Research Need

“Guide for Designing, Specifying and Managing Chemical Grouting Applications for Tunnel Repair and Rehabilitation”

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T-20 Tunnels Technical Committee
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Polyurethane Resin Injection

- 2-part, 50-50 mix “glue”
- 30-90 sec set time
- High tensile/adhesion strength
- Mildly hydrophilic (2x-5x expansion)
- 70 pcf cured resin density
- Motor oil viscosity, easily pumped
- Hard resin to dense, hard foam
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Available References
Barriers to Chemical Grout Applications

What product(s) do I need?
Barriers to Chemical Grout Applications

What product(s) do I need?
How do I estimate quantities?
Barriers to Chemical Grout Applications

What product(s) do I need?
How do I estimate quantities?

These materials expand AND consolidate.
Barriers to Chemical Grout Applications

What product(s) do I need?
How do I estimate quantities?
How do I specify the work?
  Injection stages?
  Performance requirements?
  Verification?

Image of a worker in a yellow suit in a tunnel.
Barriers to Chemical Grout Applications

What product(s) do I need?
How do I estimate quantities?
How do I specify the work?
How do I pay for grouting?

LBS, GALS, CUFT, CUYDS
In-the-can/In-the-Ground?
Barriers to Chemical Grout Applications

What product(s) do I need?
How do I estimate quantities?
How do I specify the work?
How do I pay for grouting?
Did it work?
Is verification testing required?
Barriers to Chemical Grout Applications

What product(s) do I need?
How do I estimate quantities?
How do I specify the work?
How do I pay for grouting?
Did it work?
Why the big overrun?
Research Need

Develop practical grouting guidance for...

**Structure Rehabilitation**
- Tunnel lining joint/crack repair
- Portal structure repairs

**Void Filling**
- As-built and developing voids
- Lining extrados contact grouting

**Groundwater Management**
- Crack/joint sealing
- Failed drainage system repair

**Ground Stabilization**
- Portal rock slopes
- Roadway subgrade stabilization
Research Need

How to...

- Properly evaluate the site
- Develop effective grouting strategies
- Select the right product(s)
- Specify materials and work practices
- Identify safety concerns
- Estimate quantities/waste
- Develop contracting/risk strategies
- Select pay items
- Verify processes and procedures
- Control the project
- Inspect injection operations
- Address change of conditions
- Verify/warranty performance
- Manage stakeholder expectations
Recommended Deliverables

Reference Manual
General Applications
Product Details/Selection
Best Practices (planning thru delivery)
Guide Specification(s)

Webinar/Web-Based Training
Module 1: Product Information/Applications
Module 2: Project Development (planning/specifying)
Module 3: Project Delivery (managing/monitoring)