INTERNATIONAL CONCRETE REPAIR INSTITUTE

Modern Trends in the Repair Industry

"Use of Balloon-Pod Surface-Mounted System for Structural Pressure Injection of Distressed Concrete"

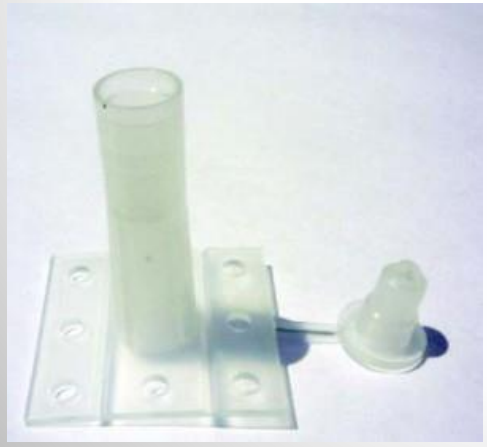
KPG AMERICAS™ in collaboration with TPS INJECTION SYSTEMS™

This presentation demonstrates a “balloon-pod surface-mounted system" that addresses common challenges experienced during concrete crack repair by resin injection. This system technology utilizes a constant-pressure application, allowing for simultaneous port injection without need for drilling. In addition, an observation window allows for verification of resin flow.

Presenters: Bokum Lee, Jon Dupont

Traditional injection ports

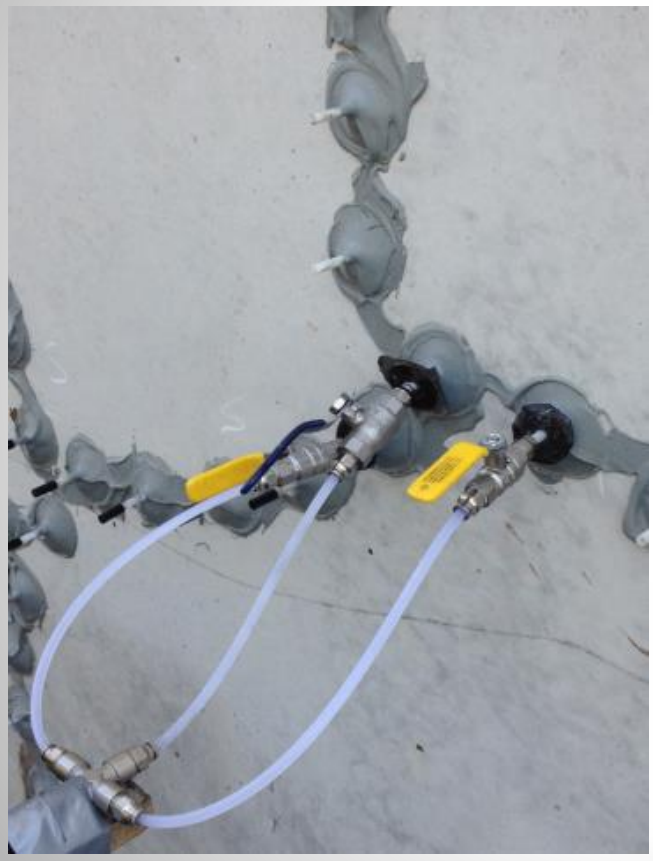
Traditional surface ports



Challenges of current systems
[Surface port injection]

- No visual gauge
- Difficult to control pressure
- Ports can detach
- Waste of capping material
- Ports need to be monitored
- Prone to dripping
- Difficult to verify epoxy flow

Challenges of current systems
[Surface port injection]



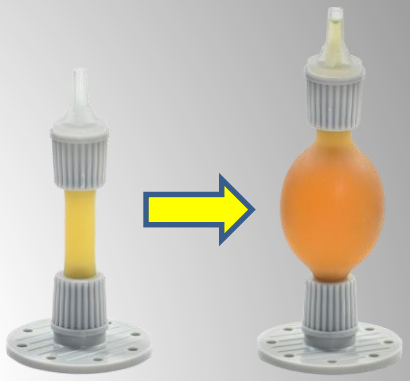
- No visual gauge
- Difficult to control pressure
- Difficult to verify epoxy flow
- Multiple injection sites
- Can be complex to set up

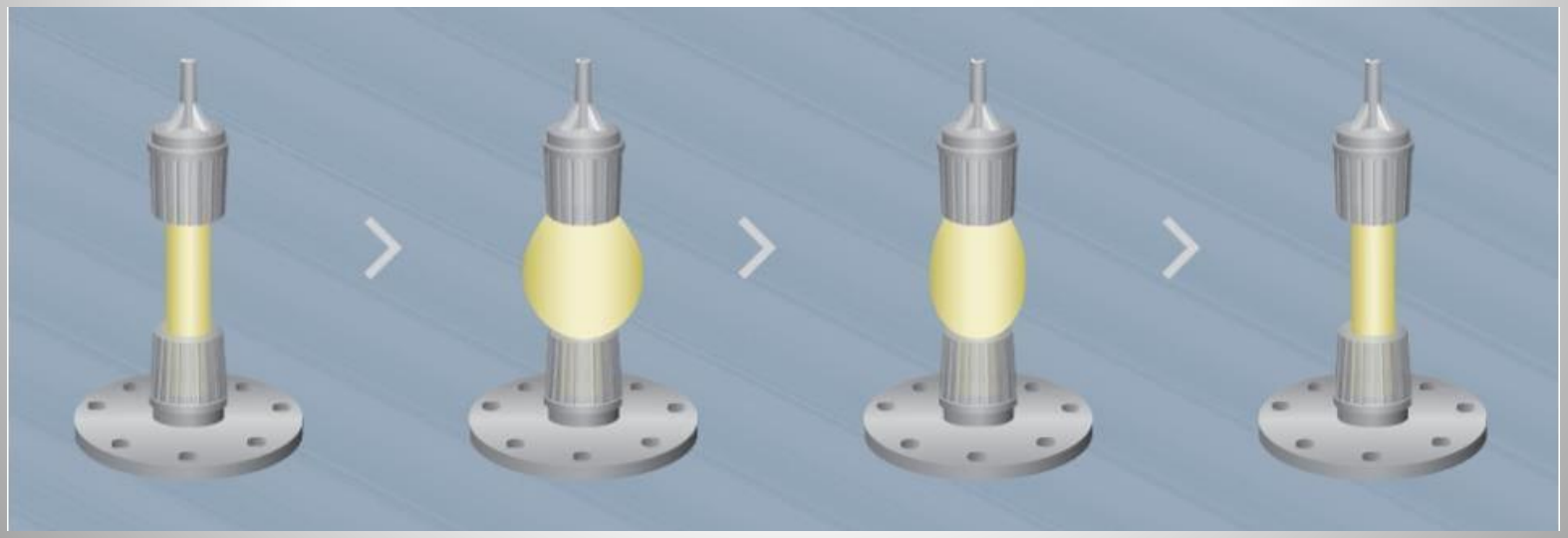
Challenges of current systems
[Surface port injection]

- Tight spacing often required
- Waste of capping material
- Difficult to control pressure

Function [Pressure]

- Injects resin at a constant pressure of 45-65 PSI
- Can accept 1.5 ounces of resin and be filled and refilled as necessary
- Can fill multiple ports to produce one-directional pressure
- Designed to absorb movement created during the injection process
- Keeps resin in but lets air and water out
- Non invasive, no drilling required, surface-mounted

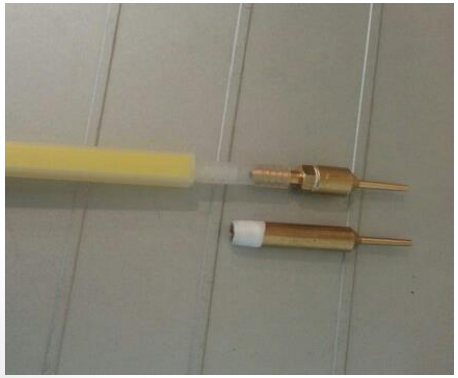




Verifiable Results

Observation windows allow engineers and inspectors to validate the flow of resin during the actual injection.

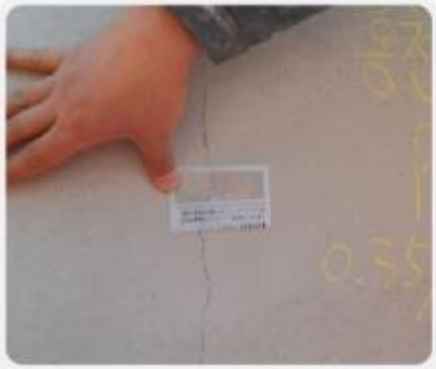
Application Methods



Hand-applied

Machine-applied

Application Process



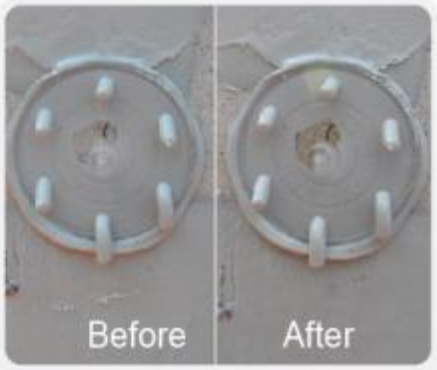
Assess

Seal

Install (Ports)

Install (Observation Window)

Inject

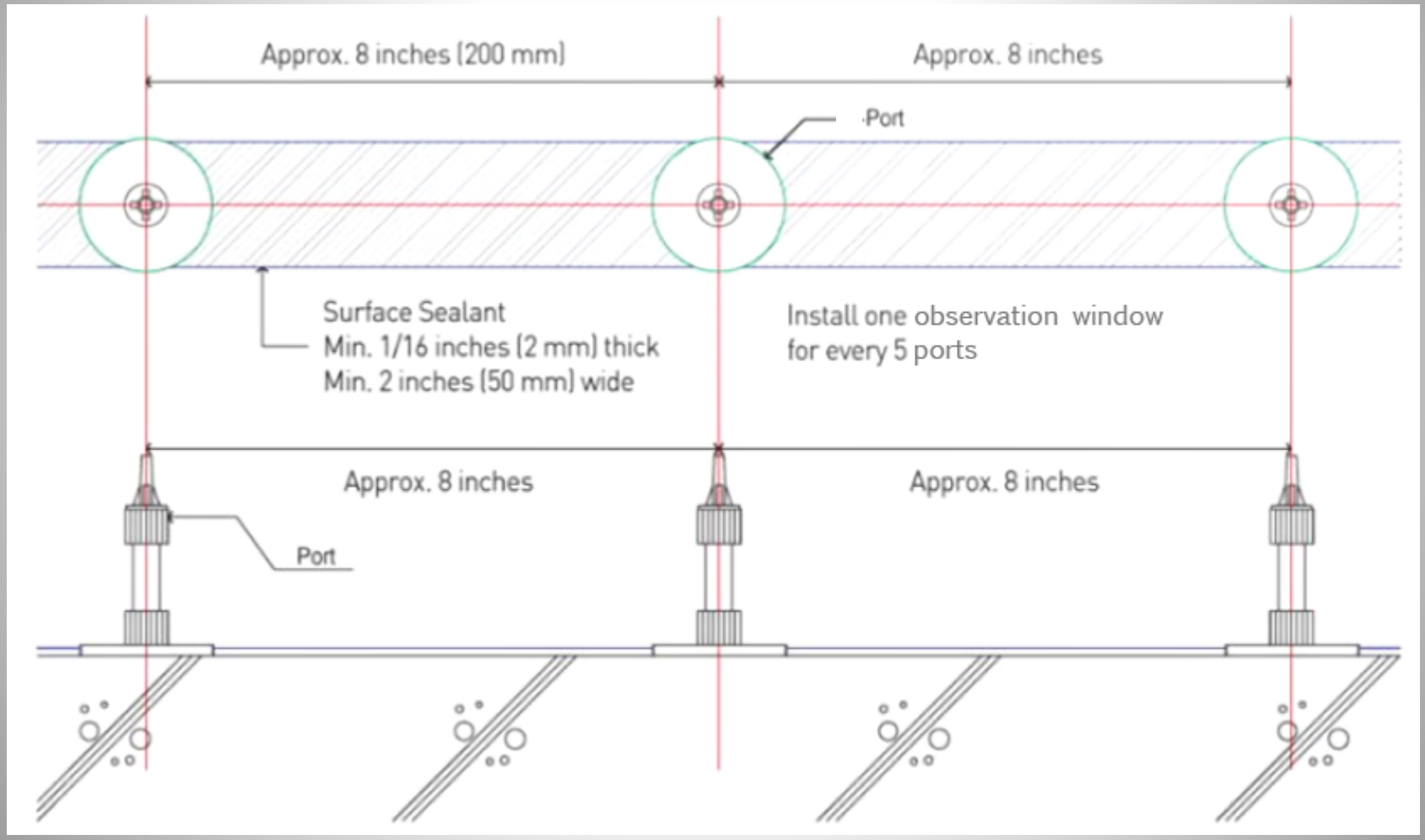


Flow Validation

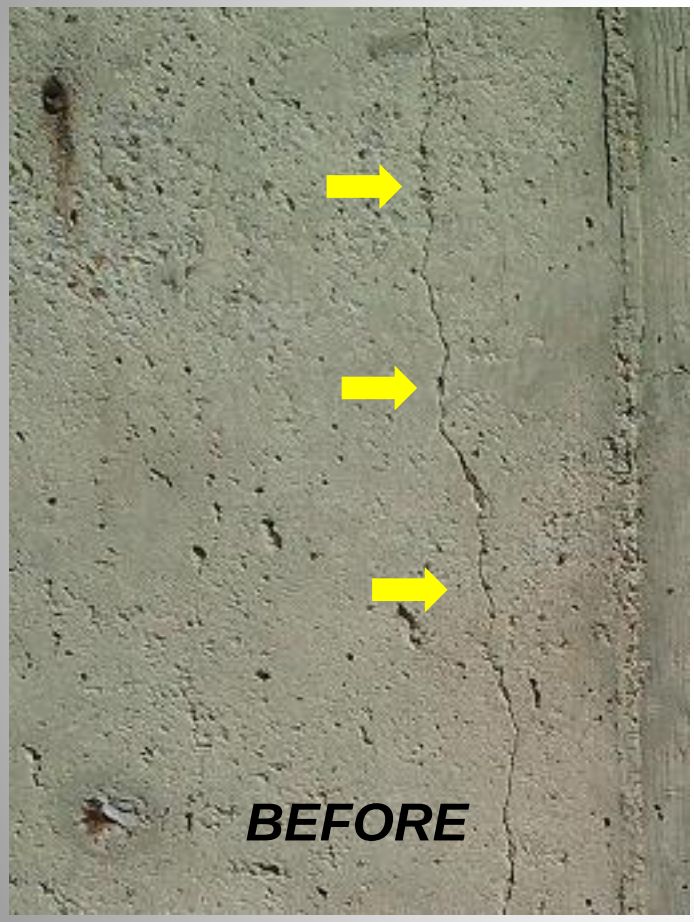
Grind

Completion

Installation Spacing Requirements



“Simple and Effective” Application



Basketball Arena (outside retaining wall)

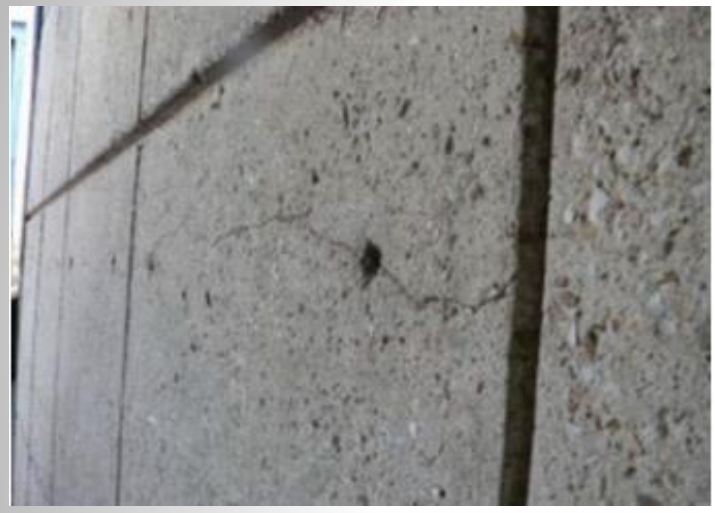
Laboratory & Field Validation

[Balloon-Pod Surface-Mounted System] for Pressure Injection Crack Fill of Concrete Structures

By Zhifu Yang
Assistant Professor
and
Jon Huddleston
Lab Manager

Middle Tennessee State University
May 2012

Laboratory & Field Validation



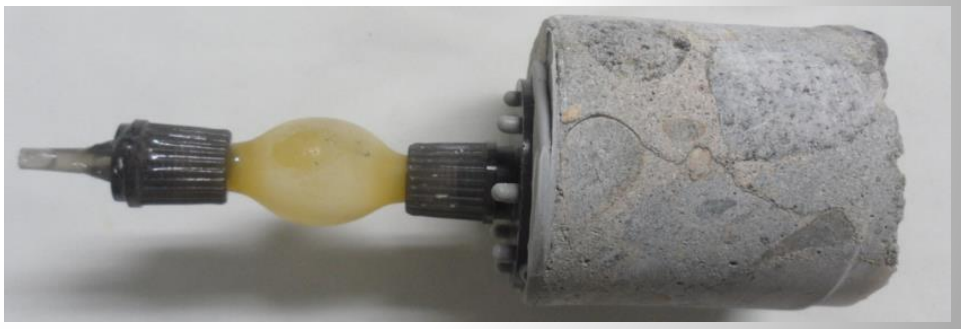
Horizontal crack in a retaining wall with typical crack opening of 0.5-1mm

Laboratory & Field Validation

Overhead cracks in concrete beams or suspended slabs as a result of overload. Reinforced concrete beam (2’ high, 1’ wide) with severe flexural cracks (0.5mm opening)

Laboratory & Field Validation

Ultrasonic Pulse Velocity measurement on fractured concrete slab



Splitting tensile test on core sample

Laboratory & Field Validation

Petrographic Analysis


1.0 mm/div


0.5 mm/div


No. Measure Result
2 2 Points 0.008 mm
3 2 Points 0.017 mm
4 2 Points 0.005 mm
1
2
3
4
0.250 mm/div

Completed Projects

Parking Deck (Double Tee Stem)

Atlanta, Georgia

Completed Projects

Double Tee Stem Repair

Atlanta, Georgia

Completed Projects

Bridge Deck Repair (US-231)

Kentucky Transportation Cabinet

Completed Projects

SR-22

Macon, Georgia

Completed Projects

Arts Center Station – MARTA

Atlanta, Georgia

Completed Projects

Parking Deck Overhead Crack Repair

Conclusion

Laboratory results, as well as field validation, have shown very conclusively that balloon-pod surface port injection is a better system of delivering adhesives into fractures of concrete.

- Balloon pod acts as visual gauge
- Fast injection results in early completion, saving time and cost
- Process is automatic, which leads to minimal labor demand
- Consistent, verifiable results lead to high-quality crack repair
- Simple and effective; no need for expensive, high-pressure equipment
- Especially advantageous for large areas of cracked concrete where it is not economical to repair by conventional pressure injection methods (port to port).

"Use of Balloon-Pod Surface-Mounted System for Structural Pressure Injection of Distressed Concrete"

KPG AMERICAS™

TPS INJECTION SYSTEMS™