ARMPS: Actual Pillar Dimensions (width x length, ft). Entries shown from left to right.

Default Design

Panel 15

90°

90°

30°

North from N Side

80 x 80

80 x 80

80 x 80

4-5-07

226-20
ARMPS module build: 5.0.41
Project File: C:\Documents and Settings\Gilbride.AGAPITO\My Documents\MyNIOSH\226-20 GENWAL Main 1
Input Units: (ft) (psi)

[PROJECT TITLE]
GENWAL Crandall Canyon Main West Retreat in the Mains

[PROJECT DESCRIPTION]

[DEVELOPMENT GEOMETRY PARAMETERS]
Entry Height................................. 8 (ft)
Depth of Cover..................................2000 (ft)
Crosscut Angle.................................90 (deg)
Entry Width.................................... 20 (ft)
Number of Entries............................. 3
Crosscut Spacing.............................. 92 (ft)
Center to Center Distance #1..................80 (ft)
Center to Center Distance #2..................80 (ft)

[DEFAULT PARAMETERS]
In Situ Coal Strength..........................900 (psi)
Unit Weight of Overburden......................162 (pcf)
Breadth of AMZ................................223 (ft)
AMZ set automatically

[RETREAT MINING PARAMETERS]
Loading Condition............................ONE SIDE + ACTIVE GOB
Extend of Active Gob..........................3000 (ft)
Abutment Angle of Active Gob..................21 (deg)
Extend of First Gob............................2500 (ft)
Abutment Angle of 1st Gob.....................21 (deg)
Barrier Pillar Width of 1st Gob................137 (ft)
Depth of Slab Cut in Barrier Pillar of 1st Gob....40 (ft)

[ARMPS STABILITY FACTORS]
DEVELOPMENT.................................0.84
ACTIVE GOB..................................0.72
ONE SIDE + ACTIVE GOB......................0.22 Retreat

[DATA ABOUT THE ACTIVE MINING ZONE (AMZ)]
AMZ Width.....................................160.0 (ft)
AMZ Breadth...................................223.0 (ft)
AMZ Area......................................35680.3 (ft)*(ft)
Extraction Ratio Within AMZ...................0.41
Development Load on AMZ.....................5.78E+06 (tons)
Front Abutment Load .........................62186 (tons) /(ft)
First Side Abutment Load.....................62186 (tons) /(ft)

R-FACTOR For Front Abutment.................0.900
R-FACTOR For First Side Abutment............0.730

TOTAL LOADINGS ON AMZ, INCLUDING TRANSFER FROM BARRIERS
<table>
<thead>
<tr>
<th>LOAD</th>
<th>ABUTMENT</th>
<th>LTRANSBAR</th>
<th>LTRANSEM</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDITION</td>
<td>LOAD (tons)</td>
<td>(tons)</td>
<td>(tons)</td>
<td>(tons)</td>
</tr>
<tr>
<td>DEVELOPMENT</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>5.78E+06</td>
</tr>
<tr>
<td>ACTIVE GOB</td>
<td>9.01E+05</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>6.68E+05</td>
</tr>
<tr>
<td>1S + ACTIVE GOB</td>
<td>3.75E+06</td>
<td>7.68E+06</td>
<td>4.03E+06</td>
<td>2.21E+07</td>
</tr>
</tbody>
</table>

R-Factor for front abutment is the percent of the total front abutment load that is applied to the AMZ.
R-Factor for side abutment is the percent of the total
side abutment load that is applied to the barrier pillar 
(the remainder is applied to the AMZ).

LTRANBAR is the load transferred to the AMZ from the 
barrier pillar between the side and active gob if the 
barrier's SF is less than 1.5.

LTRANSREM is the load transferred to the AMZ from the 
remnant barrier between the side and active gob if the 
remnant's SF is less than 1.5.

[PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>PILLAR</th>
<th>ENTRY CENTER (ft)</th>
<th>MINIMUM DIMENSION (ft)</th>
<th>MAXIMUM DIMENSION (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80.00</td>
<td>60.00</td>
<td>72.00</td>
</tr>
<tr>
<td>2</td>
<td>80.00</td>
<td>60.00</td>
<td>72.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILLAR</th>
<th>AREA (ft)^2</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.32E+03</td>
<td>3.21E+03</td>
<td>9.98E+05</td>
</tr>
<tr>
<td>2</td>
<td>4.32E+03</td>
<td>3.21E+03</td>
<td>9.98E+05</td>
</tr>
</tbody>
</table>

TOTAL LOAD-BEARING CAPACITY OF PILLARS WITHIN AMZ: 4.84E+06 (tons)

To view the distribution of Pillar Load Bearing Capacity 
select 'View Plots->Settings->Pillar Load Bearing Capacity'

[BARRIER PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>WIDTH (ft)</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>137.00</td>
<td>7.19E+03</td>
<td>1.58E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>LOAD (tons)</th>
<th>FRONT-ABUTMENT LOAD (tons)</th>
<th>SIDE-ABUTMENT LOAD (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.31E+06</td>
<td>2.80E+06</td>
<td>1.01E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS (cont'd)]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>TOTAL LOAD (tons)</th>
<th>STABILITY FACTOR</th>
<th>LTRANSBAR LOAD (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>9.11E+03</td>
<td>0.87</td>
<td>3.84E+03</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR STRESSES]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>STRESS (psi)</th>
<th>STRESS (psi)</th>
<th>STRESS (psi)</th>
<th>TOTAL STRESS (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2414</td>
<td>1272</td>
<td>4600</td>
<td>8287</td>
</tr>
</tbody>
</table>

[REMNANT BARRIER PILLARS BETWEEN GOBS]

<table>
<thead>
<tr>
<th>REMNANT PILLAR</th>
<th>WIDTH (ft)</th>
<th>STABILITY FACTOR</th>
<th>LFTBAR LOAD (tons)</th>
<th>LTRANSREM LOAD (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>97.0</td>
<td>0.32</td>
<td>4.03E+06</td>
<td>4.03E+06</td>
</tr>
</tbody>
</table>

[STRESS ON INDIVIDUAL PILLARS WITHIN THE AMZ]
DEVELOPMENT STRESSES..........................3833 (psi)

FRONT ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN ROW       ACTIVE GOB  1S + ACTIVE GOB  2S + ACTIVE GOB
1                     764       4181            4181
2                     433       2369            2369
3                     196       1072            1072

FIRST SIDE ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN COLUMN     LOAD
1                     9022
2                     4823

To view the distribution of Individual Pillar Stresses - Abutment or Total
select 'View Plots->Settings->Individual Pillar Stresses - Abutment'
select 'View Plots->Settings->Individual Pillar Stresses - Total'
ARMPS: Actual Pillar Dimensions (width x length, ft). Entries shown from left to right.

4-5-07
(226-20)

20'
Large pillars (+20')

2.25

AAI000959
ARMPS module build: 5.0.41
Project File: C:\Documents and Settings\Gilbride.AGAPITO\My Documents\MyNIOSH\226-20 GENWAL Main
Input Units: (ft) (psi)

[PROJECT TITLE]
GENWAL Crandall Canyon Main West Retreat in the Mains

[PROJECT DESCRIPTION]

[DEVELOPMENT GEOMETRY PARAMETERS]
Entry Height..................................8 (ft)
Depth of Cover..................................2000 (ft)
Crosscut Angle..................................90 (deg)
Entry Width..................................20 (ft)
Number of Entries...............................3
Crosscut Spacing..................................112 (ft)
Center to Center Distance #1..................80 (ft)
Center to Center Distance #2..................80 (ft)

[DEFAULT PARAMETERS]
In Situ Coal Strength..........................900 (psi)
Unit Weight of Overburden......................162 (pcf)
Breadth of AMZ..................................223 (ft)
AMZ set automatically

[RETRAIT MINING PARAMETERS]
Loading Condition................................ONE SIDE + ACTIVE GOB
Extend of Active Gob............................3000 (ft)
Abutment Angle of Active Gob...................21 (deg)
Extend of First Gob..............................2500 (ft)
Abutment Angle of 1st Gob......................21 (deg)
Barrier Pillar Width of 1st Gob.................117 (ft)
Depth of Slab Cut in Barrier Pillar of 1st Gob.40 (ft)

[ARMPS STABILITY FACTORS]
DEVELOPMENT.................................0.94
ACTIVE GOB.................................0.81
ONE SIDE + ACTIVE GOB......................0.25

[DATA ABOUT THE ACTIVE MINING ZONE (AMZ)]
AMZ Width....................................160.0 (ft)
AMZ Breadth..................................223.0 (ft)
AMZ Area.....................................35680.0 (ft)*(ft)
Extraction Ratio Within AMZ...................0.38
Development Load on AMZ......................5.78E+06 (tons)
Front Abutment Load...........................62186 (tons)/(ft)
First Side Abutment Load......................62186 (tons)/(ft)

R-FACTOR For Front Abutment..................0.900
R-FACTOR For First Side Abutment............0.730

TOTAL LOADINGS ON AMZ, INCLUDING TRANSFER FROM BARRIERS

<table>
<thead>
<tr>
<th>LOAD</th>
<th>ABUTMENT</th>
<th>LTRANSBAR</th>
<th>LTRANSREM</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CONDITION LOAD</td>
<td>(tons)</td>
<td>(tons)</td>
<td>(tons)</td>
<td>(tons)</td>
</tr>
<tr>
<td>DEVELOPMENT</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>5.78E+06</td>
</tr>
<tr>
<td>ACTIVE GOB</td>
<td>9.01E+05</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>6.68E+06</td>
</tr>
<tr>
<td>1S + ACTIVE GOB</td>
<td>3.75E+05</td>
<td>7.68E+05</td>
<td>4.03E+06</td>
<td>2.21E+07</td>
</tr>
</tbody>
</table>

R-Factor for front abutment is the percent of the total front abutment load that is applied to the AMZ.

R-Factor for side abutment is the percent of the total
side abutment load that is applied to the barrier pillar (the remainder is applied to the AMZ).

LTRANSBAR is the load transferred to the AMZ from the barrier pillar between the side and active gob if the barrier's SF is less than 1.5.

LTRANSREM is the load transferred to the AMZ from the remnant barrier between the side and active gob if the remnant's SF is less than 1.5.

[PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>PILlar</th>
<th>ENTRY CENTER (ft)</th>
<th>MINIMUM DIMENSION (ft)</th>
<th>MAXIMUM DIMENSION (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80.00</td>
<td>60.00</td>
<td>92.00</td>
</tr>
<tr>
<td>2</td>
<td>80.00</td>
<td>60.00</td>
<td>92.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILlar</th>
<th>AREA (ft²)</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.52E+03</td>
<td>3.43E+03</td>
<td>1.36E+06</td>
</tr>
<tr>
<td>2</td>
<td>5.52E+03</td>
<td>3.43E+03</td>
<td>1.36E+06</td>
</tr>
</tbody>
</table>

TOTAL LOAD-BEARING CAPACITY OF PILLARS WITHIN AMZ: 5.43E+06 (tons)

To view the distribution of Pillar Load Bearing Capacity select 'View Plots->Settings->Pillar Load Bearing Capacity'

[BARRIER PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>BARRIER PILlar</th>
<th>WIDTH (ft)</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>137.00</td>
<td>7.19E+03</td>
<td>1.58E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS]

<table>
<thead>
<tr>
<th>BARRIER PILlar</th>
<th>DEVELOPMENT LOAD (tons)</th>
<th>FRONT-ABUTMENT LOAD (tons)</th>
<th>SIDE-ABUTMENT LOAD (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.31E+06</td>
<td>2.80E+06</td>
<td>1.01E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS (cont'd)]

<table>
<thead>
<tr>
<th>BARRIER PILlar</th>
<th>TOTAL LOAD (tons)</th>
<th>STABILITY FACTOR</th>
<th>LTRANSBAR (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>9.11E+03</td>
<td>0.87</td>
<td>3.84E+03</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR STRESSES]

<table>
<thead>
<tr>
<th>BARRIER PILlar</th>
<th>DEVELOPMENT STRESS (psi)</th>
<th>FRONT-ABUTMENT STRESS (psi)</th>
<th>SIDE-ABUTMENT STRESS (psi)</th>
<th>TOTAL STRESS (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2414</td>
<td>1272</td>
<td>4600</td>
<td>8287</td>
</tr>
</tbody>
</table>

[REMNANT BARRIER PILLARS BETWEEN GOBS]

<table>
<thead>
<tr>
<th>REMNANT PILlar</th>
<th>WIDTH (ft)</th>
<th>STABILITY FACTOR</th>
<th>LFTBAR (tons)</th>
<th>LTRANSREM (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>97.00</td>
<td>0.32</td>
<td>4.03E+06</td>
<td>4.03E+06</td>
</tr>
</tbody>
</table>

[STRESS ON INDIVIDUAL PILLARS WITHIN THE AMZ]
DEVELOPMENT STRESSES.........................3652 (psi)

FRONT ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN ROW  | ACTIVE GOB | 1S + ACTIVE GOB | 2S + ACTIVE GOB
1               | 691        | 3782            | 3782
2               | 331        | 1810            | 1810
3               | 103        | 565             | 565

FIRST SIDE ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN COLUMN | LOAD
1               | 8596
2               | 4595

To view the distribution of Individual Pillar Stresses - Abutment or Total
select 'View Plots->Settings->Individual Pillar Stresses - Abutment'
select 'View Plots->Settings->Individual Pillar Stresses - Total'
ARMPS: Actual Pillar Dimensions (width\texttimes length, ft). Entries shown from left to right.

40' longer pillar

0.26
[PROJECT TITLE]
GENWAL Crandall Canyon Main West Retreat in the Mains

[PROJECT DESCRIPTION]

[DEVELOPMENT GEOMETRY PARAMETERS]
Entry Height
Depth of Cover
Crosscut Angle
Entry Width
Number of Entries
Crosscut Spacing
Center to Center Distance #1
Center to Center Distance #2

[DEFAULT PARAMETERS]
In Situ Coal Strength
Unit Weight of Overburden
Breadth of AMZ
AMZ set automatically

[RETREAT MINING PARAMETERS]
Loading Condition
Extend of Active Gob
Abutment Angle of Active Gob
Extend of First Gob
Abutment Angle of 1st Gob
Barrier Pillar Width of 1st Gob
Depth of Slab Cut in Barrier Pillar of 1st Gob

[ARMPS STABILITY FACTORS]
Development
Active Gob
One Side + Active Gob

[DATA ABOUT THE ACTIVE MINING ZONE (AMZ)]
AMZ Width
AMZ Breadth
AMZ Area
Extraction Ratio Within AMZ
Development Load on AMZ
Front Abutment Load
First Side Abutment Load

R-FACTOR For Front Abutment
R-FACTOR For First Side Abutment

TOTAL LOADINGS ON AMZ, INCLUDING TRANSFER FROM BARRIERS
LOAD CONDITION LOAD (tons) ABUTMENT (tons) LTRANSBAR (tons) LTRANSREM (tons) TOTAL (tons)
DEVELOPMENT 0.00E+00 0.00E+00 0.00E+00 0.00E+00 5.78E+06
ACTIVE Gob 9.01E+05 0.00E+00 0.00E+00 6.68E+06
1S + ACTIVE Gob 3.75E+06 7.68E+06 4.03E+06 2.21E+07

R-Factor for front abutment is the percent of the total front abutment load that is applied to the AMZ.

R-Factor for side abutment is the percent of the total
side abutment load that is applied to the barrier pillar
(the remainder is applied to the AMZ).

LTRANBAR is the load transferred to the AMZ from the
barrier pillar between the side and active gob if the
barrier's SF is less than 1.5.

LTRANSREM is the load transferred to the AMZ from the
remnant barrier between the side and active gob if the
remnant's SF is less than 1.5.

[PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>PILLAR CENTER</th>
<th>MINIMUM DIMENSION (ft)</th>
<th>MAXIMUM DIMENSION (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80.00</td>
<td>60.00</td>
</tr>
<tr>
<td>2</td>
<td>80.00</td>
<td>60.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILLAR AREA</th>
<th>STRENGTH LOAD-BEARING CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td>(ft)*(ft)</td>
<td>(psi)</td>
</tr>
<tr>
<td>1</td>
<td>6.72E+03</td>
</tr>
<tr>
<td>2</td>
<td>6.72E+03</td>
</tr>
</tbody>
</table>

TOTAL LOAD-BEARING CAPACITY OF PILLARS WITHIN AMZ: 5.84E+06 (tons)

To view the distribution of Pillar Load Bearing Capacity
select 'View Plots->Settings->Pillar Load Bearing Capacity'.

[BARRIER PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>WIDTH (ft)</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>137.00</td>
<td>7.19E+03</td>
<td>1.58E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT</th>
<th>FRONT-ABUTMENT LOAD (tons)</th>
<th>SIDE-ABUTMENT LOAD (tons)</th>
<th>LOAD (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.31E+06</td>
<td>2.80E+06</td>
<td>1.01E+07</td>
<td></td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS (cont'd)]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>TOTAL LOAD (tons)</th>
<th>STABILITY FACTOR</th>
<th>LTRANBAR (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>9.11E+03</td>
<td>0.87</td>
<td>3.84E+03</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR STRESSES]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT</th>
<th>FRONT-ABUTMENT STRESS (psi)</th>
<th>SIDE-ABUTMENT STRESS (psi)</th>
<th>STRESS (psi)</th>
<th>TOTAL STRESS (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2414</td>
<td>1272</td>
<td>4600</td>
<td>8287</td>
<td></td>
</tr>
</tbody>
</table>

[REMNANT BARRIER PILLARS BETWEEN GOBS]

<table>
<thead>
<tr>
<th>REMNANT</th>
<th>WIDTH (ft)</th>
<th>STABILITY FACTOR</th>
<th>LFTBAR (tons)</th>
<th>LTRANSREM (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>97.0</td>
<td>0.32</td>
<td>4.03E+06</td>
<td>4.03E+06</td>
</tr>
</tbody>
</table>

[STRESS ON INDIVIDUAL PILLARS WITHIN THE AMZ]

AAI000965
DEVELOPMENT STRESSES..........................3536 (psi)

FRONT ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN ROW    ACTIVE GOB    1S + ACTIVE GOB    2S + ACTIVE GOB
    1           635            3473            3473
    2           251            1372            1372
    3           45             248             248

FIRST SIDE ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN COLUMN    LOAD
    1           8321
    2           4449

To view the distribution of Individual Pillar Stresses - Abutment or Total
select 'View Plots->Settings->Individual Pillar Stresses - Abutment'
select 'View Plots->Settings->Individual Pillar Stresses - Total'
ARMP: Actual Pillar Dimensions (width*length, ft). Entries shown from left to right.

4-5-07

10' wider pillar

0.26
ARMPS module build: 5.0.41
Project File: C:\Documents and Settings\gilbride.agapito\My Documents\MyNIOSH\226-20 GENWAL Main v
Input Units: (ft) (psi)

[PROJECT TITLE]
GENWAL Crandall Canyon Main West Retreat in the Mains

[PROJECT DESCRIPTION]

[DEVELOPMENT GEOMETRY PARAMETERS]
Entry Height ....................................... 8 (ft)
Depth of Cover ..................................... 2.000 (ft)
Crosscut Angle .................................... .90 (deg)
Enter Width ....................................... 1.20 (ft)
Number of Entries .................................. 3
Crosscut Spacing ................................... .92 (ft)
Center to Center Distance #1 ...................... .90 (ft)
Center to Center Distance #2 ...................... .90 (ft)

[DEFAULT PARAMETERS]
In Situ Coal Strength ................................ 900 (psi)
Unit Weight of Overburden ........................... 162 (pcf)
Breadth of AMZ ..................................... 2.23 (ft)
AMZ set automatically

[RETREAT MINING PARAMETERS]
Loading Condition .................................... ONE SIDE + ACTIVE GOB
Extend of Active Gob ................................ 3.000 (ft)
Abutment Angle of Active Gob ...................... .21 (deg)
Extend of First Gob .................................. 2.500 (ft)
Abutment Angle of 1st Gob ........................... .21 (deg)
Barrier Pillar Width of 1st Gob ................. .137 (ft)
Depth of Slab Cut in Barrier Pillar of 1st Gob ... 4.0 (ft)

[ARMPS STABILITY FACTORS]
DEVELOPMENT ..................................... 0.93
ACTIVE GOB ...................................... 0.93
ONE SIDE + ACTIVE GOB ......................... 0.28

[DATA ABOUT THE ACTIVE MINING ZONE (AMZ)]
AMZ Width ........................................ 180.0 (ft)
AMZ Breadth ....................................... 223.0 (ft)
AMZ Area .......................................... 41040.0 (ft)* (ft)
Extraction Ratio Within AMZ ...................... 0.39
Development Load on AMZ ......................... 6.50E+06 (tons)
Front Abutment Load .............................. 62186 (tons)/(ft)
First Side Abutment Load ......................... 62186 (tons)/(ft)
R-FACTOR For Front Abutment ...................... 0.900
R-FACTOR For First Side Abutment ................ 0.730

TOTAL LOADINGS ON AMZ, INCLUDING TRANSFER FROM BARRIERS

<table>
<thead>
<tr>
<th>LOAD CONDITION</th>
<th>LOAD (tons)</th>
<th>LTRANSBAR (tons)</th>
<th>LTRANSREM (tons)</th>
<th>TOTAL (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVELOPMENT</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>6.50E+06</td>
</tr>
<tr>
<td>ACTIVE GOB</td>
<td>1.14E+06</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>7.64E+06</td>
</tr>
<tr>
<td>1S + ACTIVE GOB</td>
<td>3.75E+06</td>
<td>7.68E+06</td>
<td>4.47E+06</td>
<td>2.35E+07</td>
</tr>
</tbody>
</table>

R-Factor for front abutment is the percent of the total front abutment load that is applied to the AMZ.
R-Factor for side abutment is the percent of the total load that is applied to the AMZ.

AAI000968
side abutment load that is applied to the barrier pillar
(the remainder is applied to the AMZ).

LTRANBAR is the load transferred to the AMZ from the
barrier pillar between the side and active gob if the
barrier's SF is less than 1.5.

LTRANSREM is the load transferred to the AMZ from the
remnant barrier between the side and active gob if the
remnant's SF is less than 1.5.

[PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>PILLAR</th>
<th>ENTRY CENTER (ft)</th>
<th>MINIMUM DIMENSION (ft)</th>
<th>MAXIMUM DIMENSION (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>90.00</td>
<td>70.00</td>
<td>72.00</td>
</tr>
<tr>
<td>2</td>
<td>90.00</td>
<td>70.00</td>
<td>72.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILLAR</th>
<th>AREA (ft) * (ft)</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.04E+03</td>
<td>3.45E+03</td>
<td>1.25E+06</td>
</tr>
<tr>
<td>2</td>
<td>5.04E+03</td>
<td>3.45E+03</td>
<td>1.25E+06</td>
</tr>
</tbody>
</table>

TOTAL LOAD-BEARING CAPACITY OF PILLARS WITHIN AMZ: 6.07E+06 (tons)

To view the distribution of Pillar Load Bearing Capacity
select 'View Plots->Settings->Pillar Load Bearing Capacity'

[BARRIER PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>WIDTH (ft)</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>137.00</td>
<td>7.19E+03</td>
<td>1.58E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT LOAD (tons)</th>
<th>FRONT-ABUTMENT LOAD (tons)</th>
<th>SIDE-ABUTMENT LOAD (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.31E+06</td>
<td>2.80E+06</td>
<td>1.01E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS (cont'd)]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>TOTAL LOAD (tons)</th>
<th>STABILITY FACTOR</th>
<th>LTRANSBAR (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>9.11E+03</td>
<td>0.87</td>
<td>3.84E+03</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR STRESSES]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT STRESS (psi)</th>
<th>FRONT-ABUTMENT STRESS (psi)</th>
<th>SIDE-ABUTMENT STRESS (psi)</th>
<th>TOTAL STRESS (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2414</td>
<td>1272</td>
<td>4600</td>
<td>8287</td>
</tr>
</tbody>
</table>

[REMNANT BARRIER PILLARS BETWEEN GOBS]

<table>
<thead>
<tr>
<th>REMNANT</th>
<th>WIDTH (ft)</th>
<th>STABILITY FACTOR</th>
<th>LPTBAR (tons)</th>
<th>LTRANSREM (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>97.0</td>
<td>0.32</td>
<td>4.47E+06</td>
<td>4.47E+06</td>
</tr>
</tbody>
</table>

[STRESS ON INDIVIDUAL PILLARS WITHIN THE AMZ]

AA1000969
DEVELOPMENT STRESSES.........................3696 (psi)

FRONT ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN ROW       ACTIVE GOB  1S + ACTIVE GOB  2S + ACTIVE GOB
                      1         2         3
1                   825       4076       4076
2                   468       2309       2309
3                   212       1045       1045

FIRST SIDE ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN COLUMN    LOAD
1                    8487
2                    3857

To view the distribution of Individual Pillar Stresses - Abutment or Total
select 'View Plots->Settings->Individual Pillar Stresses - Abutment'
select 'View Plots->Settings->Individual Pillar Stresses - Total'
ARMP: Actual Pillar Dimensions (width x length, ft). Entries shown from left to right.

<table>
<thead>
<tr>
<th>Width</th>
<th>Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>2500</td>
<td>137</td>
</tr>
</tbody>
</table>

No Slabbing

Default Design - NO SLAB

0.25
[PROJECT TITLE]
GENWAL Crandall Canyon Main West Retreat in the Mains

[PROJECT DESCRIPTION]

[DEVELOPMENT GEOMETRY PARAMETERS]
Entry Height .............................................. 8 (ft)
Depth of Cover ............................................ 2000 (ft)
Crosscut Angle ............................................ 90 (deg)
Entry Width ................................................ 20 (ft)
Number of Entries ........................................ 3
Crosscut Spacing .......................................... 92 (ft)
Center to Center Distance #1 ....................... 80 (ft)
Center to Center Distance #2 ....................... 80 (ft)

[DEFAULT PARAMETERS]
In Situ Coal Strength ................................... 900 (psi)
Unit Weight of Overburden ........................... 162 (pcf)
Breadth of AMZ ........................................... 223 (ft)
AMZ set automatically

[RETREAT MINING PARAMETERS]
Loading Condition ................................... ONE SIDE + ACTIVE GOB
Extend of Active Gob .................................. 3000 (ft)
Abutment Angle of Active Gob ....................... 21 (deg)
Extend of First Gob ..................................... 2500 (ft)
Abutment Angle of 1st Gob ............................ 21 (deg)
Barrier Pillar Width of 1st Gob ...................... 137 (ft)
Depth of Slab Cut in Barrier Pillar of 1st Gob .... 0 (ft)

[ARMPS STABILITY FACTORS]
DEVELOPMENT ........................................... 0.84
ACTIVE GOB ............................................. 0.72
ONE SIDE + ACTIVE GOB ............................. 0.23

[DATA ABOUT THE ACTIVE MINING ZONE (AMZ)]
AMZ Width ................................................ 160.0 (ft)
AMZ Breadth .............................................. 223.0 (ft)
AMZ Area .................................................. 35680.0 (ft) *(ft)
Extraction Ratio Within AMZ ......................... 0.41
Development Load on AMZ ............................ 5.78E+06 (tons)
Front Abutment Load .................................. 62186 (tons)/(ft)
First Side Abutment Load ............................. 62186 (tons)/(ft)

R-FACTOR For Front Abutment ..................... 0.900
R-FACTOR For First Side Abutment ............... 0.730

TOTAL LOADINGS ON AMZ, INCLUDING TRANSFER FROM BARRIERS
<table>
<thead>
<tr>
<th>LOAD</th>
<th>CONDITION</th>
<th>LOAD (tons)</th>
<th>LTRANSBAR</th>
<th>LTRANSREM</th>
<th>TOTAL (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVELOPMENT</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>5.78E+06</td>
<td></td>
</tr>
<tr>
<td>ACTIVE GOB</td>
<td>3.75E+06</td>
<td>5.44E+06</td>
<td>3.63E+06</td>
<td>6.68E+06</td>
<td></td>
</tr>
</tbody>
</table>

R-Factor for front abutment is the percent of the total front abutment load that is applied to the AMZ.

R-Factor for side abutment is the percent of the total...
side abutment load that is applied to the barrier pillar (the remainder is applied to the AMZ).

LTRANBAR is the load transferred to the AMZ from the barrier pillar between the side and active gob if the barrier's SF is less than 1.5.

LTRANSREM is the load transferred to the AMZ from the remnant barrier between the side and active gob if the remnant's SF is less than 1.5.

[PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>PILAR</th>
<th>ENTRY CENTER (ft)</th>
<th>MINIMUM DIMENSION (ft)</th>
<th>MAXIMUM DIMENSION (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80.00</td>
<td>60.00</td>
<td>72.00</td>
</tr>
<tr>
<td>2</td>
<td>80.00</td>
<td>60.00</td>
<td>72.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILAR</th>
<th>AREA (ft)^2</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.32E+03</td>
<td>3.21E+03</td>
<td>9.98E+05</td>
</tr>
<tr>
<td>2</td>
<td>4.32E+03</td>
<td>3.21E+03</td>
<td>9.98E+05</td>
</tr>
</tbody>
</table>

TOTAL LOAD-BEARING CAPACITY OF PILLARS WITHIN AMZ: 4.84E+06 (tons)

To view the distribution of Pillar Load Bearing Capacity select 'View Plots->Settings->Pillar Load Bearing Capacity'

[BARRIER PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>WIDTH (ft)</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>137.00</td>
<td>7.19E+03</td>
<td>1.58E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT LOAD (tons)</th>
<th>FRONT-ABUTMENT LOAD (tons)</th>
<th>SIDE-ABUTMENT LOAD (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.31E+06</td>
<td>5.60E+05</td>
<td>1.01E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS (cont'd)]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>TOTAL LOAD (tons)</th>
<th>STABILITY FACTOR</th>
<th>LTRANBAR (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>7.99E+03</td>
<td>0.99</td>
<td>2.72E+03</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR STRESSES]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT STRESS (psi)</th>
<th>FRONT-ABUTMENT STRESS (psi)</th>
<th>SIDE-ABUTMENT STRESS (psi)</th>
<th>TOTAL STRESS (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2414</td>
<td>254</td>
<td>4600</td>
<td>7269</td>
</tr>
</tbody>
</table>

[REMNANT BARRIER PILLARS BETWEEN GOBS]

<table>
<thead>
<tr>
<th>REMNANT</th>
<th>WIDTH (ft)</th>
<th>STABILITY FACTOR</th>
<th>LPTBAR (tons)</th>
<th>LTRANSREM (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>137.00</td>
<td>0.60</td>
<td>4.03E+06</td>
<td>3.63E+06</td>
</tr>
</tbody>
</table>

[STRESS ON INDIVIDUAL PILLARS WITHIN THE AMZ]
DEVELOPMENT STRESSES.......................... 3833 (psi)

FRONT ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN ROW                ACTIVE GOB  1S + ACTIVE GOB  2S + ACTIVE GOB
1                                 764        3843           3843
2                                 433        2178           2178
3                                 196        985            985

FIRST SIDE ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN COLUMN LOAD
1                                 7254
2                                 3878

To view the distribution of Individual Pillar Stresses - Abutment or Total
select 'View Plots->Settings->Individual Pillar Stresses - Abutment'
select 'View Plots->Settings->Individual Pillar Stresses - Total'
ARMPS: Actual Piller Dimensions (width*length, ft). Entries shown from left to right.

- Default Design
- 1500 ft deep
- 0.44
ARMPS module build: 5.0.41
Project File: 22G-20 GEMINAL Main West Mains Area SOUTH SIDE.ARM
Input Units: (ft) (psi)

[PROJECT TITLE]
GEMINAL Crandall Canyon Main West Retreat in the Mains

[PROJECT DESCRIPTION]

[DEVELOPMENT GEOMETRY PARAMETERS]
Entry Height.............................................8 (ft)
Depth of Cover.........................................1500 (ft)
Crosscut Angle...........................................90 (deg)
Entry Width.............................................20 (ft)
Number of Entries......................................3
Crosscut Spacing........................................92 (ft)
Center to Center Distance #1..........................80 (ft)
Center to Center Distance #2..........................80 (ft)

[DEFAULT PARAMETERS]
In Situ Coal Strength...................................900 (psi)
Unit Weight of Overburden............................162 (pcf)
Breadth of AMZ............................................193 (ft)
AMZ set automatically

[RETREAT MINING PARAMETERS]
Loading Condition.....................................ONE SIDE + ACTIVE GOB
Extend of Active Gob....................................3000 (ft)
Abutment Angle of Active Gob..........................21 (deg)
Extend of First Gob......................................2500 (ft)
Abutment Angle of 1st Gob..............................21 (deg)
Barrier Pillar Width of 1st Gob........................137 (ft)
Depth of Slab Cut in Barrier Pillar of 1st Gob......40 (ft)

[ARMPS STABILITY FACTORS]
DEVELOPMENT...........................................1.12
ACTIVE GOB.............................................0.95
ONE SIDE + ACTIVE GOB.................................0.44

[DATA ABOUT THE ACTIVE MINING ZONE (AMZ)]
AMZ Width...........................................160.0 (ft)
AMZ Breadth...........................................193.0 (ft)
AMZ Area................................................30880.0 (ft)²
Extraction Ratio Within AMZ............................0.41
Development Load on AMZ..............................3.75E+06 (tons)
Front Abutment Load..................................34980 (tons)/(ft)
First Side Abutment Load..............................34980 (tons)/(ft)

R-FACTOR For Front Abutment........................0.900
R-FACTOR For First Side Abutment....................0.793

TOTAL LOADINGS ON AMZ, INCLUDING TRANSFER FROM BARRIERS

<table>
<thead>
<tr>
<th>LOAD CONDITION</th>
<th>LOAD (tons)</th>
<th>LTRANSBAR (tons)</th>
<th>LTRANSREM (tons)</th>
<th>TOTAL (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVELOPMENT</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>3.75E+06</td>
</tr>
<tr>
<td>ACTIVE GOB</td>
<td>6.67E-05</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>4.42E+06</td>
</tr>
<tr>
<td>1S + ACTIVE GOB</td>
<td>1.40E+06</td>
<td>1.58E+06</td>
<td>2.18E+06</td>
<td>9.58E+06</td>
</tr>
</tbody>
</table>

R-Factor for front abutment is the percent of the total
front abutment load that is applied to the AMZ.

R-Factor for side abutment is the percent of the total

AAI000976
side abutment load that is applied to the barrier pillar (the remainder is applied to the AMZ).

LTTRANBAR is the load transferred to the AMZ from the barrier pillar between the side and active gob if the barrier's SF is less than 1.5.

LTTRANSREM is the load transferred to the AMZ from the remnant barrier between the side and active gob if the remnant's SF is less than 1.5.

**[PILLAR PARAMETERS]**

<table>
<thead>
<tr>
<th>PILLAR</th>
<th>ENTRY CENTER (ft)</th>
<th>MINIMUM DIMENSION (ft)</th>
<th>MAXIMUM DIMENSION (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80.00</td>
<td>60.00</td>
<td>72.00</td>
</tr>
<tr>
<td>2</td>
<td>80.00</td>
<td>60.00</td>
<td>72.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILLAR</th>
<th>AREA (ft^2)</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.32E+03</td>
<td>3.21E+03</td>
<td>9.98E+05</td>
</tr>
<tr>
<td>2</td>
<td>4.32E+03</td>
<td>3.21E+03</td>
<td>9.98E+05</td>
</tr>
</tbody>
</table>

**[TOTAL LOAD-BEARING CAPACITY OF PILLARS WITHIN AMZ]: 4.19E+06 (tons)**

To view the distribution of Pillar Load Bearing Capacity select 'View Plots->Settings->Pillar Load Bearing Capacity'.

**[BARRIER PILLAR PARAMETERS]**

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>WIDTH (ft)</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>137.00</td>
<td>6.93E+03</td>
<td>1.32E+07</td>
</tr>
</tbody>
</table>

**[BARRIER PILLAR LOADS]**

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT LOAD (tons)</th>
<th>FRONT-ABUTMENT LOAD (tons)</th>
<th>SIDE-ABUTMENT LOAD (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>3.45E+06</td>
<td>1.57E+06</td>
<td>5.35E+06</td>
</tr>
</tbody>
</table>

**[BARRIER PILLAR LOADS (cont'd)]**

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>TOTAL LOAD (tons)</th>
<th>STABILITY FACTOR</th>
<th>LTTRANBAR (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>5.19E+03</td>
<td>1.27</td>
<td>7.89E+02</td>
</tr>
</tbody>
</table>

**[BARRIER PILLAR STRESSES]**

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT STRESS (psi)</th>
<th>FRONT-ABUTMENT STRESS (psi)</th>
<th>SIDE-ABUTMENT STRESS (psi)</th>
<th>TOTAL STRESS (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>1811</td>
<td>827</td>
<td>2811</td>
<td>5448</td>
</tr>
</tbody>
</table>

**[REMNANT BARRIER PILLARS BETWEEN GOBS]**

<table>
<thead>
<tr>
<th>REMNANT</th>
<th>WIDTH (ft)</th>
<th>STABILITY FACTOR</th>
<th>LTFTBAR (tons)</th>
<th>LTTRANSREM (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>97.0</td>
<td>0.55</td>
<td>2.18E+06</td>
<td>2.18E+06</td>
</tr>
</tbody>
</table>

**[STRESS ON INDIVIDUAL PILLARS WITHIN THE AMZ]**
DEVELOPMENT STRESSES......................... 2075 (psi)

FRONT ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN ROW ACTIVE GOB 1S + ACTIVE GOB 2S + ACTIVE GOB
1  630  2692  2692
2  317  1356  1356
3  112  478   478

FIRST SIDE ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN COLUMN LOAD
1  3180
2  1264

To view the distribution of Individual Pillar Stresses - Abutment or Total
select 'View Plots->Settings->Individual Pillar Stresses - Abutment'
select 'View Plots->Settings->Individual Pillar Stresses - Total'
ARIMPS: Actual Pillar Dimensions (width x length, ft). Entries shown from left to right.

Default Design

North Side

0.53
ARMPS module build: 5.0.41
Project File: C:\PROJECTS - Archived\226-20 GENWAL Main West Fillaring\226-20 GENWAL Main West Main:
Input Units: (ft) (psi)

[PROJECT TITLE]
GENWAL Crandall Canyon Main West Retreat in the Mains

[PROJECT DESCRIPTION]

[DEVELOPMENT GEOMETRY PARAMETERS]
Entry Height...........................................8 (ft)
Depth of Cover........................................2000 (ft)
Crosscut Angle........................................90 (deg)
Enter Width............................................20 (ft)
Number of Entries...................................3
Crosscut Spacing.....................................92 (ft)
Center to Center Distance #1......................80 (ft)
Center to Center Distance #2......................80 (ft)

[DEFAULT PARAMETERS]
In Situ Coal Strength...............................900 (psi)
Unit Weight of Overburden..........................162 (pcf)
Breadth of AMZ......................................223 (ft)
AMZ set automatically

[RETRIEVE MINING PARAMETERS]
Loading Condition..................................ONE SIDE + ACTIVE GOB
Extend of Active Gob................................3000 (ft)
Abutment Angle of Active Gob......................21 (deg)
Extend of First Gob..................................2500 (ft)
Abutment Angle of 1st Gob..........................21 (deg)
Barrier Pillar Width of 1st Gob....................210 (ft)
Depth of Slab Cut in Barrier Pillar of 1st Gob...0 (ft)

[ARMPS STABILITY FACTORS]

DEVELOPMENT........................................0.84
ACTIVE GOB..........................................0.72
ONE SIDE + ACTIVE GOB............................0.53

[DATA ABOUT THE ACTIVE MINING ZONE (AMZ)]
AMZ Width...........................................160.0 (ft)
AMZ Breadth..........................................223.0 (ft)
AMZ Area............................................35580.0 (ft) *(ft)
Extraction Ratio Within AMZ........................0.41
Development Load on AMZ...........................5.78E+06 (tons)
Front Abutment Load...............................62186 (tons)/(ft)
First Side Abutment Load...........................62186 (tons)/(ft)

R-FACTOR For Front Abutment.................0.900
R-FACTOR For First Side Abutment............0.895

TOTAL LOADINGS ON AMZ, INCLUDING TRANSFER FROM BARRIERS

<table>
<thead>
<tr>
<th>LOAD</th>
<th>ABUTMENT</th>
<th>LTRANSBAR</th>
<th>LTRANSREM</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVELOPMENT</td>
<td>0.000E+00</td>
<td>0.000E+00</td>
<td>0.000E+00</td>
<td>5.78E+06</td>
</tr>
<tr>
<td>ACTIVE GOB</td>
<td>9.01E+05</td>
<td>0.000E+00</td>
<td>0.000E+00</td>
<td>6.68E+06</td>
</tr>
<tr>
<td>1S + ACTIVE GOB</td>
<td>1.45E+06</td>
<td>0.000E+00</td>
<td>9.15E+05</td>
<td>9.05E+06</td>
</tr>
</tbody>
</table>

R-Factor for front abutment is the percent of the total front abutment load that is applied to the AMZ.

R-Factor for side abutment is the percent of the total...
side abutment load that is applied to the barrier pillar (the remainder is applied to the AMZ).

LTRANSBAR is the load transferred to the AMZ from the barrier pillar between the side and active gob if the barrier's SF is less than 1.5.

LTRANSREM is the load transferred to the AMZ from the remnant barrier between the side and active gob if the remnant's SF is less than 1.5.

[PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>PILLAR</th>
<th>ENTRY CENTER</th>
<th>MINIMUM DIMENSION</th>
<th>MAXIMUM DIMENSION</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(ft)</td>
<td>(ft)</td>
<td>(ft)</td>
</tr>
<tr>
<td>1</td>
<td>80.00</td>
<td>60.00</td>
<td>72.00</td>
</tr>
<tr>
<td>2</td>
<td>80.00</td>
<td>60.00</td>
<td>72.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILLAR</th>
<th>AREA STRENGTH LOAD-BEARING CAPACITY</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>(ft)(ft) (psi) (tons)</td>
</tr>
<tr>
<td>1</td>
<td>4.32E+03 3.21E+03 9.98E+05</td>
</tr>
<tr>
<td>2</td>
<td>4.32E+03 3.21E+03 9.98E+05</td>
</tr>
</tbody>
</table>

TOTAL LOAD-BEARING CAPACITY OF PILLARS WITHIN AMZ: 4.84E+06 (tons)

To view the distribution of Pillar Load Bearing Capacity, select 'View Plots->Settings->Pillar Load Bearing Capacity'

[BARRIER PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>WIDTH (ft)</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>210.00</td>
<td>9.33E+03</td>
<td>3.15E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT</th>
<th>FRONT-ABUTMENT LOAD (tons)</th>
<th>SIDE-ABUTMENT LOAD (tons)</th>
<th>LOAD (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>7.95E+06</td>
<td>5.60E+05</td>
<td>1.24E+07</td>
<td>1.10E+06</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS (cont'd)]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>TOTAL LOAD (tons)</th>
<th>STABILITY FACTOR</th>
<th>LTRANSBAR (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>1.05E+04</td>
<td>1.50</td>
<td>0.00E+00</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR STRESSES]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT</th>
<th>FRONT-ABUTMENT STRESS (psi)</th>
<th>SIDE-ABUTMENT STRESS (psi)</th>
<th>TOTAL STRESS (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2357</td>
<td>166</td>
<td>3683</td>
<td>6206</td>
</tr>
</tbody>
</table>

[REMNANT BARRIER PILLARS BETWEEN GOBS]

<table>
<thead>
<tr>
<th>REMNANT</th>
<th>WIDTH (ft)</th>
<th>STABILITY FACTOR</th>
<th>LFTBAR (tons)</th>
<th>LTRANSREM (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>210.0</td>
<td>1.27</td>
<td>4.03E+06</td>
<td>9.15E+05</td>
</tr>
</tbody>
</table>

[STRESS ON INDIVIDUAL PILLARS WITHIN THE AMZ]

AAI000981
DEVELOPMENT STRESSES..........................3833 (psi)

FRONT ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN ROW  ACTIVE GOB  1S + ACTIVE GOB  2S + ACTIVE GOB
 1           764          1540            1540
 2           433           873             873
 3           195           395             395

FIRST SIDE ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN COLUMN  LOAD
   1           1412
   2           485

To view the distribution of Individual Pillar Stresses - Abutment or Total
select 'View Plots->Settings->Individual Pillar Stresses - Abutment'
select 'View Plots->Settings->Individual Pillar Stresses - Total'
ARMPS: Actual Pillar Dimensions (width\times length, ft). Entries shown from left to right.

North Side

20' larger pillar

0.60
ARMFS module build: 5.0.41
Project File: C:\PROJECTS - Archived\226-20 GENWAL Main West Pillaring\226-20 GENWAL Main West Main
Input Units: (ft) (psi)

[PROJECT TITLE]
GENWAL Crandall Canyon Main West Retreat in the Mains

[PROJECT DESCRIPTION]

[DEVELOPMENT GEOMETRY PARAMETERS]
- Entry Height: 8 (ft)
- Depth of Cover: 2.000 (ft)
- Crosscut Angle: 90 (deg)
- Entry Width: 20 (ft)
- Number of Entries: 3
- Crosscut Spacing: 112 (ft)
- Center to Center Distance #1: 80 (ft)
- Center to Center Distance #2: 80 (ft)

[DEFAULT PARAMETERS]
- In Situ Coal Strength: 900 (psi)
- Unit Weight of Overburden: 162 (pcf)
- Breadth of AMZ: 223 (ft)
- AMZ set automatically

[RETREAT MINING PARAMETERS]
- Loading Condition: ONE SIDE + ACTIVE GOB
- Extend of Active Gob: 3000 (ft)
- Abutment Angle of Active Gob: 21 (deg)
- Extend of First Gob: 2500 (ft)
- Abutment Angle of 1st Gob: 21 (deg)
- Barrier Pillar Width of 1st Gob: 210 (ft)
- Depth of Slab Cut in Barrier Pillar of 1st Gob: 0 (ft)

[ARMFS STABILITY FACTORS]
- DEVELOPMENT: 0.94
- ACTIVE GOB: 0.81
- ONE SIDE + ACTIVE GOB: 0.60

[DATA ABOUT THE ACTIVE MINING ZONE (AMZ)]
- AMZ Width: 160.0 (ft)
- AMZ Breadth: 223.0 (ft)
- AMZ Area: 35680.0 (ft)^2
- Extraction Ratio within AMZ: 0.38
- Development Load on AMZ: 5.78E+06 (tons)
- Front Abutment Load: 62186 (tons)/(ft)
- First Side Abutment Load: 62186 (tons)/(ft)

R-FACTOR For Front Abutment: 0.900
R-FACTOR For First Side Abutment: 0.895

TOTAL LOADINGS ON AMZ, INCLUDING TRANSFER FROM BARRIERS

<table>
<thead>
<tr>
<th>CONDITION</th>
<th>LOAD</th>
<th>ABUTMENT</th>
<th>LTRANSBAR</th>
<th>LTRANSREM</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVELOPMENT</td>
<td>LOAD (tons)</td>
<td>(tons)</td>
<td>(tons)</td>
<td>5.78E+06</td>
<td></td>
</tr>
<tr>
<td>ACTIVE GOB</td>
<td>9.01E+05</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>6.68E+06</td>
<td></td>
</tr>
<tr>
<td>1s + ACTIVE GOB</td>
<td>1.45E+06</td>
<td>0.00E+00</td>
<td>9.15E+05</td>
<td>9.05E+06</td>
<td></td>
</tr>
</tbody>
</table>

R-Factor for front abutment is the percent of the total front abutment load that is applied to the AMZ.

R-Factor for side abutment is the percent of the total...
side abutment load that is applied to the barrier pillar 
(the remainder is applied to the AMZ).

LTRANBAR is the load transferred to the AMZ from the 
barrier pillar between the side and active gob if the 
barrier's SF is less than 1.5.

LTRANSREM is the load transferred to the AMZ from the 
remnant barrier between the side and active gob if the 
remnant's SF is less than 1.5.

[PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>PILLAR</th>
<th>ENTRY CENTER (ft)</th>
<th>MINIMUM DIMENSION (ft)</th>
<th>MAXIMUM DIMENSION (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80.00</td>
<td>60.00</td>
<td>92.00</td>
</tr>
<tr>
<td>2</td>
<td>80.00</td>
<td>60.00</td>
<td>92.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILLAR</th>
<th>AREA (ft)*ft</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.52E+03</td>
<td>3.43E+03</td>
<td>1.36E+06</td>
</tr>
<tr>
<td>2</td>
<td>5.52E+03</td>
<td>3.43E+03</td>
<td>1.36E+06</td>
</tr>
</tbody>
</table>

TOTAL LOAD-BEARING CAPACITY OF PILLARS WITHIN AMZ: 5.43E+06 (tons)

To view the distribution of Pillar Load Bearing Capacity 
select 'View Plots->Settings->Pillar Load Bearing Capacity'

[BARRIER PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>WIDTH (ft)</th>
<th>STRENGTH (psi)</th>
<th>LOAD-BEARING CAPACITY (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>210.00</td>
<td>9.33E+03</td>
<td>3.15E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT</th>
<th>FRONT-ABUTMENT LOAD (tons)</th>
<th>SIDE-ABUTMENT LOAD (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>7.95E+06</td>
<td>5.60E+05</td>
<td>1.24E+07</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS (cont'd)]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>TOTAL LOAD (tons)</th>
<th>STABILITY FACTOR</th>
<th>LTRANBAR (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>1.05E+04</td>
<td>1.50</td>
<td>0.00E+00</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR STRESSES]

<table>
<thead>
<tr>
<th>BARRIER</th>
<th>DEVELOPMENT</th>
<th>FRONT-ABUTMENT STRESS (psi)</th>
<th>SIDE-ABUTMENT STRESS (psi)</th>
<th>TOTAL STRESS (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2357</td>
<td>166</td>
<td>3683</td>
<td>6206</td>
</tr>
</tbody>
</table>

[REMNANT BARRIER PILLARS BETWEEN GOBS]

<table>
<thead>
<tr>
<th>REMNANT</th>
<th>WIDTH (ft)</th>
<th>STABILITY FACTOR</th>
<th>LFTBAR (tons)</th>
<th>LTRANSREM (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>210.0</td>
<td>1.27</td>
<td>4.03E+06</td>
<td>9.15E+05</td>
</tr>
</tbody>
</table>

[STRESS ON INDIVIDUAL PILLARS WITHIN THE AMZ]
DEVELOPMENT STRESSES..............................3652 (psi)

FRONT ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN ROW   ACTIVE GOB   1S + ACTIVE GOB   2S + ACTIVE GOB
1                  691            1393             1393
2                  331            667             667
3                  103            208             208

FIRST SIDE ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN COLUMN   LOAD
1                  1345
2                  463

To view the distribution of Individual Pillar Stresses - Abutment or Total
select 'View Plots-->Settings-->Individual Pillar Stresses - Abutment'
select 'View Plots-->Settings-->Individual Pillar Stresses - Total'
ARMPS: Actual Pillar Dimensions (width/length, ft). Entries shown from left to right.

North Side

40' longer pillar

0.65
GENWAL Crandall Canyon Main West Retreat in the Mains

[DEVELOPMENT GEOMETRY PARAMETERS]
Entry Height .......................... 8 (ft)
Depth of Cover .......................... 2000 (ft)
Crosscut Angle ........................ 90 (deg)
Entry Width ........................... 20 (ft)
Number of Entries ...................... 3
Crosscut Spacing ...................... 132 (ft)
Center to Center Distance #1 ........... 80 (ft)
Center to Center Distance #2 ........... 80 (ft)

[DEFAULT PARAMETERS]
In Situ Coal Strength .................. 900 (psi)
Unit Weight of Overburden .............. 162 (pcf)
Breadth of AMZ ........................ 223 (ft)
AMZ set automatically

[RETRACTION MINING PARAMETERS]
Loading Condition . ONE SIDE + ACTIVE GOB
Extend of Active Gob ................ ... 3000 (ft)
Abutment Angle of Active Gob ........ 21 (deg)
Extend of First Gob ................... 2500 (ft)
Abutment Angle of 1st Gob .............. 21 (deg)
Barrier Pillar Width of 1st Gob ........ 210 (ft)
Depth of Slab Cut in Barrier Pillar of 1st Gob... 0 (ft)

[ARMPS STABILITY FACTORS]
DEVELOPMENT ........................ 1.01
ACTIVE GOB .......................... 0.87
ONE SIDE + ACTIVE GOB ............... 0.65

[DATA ABOUT THE ACTIVE MINING ZONE (AMZ)]
AMZ Width ............................ 160.0 (ft)
AMZ Breadth ........................... 223.0 (ft)
AMZ Area ................................ 35680.0 (ft)*(ft)
Extraction Ratio Within AMZ .......... 0.36
Development Load on AMZ ............... 5.78E+06 (tons)
Front Abutment Load................... 62186 (tons)/(ft)
First Side Abutment Load.............. 62186 (tons)/(ft)

R-FACTOR For Front Abutment .......... 0.900
R-FACTOR For First Side Abutment ..... 0.895

TOTAL LOADINGS ON AMZ, INCLUDING TRANSFER FROM BARRIERS

<table>
<thead>
<tr>
<th>LOAD</th>
<th>ABUTMENT</th>
<th>LTRANSBAR</th>
<th>LTRANSREM</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>DEVELOPMENT</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>5.78E+06</td>
</tr>
<tr>
<td>ACTIVE GOB</td>
<td>9.01E+05</td>
<td>0.00E+00</td>
<td>0.00E+00</td>
<td>6.68E+06</td>
</tr>
<tr>
<td>1S + ACTIVE GOB</td>
<td>1.45E+06</td>
<td>0.00E+00</td>
<td>9.15E+05</td>
<td>9.05E+06</td>
</tr>
</tbody>
</table>

R-Factor for front abutment is the percent of the total front abutment load that is applied to the AMZ.

R-Factor for side abutment is the percent of the total...
side abutment load that is applied to the barrier pillar (the remainder is applied to the AMZ).

LTRANBAR is the load transferred to the AMZ from the barrier pillar between the side and active gob if the barrier's SF is less than 1.5.

LTRANSREM is the load transferred to the AMZ from the remnant barrier between the side and active gob if the remnant's SF is less than 1.5.

[PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>PILLAR</th>
<th>ENTRY CENTER (ft)</th>
<th>MINIMUM DIMENSION (ft)</th>
<th>MAXIMUM DIMENSION (ft)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>80.00</td>
<td>60.00</td>
<td>112.00</td>
</tr>
<tr>
<td>2</td>
<td>80.00</td>
<td>60.00</td>
<td>112.00</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>PILLAR AREA (ft)*(ft)</th>
<th>STRENGTH LOAD-BEARING CAPACITY (psi) (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6.72E+03 3.57E+03 1.73E+06</td>
</tr>
<tr>
<td>2</td>
<td>6.72E+03 3.57E+03 1.73E+06</td>
</tr>
</tbody>
</table>

TOTAL LOAD-BEARING CAPACITY OF PILLARS WITHIN AMZ: 5.84E+06 (tons)

To view the distribution of Pillar Load Bearing Capacity select 'View Plots->Settings->Pillar Load Bearing Capacity'

[BARRIER PILLAR PARAMETERS]

<table>
<thead>
<tr>
<th>BARRIER PILLAR PARAMETERS</th>
<th>STRENGTH LOAD-BEARING</th>
</tr>
</thead>
<tbody>
<tr>
<td>BARRIER</td>
<td>PILLAR</td>
</tr>
<tr>
<td>First</td>
<td></td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS]

<table>
<thead>
<tr>
<th>BARRIER DEVELOPMENT</th>
<th>FRONT-ABUTMENT LOAD (tons)</th>
<th>SIDE-ABUTMENT LOAD (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>7.95E+06</td>
<td>5.60E+05</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR LOADS (cont'd)]

<table>
<thead>
<tr>
<th>BARRIER TOTAL LOAD (tons)</th>
<th>STABILITY FACTOR</th>
<th>LTRANSBAR (tons)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>1.05E+04</td>
<td>1.50</td>
</tr>
</tbody>
</table>

[BARRIER PILLAR STRESSES]

<table>
<thead>
<tr>
<th>BARRIER DEVELOPMENT</th>
<th>FRONT-ABUTMENT STRESS (psi)</th>
<th>SIDE-ABUTMENT STRESS (psi)</th>
<th>TOTAL STRESS (psi)</th>
</tr>
</thead>
<tbody>
<tr>
<td>First</td>
<td>2357</td>
<td>166</td>
<td>3683</td>
</tr>
</tbody>
</table>

[REMNANT BARRIER PILLARS BETWEEN GOBS]

<table>
<thead>
<tr>
<th>REMNANT BARRIER PILLARS BETWEEN GOBS</th>
<th>STABILITY FACTOR</th>
</tr>
</thead>
<tbody>
<tr>
<td>BARRIER</td>
<td>PILLAR</td>
</tr>
<tr>
<td>First</td>
<td></td>
</tr>
</tbody>
</table>

[STRESS ON INDIVIDUAL PILLARS WITHIN THE AMZ]

AAI000989
DEVELOPMENT STRESSES

FRONT ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN ROW  ACTIVE GOB  1S + ACTIVE GOB  2S + ACTIVE GOB
1      635       1280       1280
2      251       506        506
3      45        91         91

FIRST SIDE ABUTMENT STRESS (psi) APPLIED TO:
PILLARS IN COLUMN  LOAD
1       1302       
2       448        

To view the distribution of Individual Pillar Stresses - Abutment or Total
select 'View Plots->Settings->Individual Pillar Stresses - Abutment'
select 'View Plots->Settings->Individual Pillar Stresses - Total'