Engineer: S. Ditton  
Client: Narrabri Coal Operations Pty Ltd - Narrabri Coal Mine (Stage 2)  
Drawn: S. Ditton  
Date: 10.03.09  
Title: Empirical v. Analytical Chain Pillar Subsidence Prediction Model Outcomes  
Ditton Geotechnical Services Pty Ltd  
Scale: NTS  
Figure No: 16e
Empirical Model for Goaf Edge Subsidence Prediction Above Longwall Panels

Mean = \(0.0722(W/H)^{2.557}\)

\(R^2 = 0.8215\)

\[U95\% \frac{S_{side}}{S_{max}} = 0.1719 (W/H)^{-1.9465}\]
Empirical Model for Predicting the Angle of Draw from Longwall Panel Limits

\[ y = 7.646 \ln(x) + 32.259 \]

\[ R^2 = 0.5616 \]

95% UCL (Mean + 8.7)

95% LCL (Mean - 8.7)

Predicted NCM (mean)

Predicted NCM (U95%CL)

General Design Limit of 26.5°

Maximum Limit of 35° for Sensitive Features

Angle of Draw (degrees)

Longwall Panel Goaf Edge Subsidence (m)
Inflexion Point
Maximum Convex Curvature
Maximum Concave Curvature
Log. (Maximum Concave Curvature)
Log. (Inflexion Point)
Log. (Maximum Convex Curvature)

\[ y = 0.3409 \ln(x) + 0.3996 \quad R^2 = 0.5906 \]

\[ y = 0.2425 \ln(x) + 0.3097 \quad R^2 = 0.734 \]

\[ y = 0.1643 \ln(x) + 0.2203 \quad R^2 = 0.2802 \]
Predicted Credible Worst-Case Subsidence along XL 4 after Extraction of LWs 1 to 13 for Case 1 (non-spanning Garrawilla Volcanics)

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Engineer: S. Ditton
Client: Narrabri Coal Operations Pty Ltd - Narrabri Coal Mine (Stage 2)
Drawn: S. Ditton
Date: 08.08.08
Title: Predicted Credible Worst-Case Subsidence along XL 4 after Extraction of LWs 1 to 13 for Case 1 (non-spanning Garrawilla Volcanics)

Scale: NTS
Figure No: 20
Predicted Credible Worst-Case Tilt along XL 4 after Extraction of LWs 1 to 13 for Ditton Geotechnical Services Pty Ltd

Scale: NTS

Figure No: 21
Predicted Credible Worst-Case Strain along XL 4 after Extraction of LWs 1 to 13 for Case 1 (non-spanning Garrawilla Volcanics)
Predicted Credible Worst-Case Subsidence along XL 4 after Extraction of LWs 1 to 13 for Case 2 (with Spanning Garrawilla Volcanics)
Title: Predicted Credible Worst-Case Tilt along XL 4 after Extraction of LWs 1 to 13 for Case 2 (with spanning Garrawilla Volcanics)
Predicted Credible Worst-Case Strain along XL 4 after Extraction of LWs 1 to 13 for Case 2 (with spanning Garrawilla Volcanics)
SPDS Calibrated Model v. Modified ACARP, 2003 Model Subsidence Predictions Along Ditton Geotechnical Services Pty Ltd

Scale: NTS

Figure No: 26
SPDS Calibrated Model v. Modified ACARP, 2003 Model Tilt Predictions Along Ditton Geotechnical Services Pty Ltd

Chain (mm/m)

Tilt (mm/m)

ACARP  SDPS

Engineer: S.Ditton  Client: Narrabri Coal Operations Pty Ltd - Narrabri Coal Mine (Stage 2)
Drawn: S.Ditton  NAR-001/1
Date: 08.08.08  Title: SPDS Calibrated Model v. Modified ACARP, 2003 Model Tilt Predictions Along XL 4 After LWs 1 to 13: Case 1 (non-spanning Garrawilla Volcanics)
Ditton Geotechnical Services Pty Ltd  Scale: NTS  Figure No: 27
Note:
1. Maximum SDPS Panel = Mean ACARP
2. Maximum SDPS Chain Pillar = L95%CL ACARP
Title: SPDS Calibrated Model v. Modified ACARP, 2003 Model Tilt Predictions Along Ditton Geotechnical Services Pty Ltd

Scale: NTS

Figure No: 30

Engineer: S. Ditton
Client: Narrabri Coal Operations Pty Ltd - Narrabri Coal Mine (Stage 2)
Drawn: S. Ditton
Date: 08.08.08
Title: SPDS Calibrated Model v. Modified ACARP, 2003 Model Tilt Predictions Along XL 4 After LWs 1 to 13: Case 2 (with spanning Garrawilla Volcanics)
SPDS Calibrated Model v. Modified ACARP, 2003 Model Strain Predictions Along
后的Garrawilla Volcanics

DgS
Engineer: S.Ditton
Drawn: S.Ditton
Date: 08.08.08
Title: SPDS Calibrated Model v. Modified ACARP, 2003 Model Strain Predictions Along

Narrabri Coal Operations Pty Ltd - Narrabri Coal Mine (Stage 2)
NAR-001/1
XL 4 After LWs 1 to 13: Case 2 (with spanning Garrawilla Volcanics)

Scale: NTS
Figure No: 31
SPDS Calibrated Model v. Modified ACARP, 2003 Model Subsidence Predictions Along Ditton Geotechnical Services Pty Ltd

Engineer: S. Ditton
Client: Narrabri Coal Operations Pty Ltd - Narrabri Coal Mine (Stage 2)
Drawn: S. Ditton
Date: 08.08.08
Title: SPDS Calibrated Model v. Modified ACARP, 2003 Model Subsidence Predictions Along XL 4 After LWs 1 to 13: Case 3 (min. chain pillar subsidence & no spanning Garra’s)
Scale: NTS
Figure No.: 32
Figure 34: SPDS Calibrated Model v. Modified ACARP, 2003 Model Strain Predictions Along DgS -12 -10 -8 -6 -4 -2 0 2 4 6 8 10 12 Chain (m)

Strain (mm/m)

ACARP (U95%CL) SPDS

Engineer: S. Ditton
Client: Narrabri Coal Operations Pty Ltd - Narrabri Coal Mine (Stage 2)
Drawn: S. Ditton
Date: 08.08.08
Title: SPDS Calibrated Model v. Modified ACARP, 2003 Model Strain Predictions Along XL 4 After LWs 1 to 13: Case 3 (min. chain pillar subsidence & no spanning Garra's)
Scale: NTS

DgS
Ditton Geotechnical Services Pty Ltd
Figure No: 34

25300 25800 26300 26800 27300 27800 28300 28800 29300 29800 30300
Predicted Mine Subsidence Contours above Longwall Layout for Case 1 (Maximum subsidence with no spanning volcanic units) and 4.2 m Extraction Height

Key:
- Subsidence contours
- Main Creeks
- Fences
- Unsealed Roads/Tracks
- Orchards
- Farm Dams
- Buildings

Engineer: S. Ditton
Client: Narrabri Coal Operations Pty Ltd - Narrabri Coal Mine (Stage 2)
Title: Predicted Mine Subsidence Contours above Longwall Layout for Case 1 (Maximum subsidence with no spanning volcanic units) and 4.2 m Extraction Height
Scale: 1:60,000

Figure No: 35
Figure No: 37

Subsidence (m)

Key:
- Subsidence Contours
- Main Creeks
- Fences
- Unsealed Roads/Tracks
- Orchards
- Farm Dams
- Buildings

Engineer: S.Ditton
Drawn: S.Ditton
Date: 12.06.08

Ditton Geotechnical Services Pty Ltd

Title: Predicted Mine Subsidence Contours above Longwall Layout for Case 3 (Non-spanning Garrawilla Volcanics and Mean Chain Pillar Subsidence)

Client: Narrabri Coal Operations Pty Ltd - Narrabri Coal Mine (Stage 2)
NAR-001/1

Scale: 1:60,000