

Protect your Lift Leg Pockets with Loctite MR 5898

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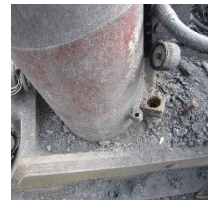
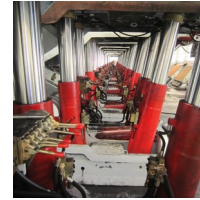
| Agenda

1. Background
2. The Current Solution
3. Problems with the Current Solution
4. Creation of Loctite MR 5898
5. Loctite MR 5898 Properties
6. Application Process
7. Key Benefits of Loctite MR 5898
8. Henkel Resources



Objectives

1. Understand the risks associated with dust, debris, and tooling filling up the leg pockets
2. Understand the time and cost associated with repetitive maintenance of the current solution
3. Learn the key benefits of a cure-in-place sealing system for the lift leg pockets
 - Safety
 - Time
 - Cost



| Background

The Problem

- A chronic issue in longwall mining, lift leg pockets are susceptible to and collect debris, such as dirt, rocks, coal, metal tools and cutting tips from the shear which become lodged under the hydraulic rams.
- Over time, the debris packs into the pocket, restricting movement.
- Wear begins to develop through the bottoms of the rams, damaging the shield causing catastrophic failure, expensive repairs, and extended or unexpected downtime.



| Background

The Problem

- Cleaning out the pockets can take upwards of 8 man-hours per pocket of severely compacted coal debris
- Typical planned maintenance is done daily over a 6 hour shift
- Now that solutions exist, fines can be issued for unprotected pockets



| The Current Solution

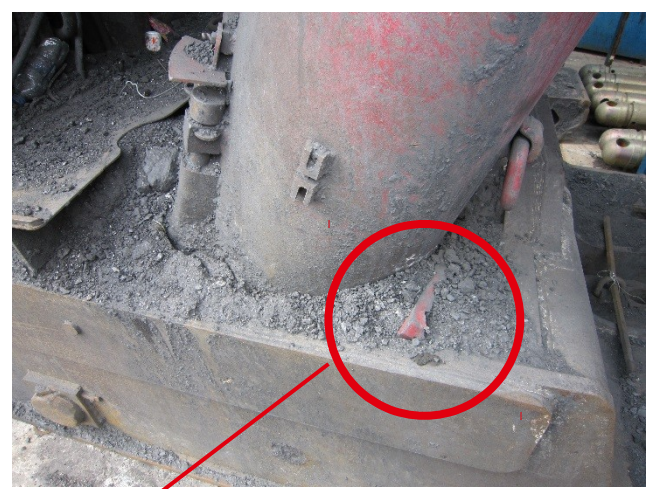
Pre-Molded Foam Inserts

- Pre-molded inserts are a common solution in the industry:
- **Pro's**
 - Fit to the exact model of equipment
 - Push-in-place
 - Flexible and don't take compression set

Problems with the Current Solution

Pre-Molded Foam Inserts

- **Con's**
 - Long lead time
 - Take up significant space for storage and transport
 - One size does not fit all
 - Pocket must be completely clean for correct fit
 - Tend to slip or fall out of place in short period of time, rendering them ineffective
 - Easily Damaged – no repair option



Loctite MR 5898 Flexible Foaming Polyurethane Cure-In-Place Foaming Pocket Sealing

- Developed with an industry partner and direct involvement from a Longwall Maintenance Coordinator
- Objective was to create a product that would bond to and seal the pockets from debris while remaining flexible to prevent push-out and allow hydraulic lift leg movement during operation



Loctite MR 5898 Flexible Foaming Polyurethane

Cure-In-Place Foaming Pocket Sealing

- Loctite MR 5898 is a cure-in-place two-component foaming polyurethane
- Expands 700%-1000% from liquid to foam within 5 minutes
- Functional cure within 15 minutes
- Fills in all crevices/geometries and bonds to the pocket to prevent pushout or separation from pocket and leg
- No special equipment required – easy to mix kits



Loctite MR 5898 Flexible Foaming Polyurethane Preparation Recommendations

- Pockets should be clean and dry, however Loctite MR 5898 is tolerant to some contamination and moisture
- Tape off holes/leak paths
- If non-stick is preferred, apply mold release to surface
- Keep temperature in mind
 - Designed to be poured underground ~50°F
 - Ideal temperature ~72°F
 - Maximum application temperature ~100°F
- Be mindful of foaming volume
 - Start off with less until fill is “dialed in”



Loctite MR 5898 Flexible Foaming Polyurethane

Mixing

- Pre-mix component A
- Pour A into B
- Mix until “milky white”
- Pour immediately into pocket



Loctite MR 5898 Flexible Foaming Polyurethane Foaming

- Foams 700%-1000%
- Consistent foam volume at same temperature and volume mixes
- Foams and begins to skin-over within 5 minutes
- Functional cure in about 15 minutes
- Bonds to itself



Loctite MR 5898 Flexible Foaming Polyurethane Manipulation Techniques

- After reaching full foam, a couple techniques can be used to manipulate the geometry
 - Push-down using plastic or form with mold release
 - Cut using serrated knife
 - Apply more to top-off area or fill hole – product will bond to itself



Loctite MR 5898 Flexible Foaming Polyurethane Finished Product

- Loctite MR 5898 has the consistency of “rubbery memory foam” after cured.
- Longwalls can return to service 15 minutes after the product has been poured
- Product is self-extinguishing and compatible with other materials used underground



Loctite MR 5898 Flexible Foaming Polyurethane

Benefits

- Cure-in-place foaming system that bonds to pocket
 - Fast return to service (15 min)
 - Will not slide/push out, doesn't take compression set
 - One size fits all
- Can be applied at repair stage above ground or during operation underground
- No special equipment required
- Safe to use
 - Low odor
 - Self-extinguishing
- No significant lead time
- Less space requirements for storage and transport

Loctite MR 5898 Flexible Foaming Polyurethane

Durability

- After 9 months in service:



- Customer has been using for over 3 years!

Loctite MR 5898 Resources

- Sell Sheet
- Data Sheet
- YouTube Channel
- On-Site Training
- Cost Savings and Value Calculations

LOCTITE

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Product Description Sheet
Loctite® MR 5898™
Maintenance, Repair & Overhaul, Feb 2014

PRODUCT DESCRIPTION
LOCTITE® MR5898™ Foaming Polyurethane is an innovative solution for longwall mining operations. This foaming polyurethane bonds to the pocket and hydraulic cylinder for protection against debris and other particulates that can damage or limit the movement of the roof support shield system. MR5898™ can be used to fill the entire cavity but is flexible enough to accommodate hydraulic leg movement.

- Advantages:**
- Helps ensure proper functionality and safety of personnel
 - Helps prevent downtime and costly components
 - Safe for use underground or in confined spaces
 - Two-part formula begins to foam minutes and will be tack-free in 10 minutes
 - Flexible and easily cut or trimmed with a serrated blade
 - Keeps pockets free of debris
 - Convenient kit sizes

- DIRECTIONS FOR USE**
- **Preparation:** For best results, clean, dry and free from loose standing water.
 - If there are drainage areas at the bottom of the drainage area, they should be temporary prevent LOCTITE® MR5898™ from entering the drainage area.
 - Using a jerry mixer or equivalent drill, premix component B for 1 minute.
 - Add the entire contents of component A to the premix component B and continue to mix until mixing of the two started.
 - Begin mixing the two component being sure to rotate the mixer as you mix to incorporate all of the material.
 - Once the material begins to turn and initial foaming is visible, the material is ready to be poured. (Depending on the volume of the pour, the material may partially fall. A follow-up pour is necessary to achieve the desired thickness.)
 - Multiple pours on top of each other as soon as the foam is resilient (approx 10 minutes). The foam is to be cut and shaped as desired.
- Note: Cured product will absorb moisture.

PROPERTIES OF UNCURED MATERIAL

Feature	Typical Value
Part A: Specific Gravity	1.125
Part A: Color	Translucent to cloudy white with yellow tint
Part A: Viscosity	300-500 cps
Part B: Specific Gravity	1.024



LOCTITE® MR5898™ Foaming Polyurethane
For Longwall Roof Support Shield Systems

Introducing LOCTITE® MR5898™ foaming polyurethane, an innovative solution for longwall mining operations. This foaming polyurethane bonds to the pocket and hydraulic cylinder for protection against debris and other particulates that can damage or limit the movement of the roof support shield system. MR5898™ foams up to fill the entire cavity but is flexible enough to accommodate hydraulic leg movement.

Benefits:

- Helps ensure proper functionality of roof shield and safety of personnel
- Helps prevent downtime and costly damage to components
- Safe for use underground or in confined spaces
- Self-energizing and low odor
- Two part formula begins to foam after a few minutes and will be tack-free minutes after pouring
- Flexible and easily cut or trimmed with a serrated blade
- Keeps pockets free of debris
- Convenient kit sizes

PRODUCT	FORM	CONTAINER	RELEASE WEIGHT	CONSTRUCTION	USE STRUCTURE	APPLY TIME	FORM TIME	SET TIME	REIN. (MIN)	REIN. (MAX)
LOCTITE MR5898	WFOA	1.5 Gallon	4.5 kg (10 lb)	Two Part Foam	Part A: 10 min Part B: 10 min	10 min	10 min	10 min	11	24-48

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Thank you!

