



ACI E706 RAP Bulletin 11 SLABJACKING

Fred Goodwin, FACI, FASTM, FICRI

BASF Construction Chemicals

and Jim Warner who let me use his stuff!!



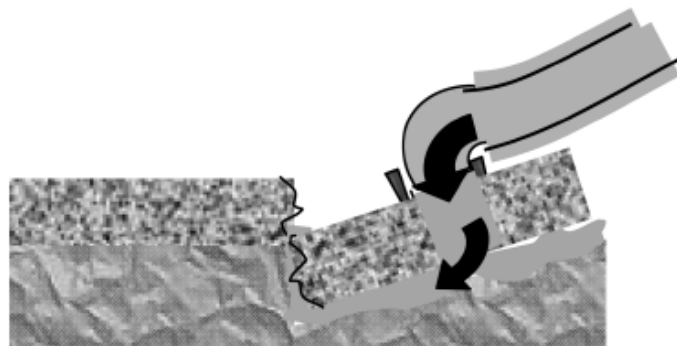
Fred Goodwin is a chemist with >30 years of experience in the construction chemicals industry, including cement manufacture, research, development, and technical support of grouts, adhesives, coatings, shotcrete, stucco, flooring, and concrete repair materials. He has been with BASF and its predecessors for 28 years and is an active member of ICRI, ACI, ASTM, NACE, SDC, and SSPC. He is a fellow of ASTM, ACI and ICRI, and current chair of the ICRI Technical Activities Committee (TAC) and SSPC 8.3 Commercial Floor Coatings. He was awarded the ASTM Award of Merit in 2016, the JCPL Editors Award in 2006, 2010, and 2012 as well as the ACI 2011 Delmar Bloem Distinguished Service Award and the ACI Foundation – SDC Council – 2015 Roumain Innovation in Concrete Award. He is certified by NACE as a Corrosion Technologist and was recently named as a Top 25 Innovative Thinker by Technology Publishing, and frequently speaks at industry events. He currently heads the BASF Construction Chemicals Global Corrosion Control Competency Center.



ACI RAP Bulletin 11

FIELD GUIDE TO
CONCRETE REPAIR
APPLICATION PROCEDURES

Slabjacking

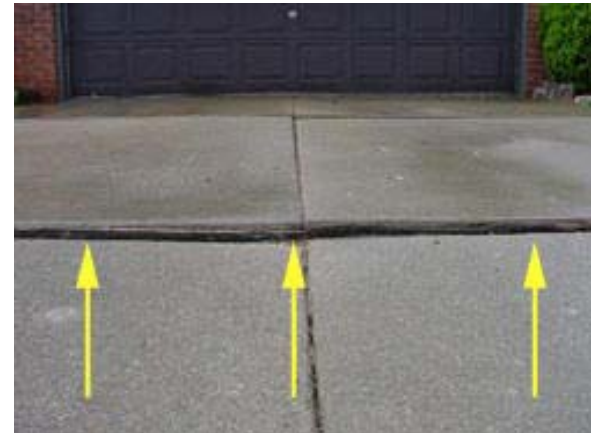
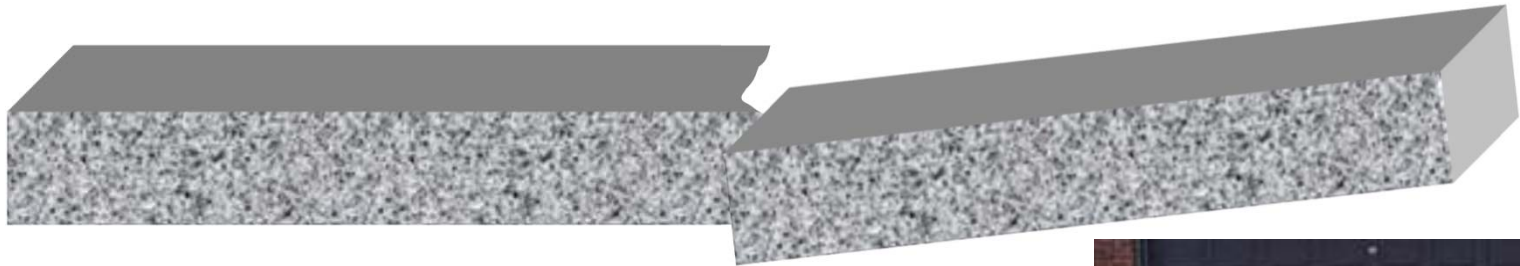


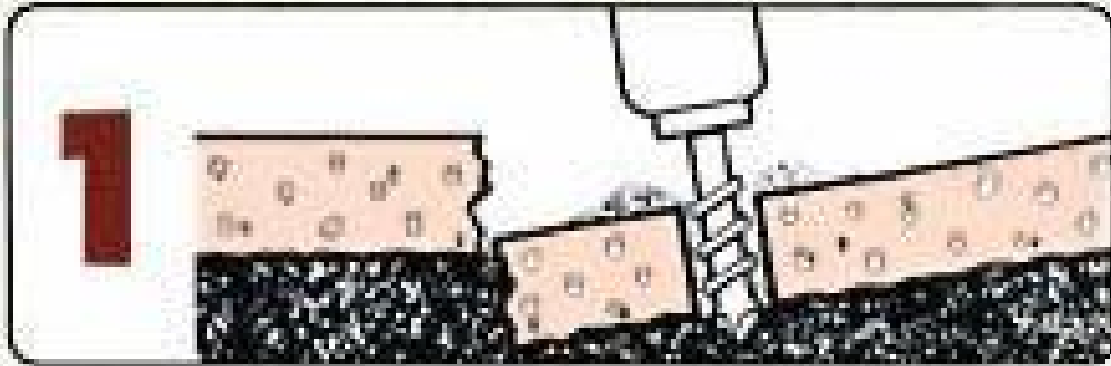
The Concrete Convention
and Exposition



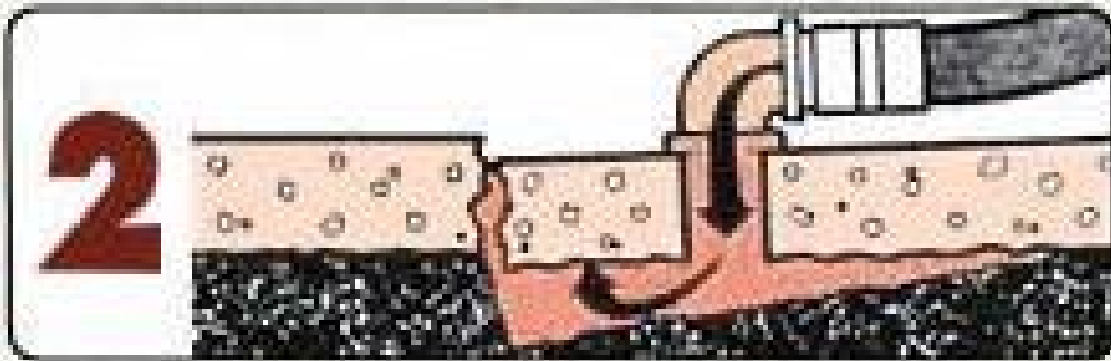
ACI Concrete Terminology

slabjacking—the process of either raising concrete pavement slabs or filling voids under them, or both, by injecting a material (cementitious, noncementitious, or asphaltic) under pressure.

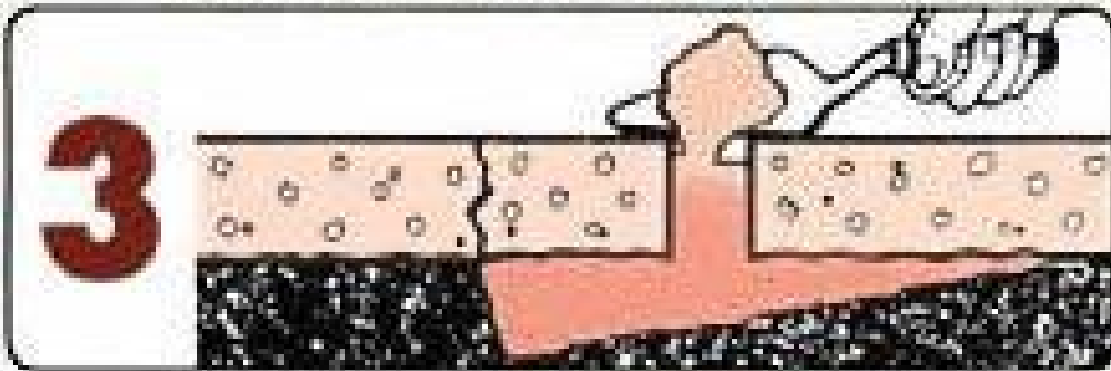




Drill Holes



Pump Grout



Fix Holes



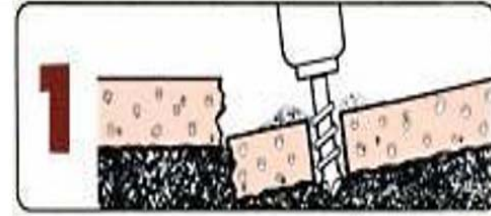
Hammer Drill



Core Drill



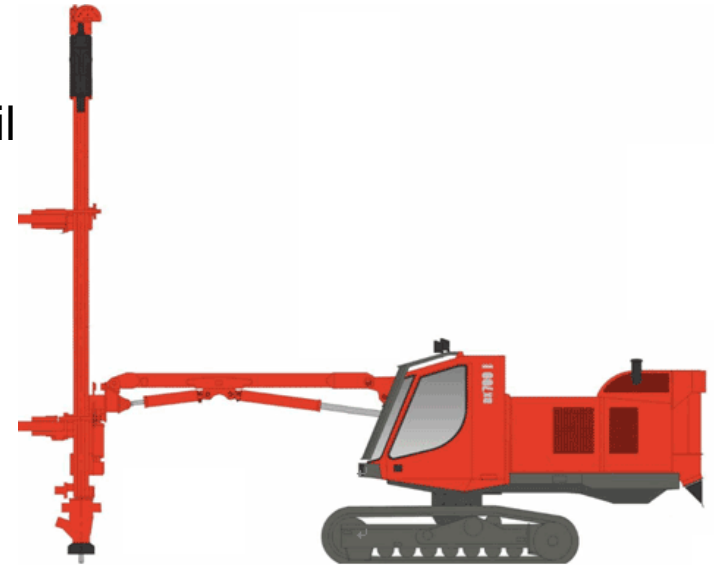
Rock Drill



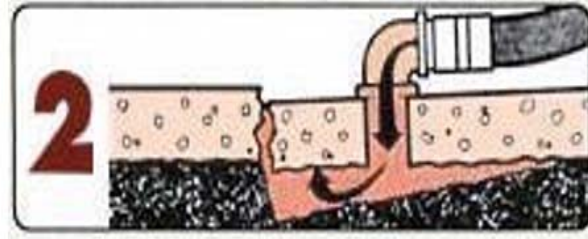
Drill Holes



Star Drill



Air Track Drill

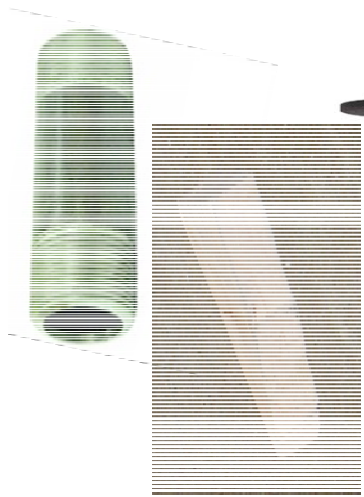


Pump Grout

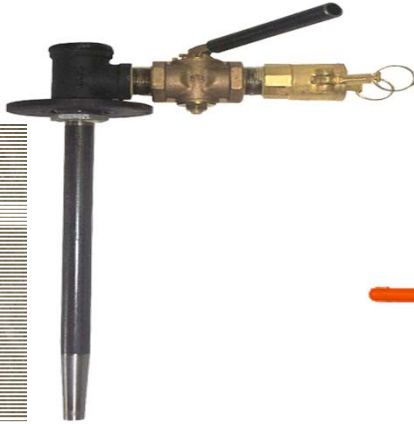


PUMPS





Pipe Nipple & Wooden Wedge



Drive Packer



Mechanical Packer



Resin Injection Packer



Inflating Packer



200 psi Hose

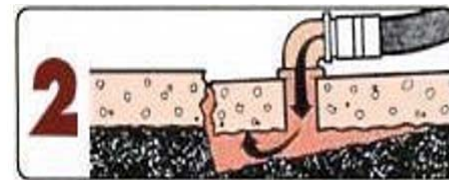


500 psi Hose

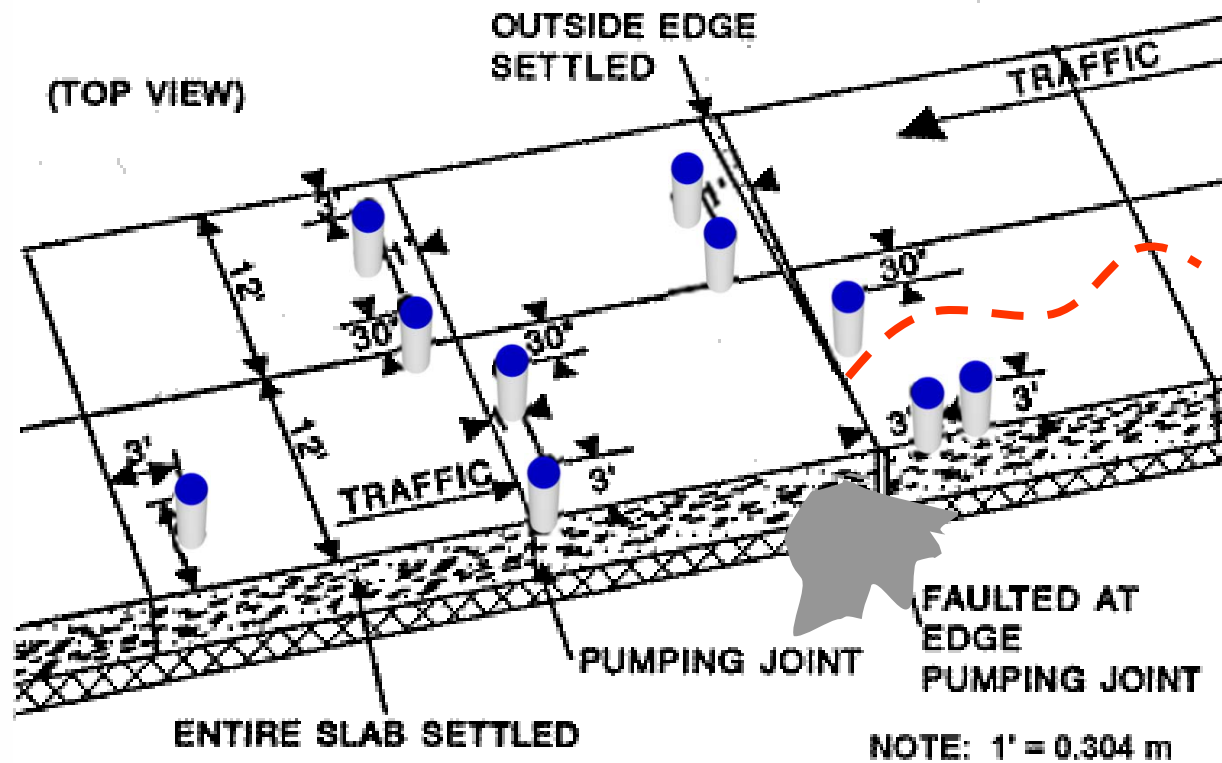


800 psi Reinforced Hose

Factory Formed Ends



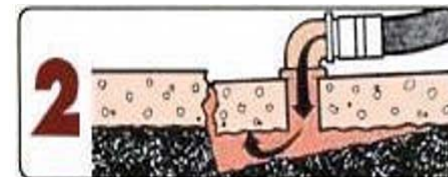
Pump Grout



Drill staggered grid of holes every 5 to 10 feet, depending on crack and settlement pattern.

Too close to edge or too fluid can leak instead of lift.

Too fast lifting cracks slab.



Pump Grout

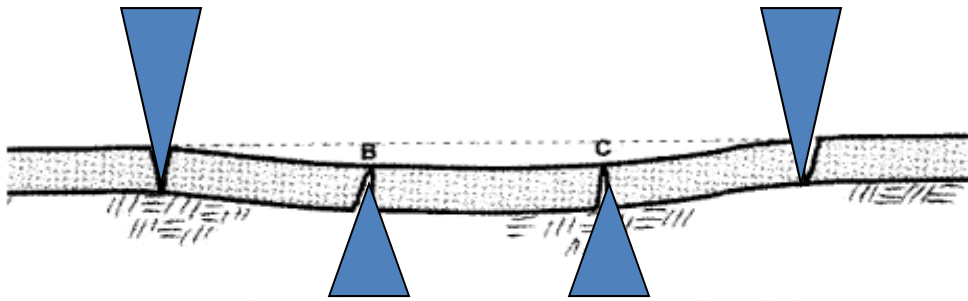


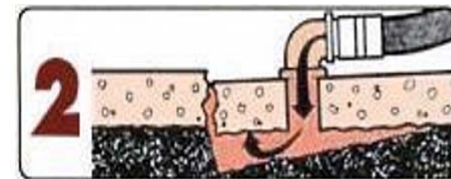
Fig. 3—Typical cracking pattern in an idealized dip (Warner 2004).



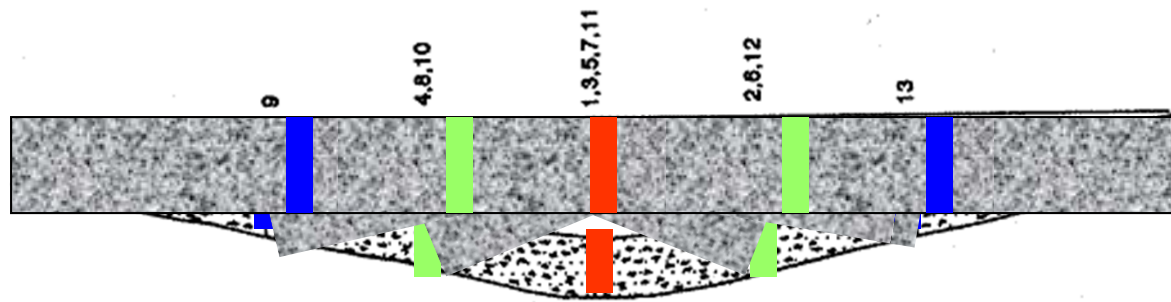
Some cracks are wider on top, others on the bottom

As temperatures increase, cracks get narrower and slabjacking is more difficult.

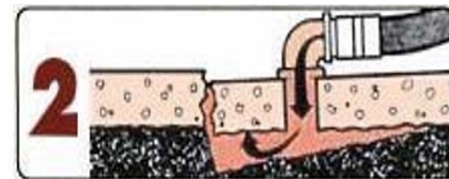
As slab lifts, binding can occur, so be prepared to move pumping location.



Pump Grout

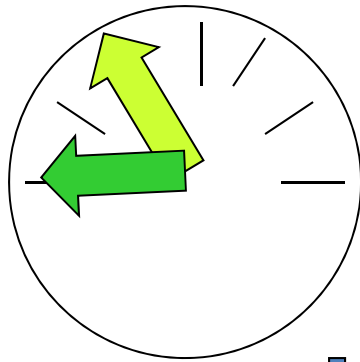


PUMPING STARTS AT LOWEST POINT AND WORKS OUTWARD IN BOTH DIRECTIONS

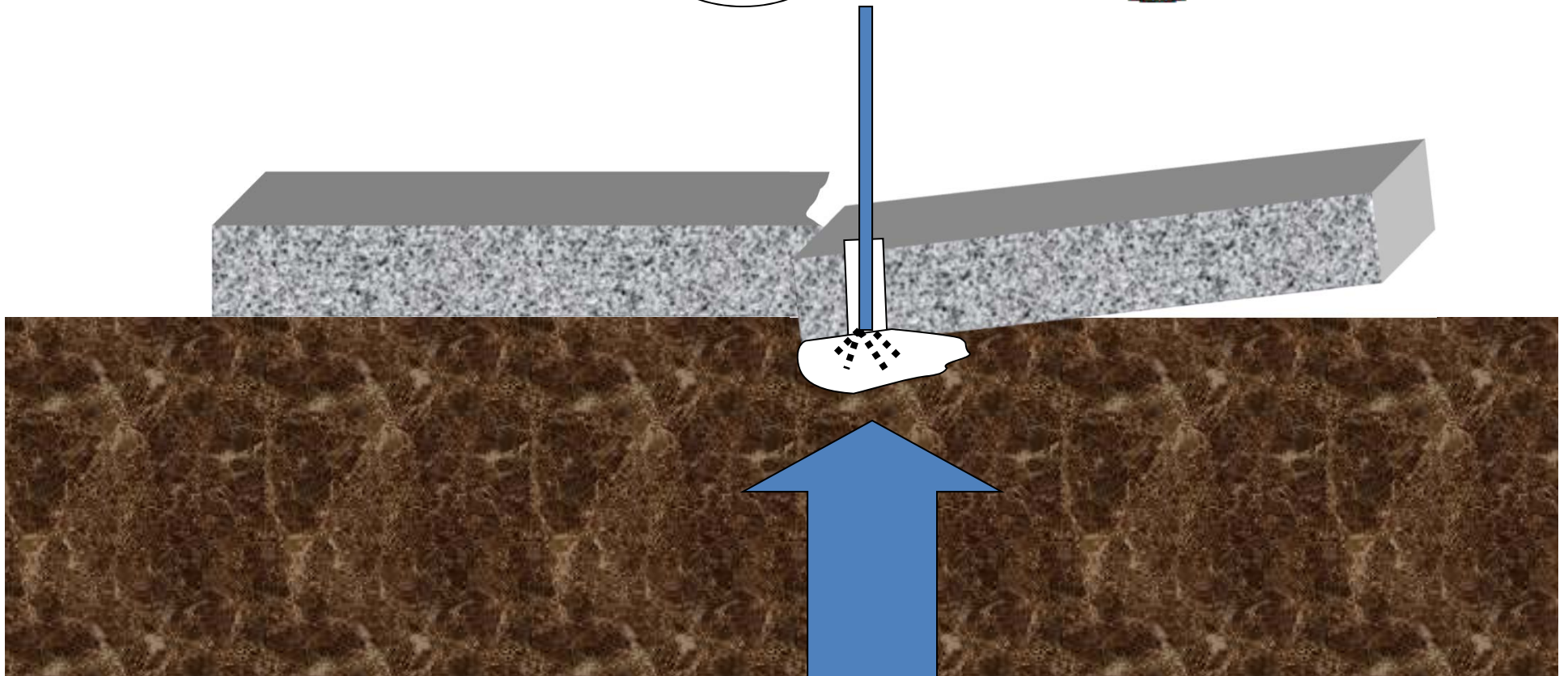
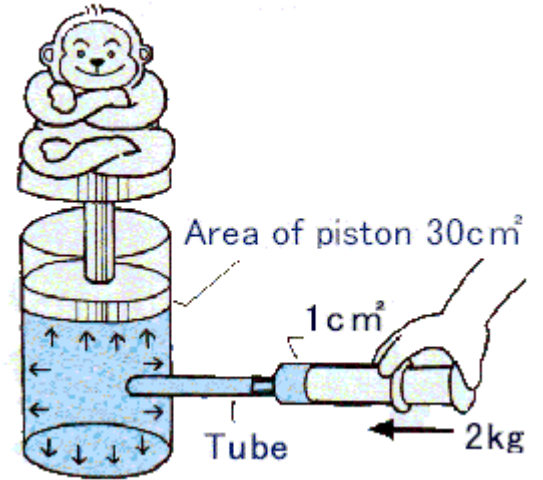


Pump Grout

Pump
Pressure



$$2\text{kg/cm}^2 \times 30\text{cm}^2 = 60\text{kg}$$



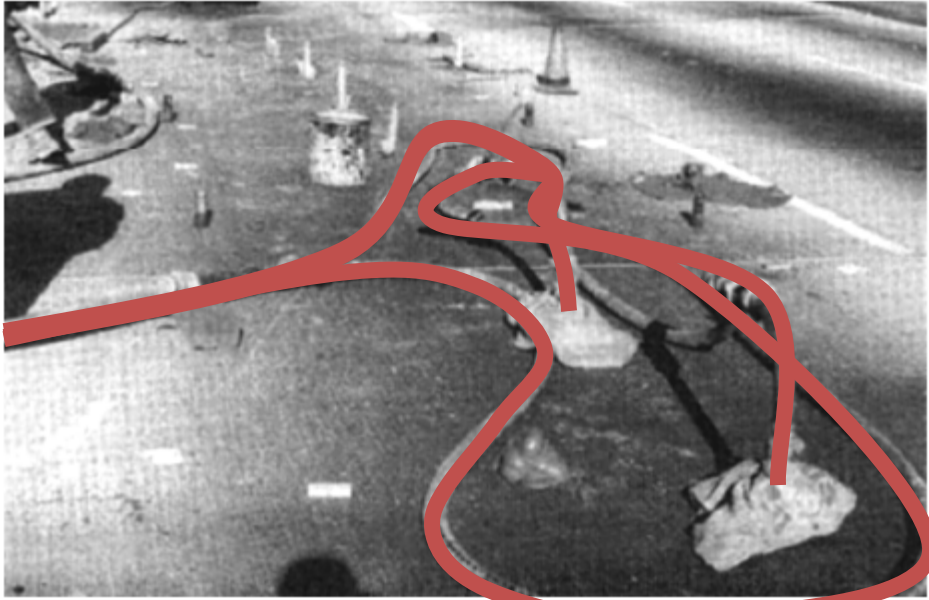
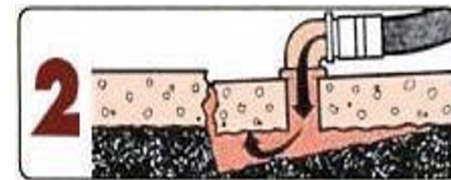
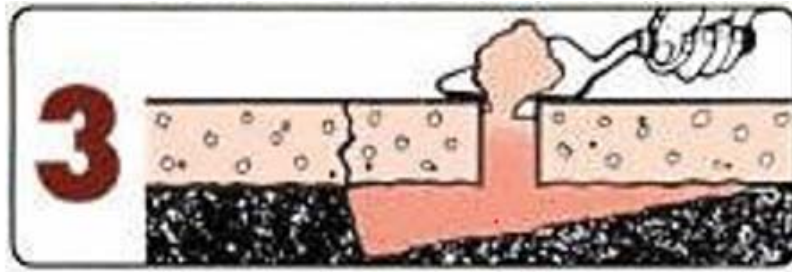


Fig. 6—A Y-fitting from a main delivery line divides into two branches (Warner 2004).



Pump Grout

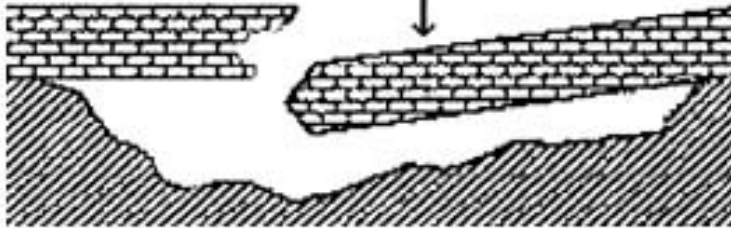


Fix Holes



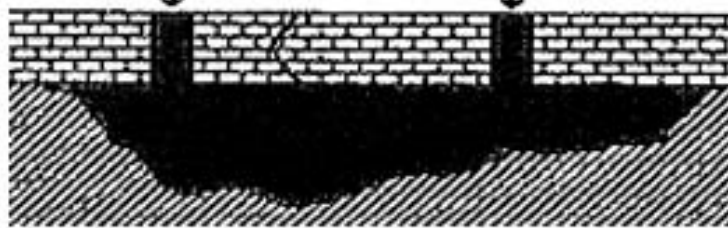
BEFORE

Sunken Concrete



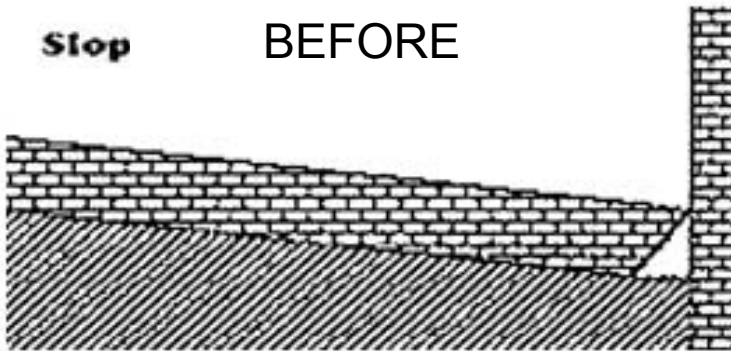
AFTER

Raised Concrete

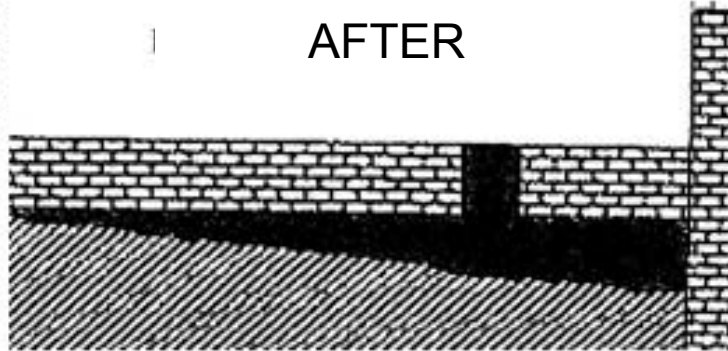


Stop

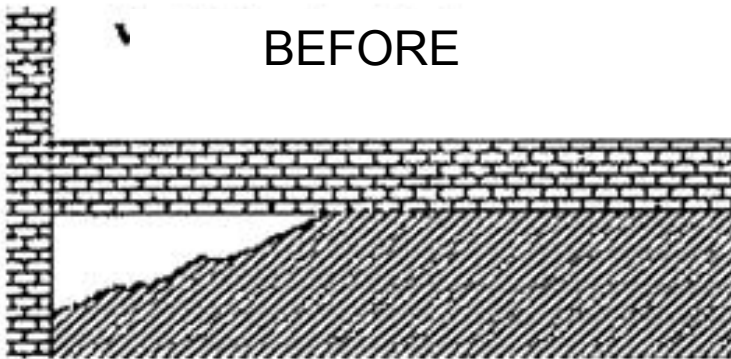
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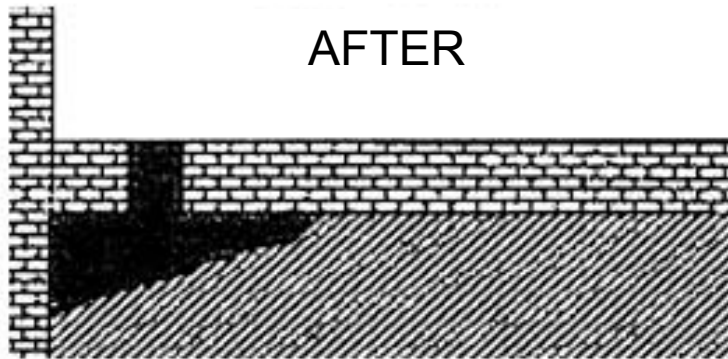
AFTER



BEFORE



AFTER





Questions



THANK YOU!

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Head of Corrosion Competency Center
BASF Construction Chemicals, EB-T