Module 4-7

Slab Stabilization and Slab Jacking

Objectives

Discuss purpose and importance of slab stabilization

Describe available materials

Describe evaluation and construction procedures

Estimate amount of material required

Slab Stabilization

Purpose is to fill existing voids and to restore support

Performed mainly to address pumping and/or voids detected by NDT

Other common names

- **Pressure grouting**
- **Undersealing**
- **Subsealing**

Slab Jacking

Purpose is to raise the slab and to restore rideability

Addresses localized areas of settlement and depression

Should not be performed to correct faulting

Selection of Projects for Slab Stabilization

Joints and working cracks exhibiting loss of support

Prior to onset of pavement damage

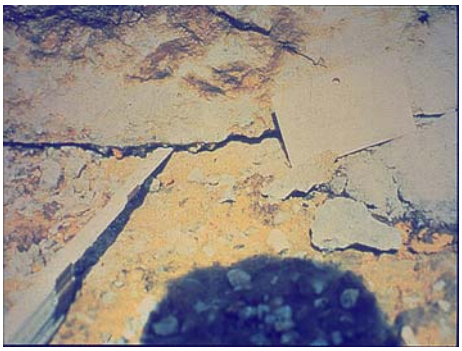
Determining loss of support

- **Visual survey**
- **Deflection testing**
- **Ground penetrating radar?**
- **Infrared thermography?**

Selection of Projects for Slab Stabilization

Selection of Projects for Slab Stabilization

Large Void Beneath Slab



Effectiveness of Slab Stabilization

Comparison of deflections before and after grouting

Effective at filling voids

Overgrouting can be more detrimental than doing nothing

Long-term effect on pavement performance is not well established

Selection of Projects for Slab Jacking

Localized areas of settlement due to loss of support

- Fill areas
- Culverts
- Bridge approaches

Not to be used to repair faulted joints

Effectiveness of Slab Jacking

Effectiveness depends on amount of lifting required at a location

Do not lift more than 6 mm (0.25 in.) at a time

Effective when closely monitored

Limitations / Design Considerations

Grout material

- Ability to fill voids
- Time before opening to traffic

Effect on subsurface drainage

Potential to develop new voids

Grout Materials

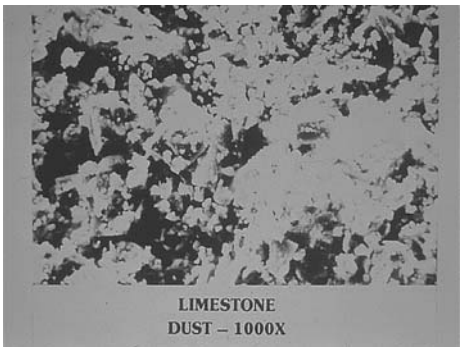
Cement grout mixtures

- **Slab stabilization**
  - **Pozzolanic - cement grout**
  - **Limestone - cement grout**
- **Slab jacking**
  - **Stiffer cement grout mixtures required**

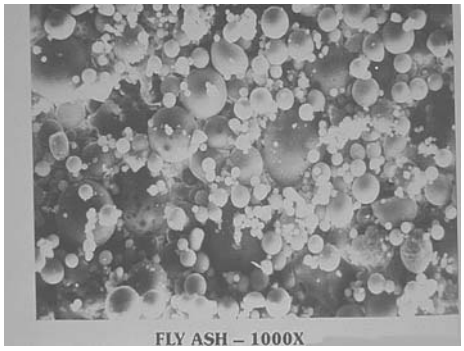
Asphalt cements

Proprietary materials

Materials - Limestone Dust



Materials - Fly Ash



Flow Cone Test

Void Detection Approaches

Maximum corner deflection

Corner deflection profile plots

Plot of corner deflections at varying load levels (x-intercept)

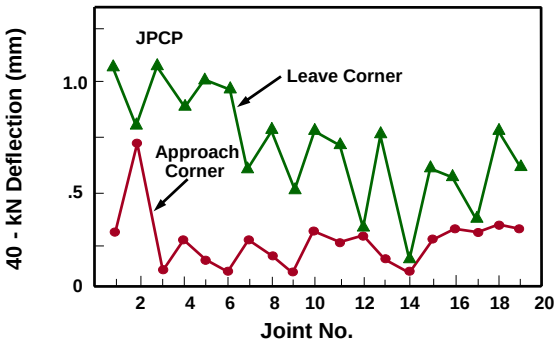
Epoxy / core test method

Void Detection Using NDT

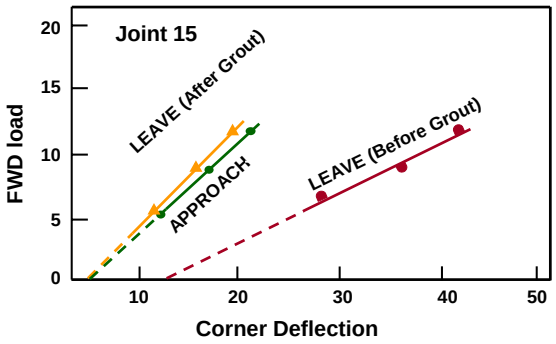
Maximum Corner Deflection Criteria

South Dakota	0.25 mm
Florida	0.38 mm
Pennsylvania	0.50 mm
Texas	0.50 mm
Oregon	0.64 mm
Georgia	0.76 mm
Washington	0.89 mm

Corner Deflection Profile Plot



Load-Deflection Plot



Cement Grout Slab Stabilization

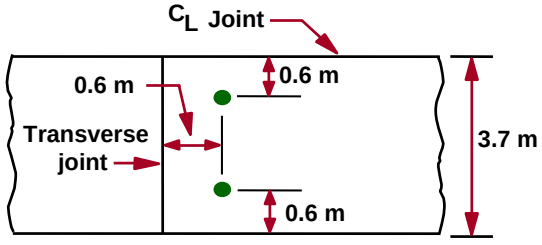
Procedure for estimating quantity

- Measure corner deflections
- Plot load vs. deflection data
- Compute estimated quantity

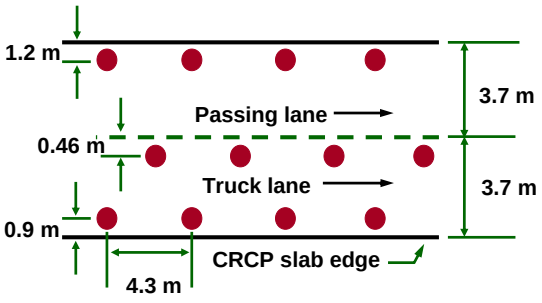
GROUT = PJG • AGT • TNJ

Average cost = $1.15 / m²

Typical Hole Pattern for Cement Grout Stabilization (JCP)



Typical Hole Pattern for Cement Grout Stabilization (CRCP)



Recommended Mix Design for Pozzolanic-Cement Grout

One part portland cement (Type I or II)

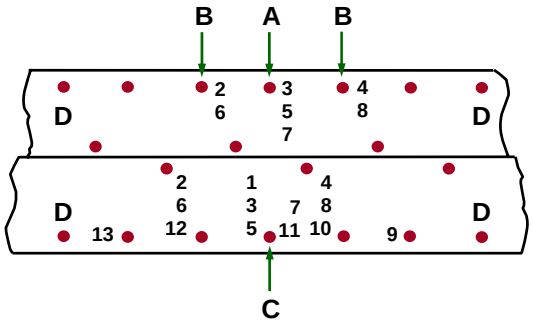
Three parts pozzolan

Water to achieve fluidity

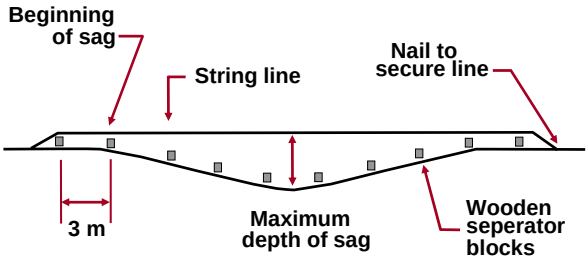
Accelerator (temperatures below 10˚ C)

Water reducers, superplasticizers, and other additives as needed

Hole Pattern for Slab Jacking



Stringline Method to Control Slab Jacking



Stringline Method of Control

Stringline Method of Control

Drill Hole ?

Automated Drill Rig

Grout Mixer

Mixing Grout

Monitor Grouting Pressure

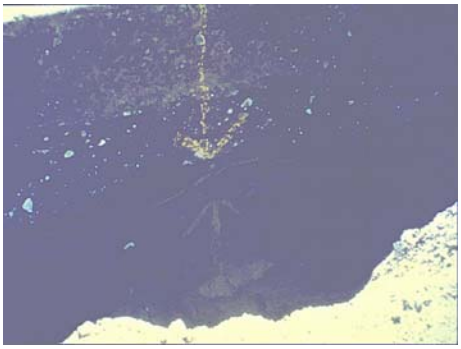
Pump Grout

Removing Grout Packer

Checking Slab Lift

Grouting Hole and Plug

Grout Layer



Grout Extruding from Joints at Slab Edge

Summary

Slab Stabilization
- Fills voids and restore support
- Corrects faulting

Slab Jacking
- Lifts the slab and restores rideability
- Corrects localized areas of settlement

Both require experienced contractors

Do not overfill