New Ground Support Products For Longwall Gate Roads

For

2013 LONGWALL USA

Pittsburgh, PA
May 9, 2013
New Ground Support Products For Longwall Gate Roads

By:
Dakota Faulkner
New Products Outline

1. Fully Grouted Cable Bolt (FGCB)
2. INSTáL® Tensionable Cable Bolt
3. Standing Support Technologies
   • J-Crib - Pumpable Cribs
   • Rapid Installation Props (RIP)
   • J-Sand Props
4. Non-Metallic Bolt and Plates
5. Questions/Open Discussion
FULLY GROUTED CABLE BOLT
What is the FGCB?

- A cable bolt that can be injected with polyurethane (PUR) to fully encapsulate the cable bolt and drill hole.
How Does It Work?

- Modified drive head to allow injection of PUR.
- Addition of rubber packer to pressurize drill hole.
Typical Uses

- Long term corrosion protection.
- Consolidate fractured or laminated strata.
- Water stoppage.
Fully Grouted Cable Bolt

- Available in:
  - 0.6” (30 ton) or 0.7” (40 ton) cable.
  - Non-Tensioned or Tensionable (INSTáL CC).

- Typically:
  - Installed in 1” or 1-3/8” drill hole.
  - Point anchored with 4-5 eq. feet of resin.
  - Standard 1-1/8” drive nut.
  - Standard minimum length of 8’.
CASE STUDY

(Deteriorating Roof Conditions)
FGCB Used for Deteriorating Roof Conditions

- Location - Eagle seam
- Mining method - Longwall
- Previously mined headgate began to take excessive weight and roof conditions rapidly began to deteriorate.
JENNMAR Recommended the FGCB

• JENNMAR’s technical engineers made an on-site visit and inspected the area.

• Recommended the FGCB due to its ability to inject the roof strata with PUR along with the added strength of a cable bolt.
Injected PUR Migrating Through the Cracks in the Strata
FGCB Successfully Utilized to Halt the Deteriorating Roof Conditions
Scoped Drill Hole

Before injection.

After injection.
INSTáL® TENSIONABLE CABLE BOLT SYSTEMS
*Now available in a Fully Grouted model.*
New Designed Bail Type Expansion Anchor (Shell)

- New serration design improves anchorage capacity.
- Improved resin channels to reduce installation pressure.
INSTáL® Cable Bolt Specifications

- 0.6” (30 ton) or 0.7” (40 ton) cable.
- Simple and fast installation.
- Provides immediate support and confinement to roof.
- Consistent applied tension.
- Can be implemented as part of primary roof support system.
- Tension Range – 6,000 lbs minimum.
- *Can be used in conjunction with PUR injection.
FULLY GROUTED INSTáL CC
(Tensionable PUR Injectable Cable Bolt)
FULLY GROUTED INSTáL CC

- Now available in 0.6” (30 ton) and 0.7” (40 ton).
- Tension Range – 6,000 lbs minimum.
- Can be implemented as part of primary roof support system and injected at any time.
Case Study - INSTáL CC
(Longwall Setup Face)
Longwall Setup Face

• Eagle Seam
• Full-width setup face.
• Laminated sandstone roof susceptible to damage with very little roof deflection.
• Significant roof movement observed in first half of setup face due to slow installation of post-tensioned cables.
• INSTáL® Cables recommended to provide immediate support and reduce roof deflection for second half of setup face.
Longwall Setup Face

Post-Tensioned Cables

INSTáL ® CC Cables

Roof location 100 ft after switch from Post Tensioned Cable Bolts to INSTáL ® CC cable bolts.
B-RIGID TRUSS SYSTEM with INSTáL® CC
B-Rigid Truss System Overview

- Jennmar T-Channel used in conjunction with Jennmar Cable Bolts.
- Outside bolts are angled over ribs into undisturbed strata.
- Replaces conventional truss systems.
Advantages of B-Rigid Truss

- **Simple Installation**—uses standard roof support materials with no special installation tools needed.
- **Conforms to roof**—no gaps between channel and roof line.
- Provides confinement to immediate roof for better roof support.
- Allows individual cables to interact.
- Can be used with all cable bolting systems.
Example of B-Rigid Truss in Use
Example of B-Rigid Truss in Use
Example of B-Rigid Truss in Use
New Standing Support Technologies
J-CRIB® Pumpable Crib
J-CRIB® Pumpable Crib

- J-CRIB® is a specialized pumpable cement and containment bag which replaces conventional timber cribs in longwall tailgates and bleeder headings.
- Two part system consisting of Part A and Part B, which when mixed together rapidly react to produce a load bearing mine roof support.
- Typical diameters and peak capacities:
  - 24” (610mm) - 150 tons (135 tonne)
  - 27” (686mm) - 200 tons (181 tonne)
  - 30” (762mm) - 230 tons (209 tonne)
J-CRIB Advantages

- High efficiency mixing and pumping equipment.
- High yield, approximately 90% by volume water.
- Long distance pumping, up to 18,000 ft (5486 m).
- Long pumping life, at least 12 hours.
- Yields controllably to ground pressure.
Conforms and Pressurizes Against the Roof & Floor

• Consistent performance, pressurization of bags ensures good contact with the mine roof and even load bearing capacity.
• Rapid gelling allows bags to be filled completely without additional form work.
Conforms and Pressurizes Against the Roof & Floor

- Consistent performance, pressurization of bags ensures good contact with the mine roof and even load bearing capacity.
- Rapid gelling allows bags to be filled completely without additional form work.
27” Diameter Standard J-CRIB Results

NIOSH RESEARCH LABORATORY
JENNMAR - J-CRIB PUMPABLES - 4/17/2013

Test A - 27 inch diameter - 71.2 inches tall - 4 inch pitch
Test B - 27 inch diameter - 71.1 inches tall - 4 inch pitch
NIOSH RESEARCH LABORATORY
JENNMAR - PUMPABLES - 4/17/2013

Test G - 27 inch diameter - 71.3 inches tall - 4 inch pitch - 1,767 lbs - GRHDB1 Bag
Rapid Installation Prop (RIP)
Rapid Installation Prop

• **Designs:**
  • Available in 50 & 100 ton (45 & 91 tonne) capacities.

• **Applications:**
  • Tailgate and bleeder support.
  • Cross-cut and intersection stabilization.
  • Belt line and headgate entry support.
  • Longwall shield recovery.
  • Longwall center entry.
  • CM pillar extraction.
  • Violation prevention.
### RIP 50 & RIP 100

#### Technical Data - RIP

<table>
<thead>
<tr>
<th>SUPPORT, tons (metric tons)</th>
<th>TRAVEL, in(mm)</th>
<th>PIPE, in (mm)</th>
<th>EXTENSION THREAD, in (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td>RIP 50 (45)</td>
<td>12 (305)</td>
<td>3 (76)</td>
<td>2.0 (51)</td>
</tr>
<tr>
<td>RIP 100 (91)</td>
<td>18 (457)</td>
<td>4 (102)</td>
<td>3.5 (89)</td>
</tr>
</tbody>
</table>

#### ADVANTAGES:
- Available in 50 or 100 ton (45 or 91 metric tons) capacities.
- Single pipe, height can be modified if necessary.
- Easy screw height adjustment.
- Piranha top plate engages roof to prevent rotation when tightening.
J-SAND PROP

- **Designs:**
  - Available in 30, 60 & 100 ton (27, 54 & 91 tonne) capacities.
  - Yieldable or Non-Yieldable.

- **Applications:**
  - Tailgate and bleeder support.
  - Cross-cut and intersection stabilization.
  - Belt line and heagate entry support.
  - Longwall shield recovery.
  - Longwall center entry.
  - CM pillar extraction.
  - Violation prevention.
Standard J-SAND PROP

- **Advantages**
  - 24 inches of height adjustment.
  - Light, quick and easy to install.
  - No equipment or tools required to install.
  - Cannot be over extended.
  - Available with a variety of head plates.
  - Yieldable versions developed provide additional displacement.
### TECHNICAL DATA

**J-SAND 30**
- **Size:** J-SAND 4-6, J-SAND 5-7, J-SAND 6-8, J-SAND 7-9
- **Height (ft/m):**
  - Collapsed: 4 (1.2), 5 (1.5), 6 (1.8), 7 (2.1)
  - Extended: 6 (1.8), 7 (2.1), 8 (2.4), 9 (2.7)
- **Weight (lb/kg):**
  - Collapsed: 53 (24), 57 (26), 61 (28), 65 (29)
  - Extended: 6 (1.8), 7 (2.1), 8 (2.4), 9 (2.7)

**J-SAND 60**
- **Size:** J-SAND 4-6, J-SAND 5-7, J-SAND 6-8, J-SAND 7-9
- **Height (ft/m):**
  - Collapsed: 4 (1.2), 5 (1.5), 6 (1.8), 7 (2.1)
  - Extended: 6 (1.8), 7 (2.1), 8 (2.4), 9 (2.7)
- **Weight (lb/kg):**
  - Collapsed: 76 (35), 82 (37), 91 (41), 97 (44)
  - Extended: 6 (1.8), 7 (2.1), 8 (2.4), 9 (2.7)

**J-SAND 100**
- **Size:** J-SAND 4-6, J-SAND 5-7, J-SAND 6-8, J-SAND 7-9
- **Height (ft/m):**
  - Collapsed: 4 (1.2), 5 (1.5), 6 (1.8), 7 (2.1)
  - Extended: 6 (1.8), 7 (2.1), 8 (2.4), 9 (2.7)
- **Weight (lb/kg):**
  - Collapsed: 91 (35), 102 (46), 112 (51), 123 (56)

- **J-SAND 30**
  - Light weight – Up to 32 pounds lighter than a comparable 60 ton J-SAND Prop.
  - Can be easily carried by one man.

- **J-SAND 60**
  - Light weight – Up to 9 pounds lighter than competing 60 ton props.
  - Over 4” of displacement on yieldable versions.

- **J-SAND 100**
  - High capacity to minimize roof movement and keep the entry open.
  - Used when the ultimate load bearing support is required.

*Custom sizes are available*
Yieldable J-SAND Props

NIOSH RESEARCH LABORATORY
J-SAND - YIELDABLE PROP - 04/18/2013

- 30 Ton Yieldable Prop - 5 inch
- 30 Ton Yieldable Prop - 5 inch
- 30 Ton Non-Yieldable Prop
- 60 Ton Yieldable Prop - 3.5 inch
- 60 Ton Yieldable Prop - 4.5 inch
- 60 Ton Non-Yieldable Prop

VERTICAL FORCE, Tons

VERTICAL DISPLACEMENT, Inches
J-PAK

• **Advantages:**
  • Replaces conventional timber cribs in longwall tailgates and bleeders.
  • Sustains peak capacity during yielding.
  • Stable and high yield performance.
  • Withstands lateral displacement.

• **Typical diameters and capacities:**
  • 18” (457 mm) ; 70 - 80 tons (64 - 73 tonne).
  • 24” (610 mm) ; 90 - 100 tons (82 - 91 tonne).
24” J-PAK Results

NIOSH RESEARCH LABORATORY
JENNMAR - J-PAK - 6/12/2012

Test A - J-Pak - 24 inch diameter - 97.25 inches tall - 1,381 lbs
Test B - J-Pak - 24 inch diameter - 96.91 inches tall - 1,310 lbs
Test C - J-Pak - 24 inch diameter - 96.67 inches tall - 1,427 lbs
Test D - J-Pak - 24 inch diameter - 97.01 inches tall - 1,320 lbs
NIOSH RESEARCH LABORATORY
JENNMAR - J-PAK - 6/12/2012

18 inch diameter J-PAK - 76.53 inches tall - 745 lbs
Non-Metallic Bolts and Plates
NON-METALLIC CUTTABLE PRODUCTS

• Products made from composite materials to resist corrosion in harsh mine environments.
• Provide rib support in longwall gate roads.
• Minimum load capacity of system (Bolt and Plate or Pan) 5 tons.
NON-METALLIC CUTTABLE PRODUCTS
Sinkable Plate

- Made of Glass Reinforced Nylon (GRN) for high density to sink when going through cleaning plant.
- Plate center allows bolt to be installed at an angle.
- Hangers molded into plate design.
NON-METALLIC CUTTABLE PRODUCTS

18” Fiberglass Pan

• Center section designed so that additional plates are not required.
• 18” Square pan provides more surface support.
• Constructed of fiberglass with a high density to sink when going through cleaning plant.
NON-METALLIC CUTTABLE PRODUCTS

Fiberglass Bolt

- GRN coating injected onto top of bolt to aid in mixing resin.
- The nut uses a standard 36mm hex wrench.
- Available in 3’ & 4’ lengths.
JENNMAR™ & KMS WOULD LIKE TO THANK YOU FOR OPPORTUNITY TO BE HERE TODAY.
Contact Information

JENNMAR CORPORATION
258 KAPPA Dr.
P.O. BOX 111253
PITTSBURGH, PA 15238
(412) 963-9071
WWW.JENNMAR.COM

Dakota Faulkner
DFAULKNER@JENNMAR.COM
(412) 963-5388