.000	2360.000	-0.541	1200.000	2420.000	-0.574
960.000	2360.000	-0.568	1220.000	2420.000	-0.584
980.000	2360.000	-0.589	1240.000	2420.000	-0.591
1000.000	2360.000	-0.606	1260.000	2420.000	-0.587
1020.000	2360.000	-0.618	1280.000	2420.000	-0.573
1040.000	2360.000	-0.625	1300.000	2420.000	-0.550
1060.000	2360.000	-0.629	1320.000	2420.000	-0.515
1080.000	2360.000	-0.628	1160.000	2440.000	-0.518
1100.000	2360.000	-0.626	1180.000	2440.000	-0.543
1120.000	2360.000	-0.624	1200.000	2440.000	-0.565
1140.000	2360.000	-0.620	1220.000	2440.000	-0.582
1160.000	2360.000	-0.615	1240.000	2440.000	-0.592
1180.000	2360.000	-0.610	1260.000	2440.000	-0.593
1200.000	2360.000	-0.601	1280.000	2440.000	-0.580
1220.000	2360.000	-0.589	1300.000	2440.000	-0.557
1240.000	2360.000	-0.574	1320.000	2440.000	-0.525
1260.000	2360.000	-0.554	1180.000	2460.000	-0.527
1280.000	2360.000	-0.530	1200.000	2460.000	-0.554
960.000	2380.000	-0.511	1220.000	2460.000	-0.575
980.000	2380.000	-0.531	1240.000	2460.000	-0.589
1000.000	2380.000	-0.546	1260.000	2460.000	-0.591
1020.000	2380.000	-0.557	1280.000	2460.000	-0.582
1040.000	2380.000	-0.564	1300.000	2460.000	-0.560
1060.000	2380.000	-0.571	1320.000	2460.000	-0.529
1080.000	2380.000	-0.575	1180.000	2480.000	-0.510
1100.000	2380.000	-0.579	1200.000	2480.000	-0.538
1120.000	2380.000	-0.581	1220.000	2480.000	-0.562
1140.000	2380.000	-0.584	1240.000	2480.000	-0.580
1160.000	2380.000	-0.588	1260.000	2480.000	-0.584
1180.000	2380.000	-0.590	1280.000	2480.000	-0.576
1200.000	2380.000	-0.590	1300.000	2480.000	-0.555
1220.000	2380.000	-0.587	1320.000	2480.000	-0.523
1240.000	2380.000	-0.580	1200.000	2500.000	-0.519
1260.000	2380.000	-0.566	1220.000	2500.000	-0.545
1280.000	2380.000	-0.546	1240.000	2500.000	-0.562
1300.000	2380.000	-0.518	1260.000	2500.000	-0.568
1040.000	2400.000	-0.505	1280.000	2500.000	-0.561
1060.000	2400.000	-0.516	1300.000	2500.000	-0.543

x-coordinate	y-coordinate	subsidence (predicted)	x-coordinate	y-coordinate	subsidence (predicted)
1320.000	2500.000	-0.513			
1220.000	2520.000	-0.520			
1240.000	2520.000	-0.538			
1260.000	2520.000	-0.545			
1280.000	2520.000	-0.539			
1300.000	2520.000	-0.522			
1240.000	2540.000	-0.506			
1260.000	2540.000	-0.514			
1280.000	2540.000	-0.508			