

# SOIL MIXING DESIGN METHODS AND CONSTRUCTION TECHNIQUES FOR USE IN HIGH ORGANIC SOILS



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# Problem Statement

- Organic soils are problematic for roadway construction; typically, the material is replaced, modified, or bridged over.
- Insitu soil mixing is one method that can be used to stabilize the material but the low pH necessitates high binder content and promotes unwanted variability in the resulting strength.

# SR 33 Polk City







# FDOT *Soils and Foundations Handbook*

- *1. Reduce fill height. This is seldom practical except in planning phase.*
- *2. Provide waiting period to allow for the majority of consolidation to occur.*
- *3. Increase surcharge height.*
- *4. Use a lightweight fill.*
- *5. Install wick drains within the compressible material to be surcharged.*
- *6. Excavate soft compressible material and backfill with granular soil.*
- *7. Ground modification such as stone columns, dynamic compaction, etc.*
- *8. Deep soil mixing.*
- *9. Combinations of some of the above.*

# Remove and Replace



# Dynamic Compaction (DC)



# Dynamic Replacement (DR or DRM)



# Soil Mixing (Wet Method)

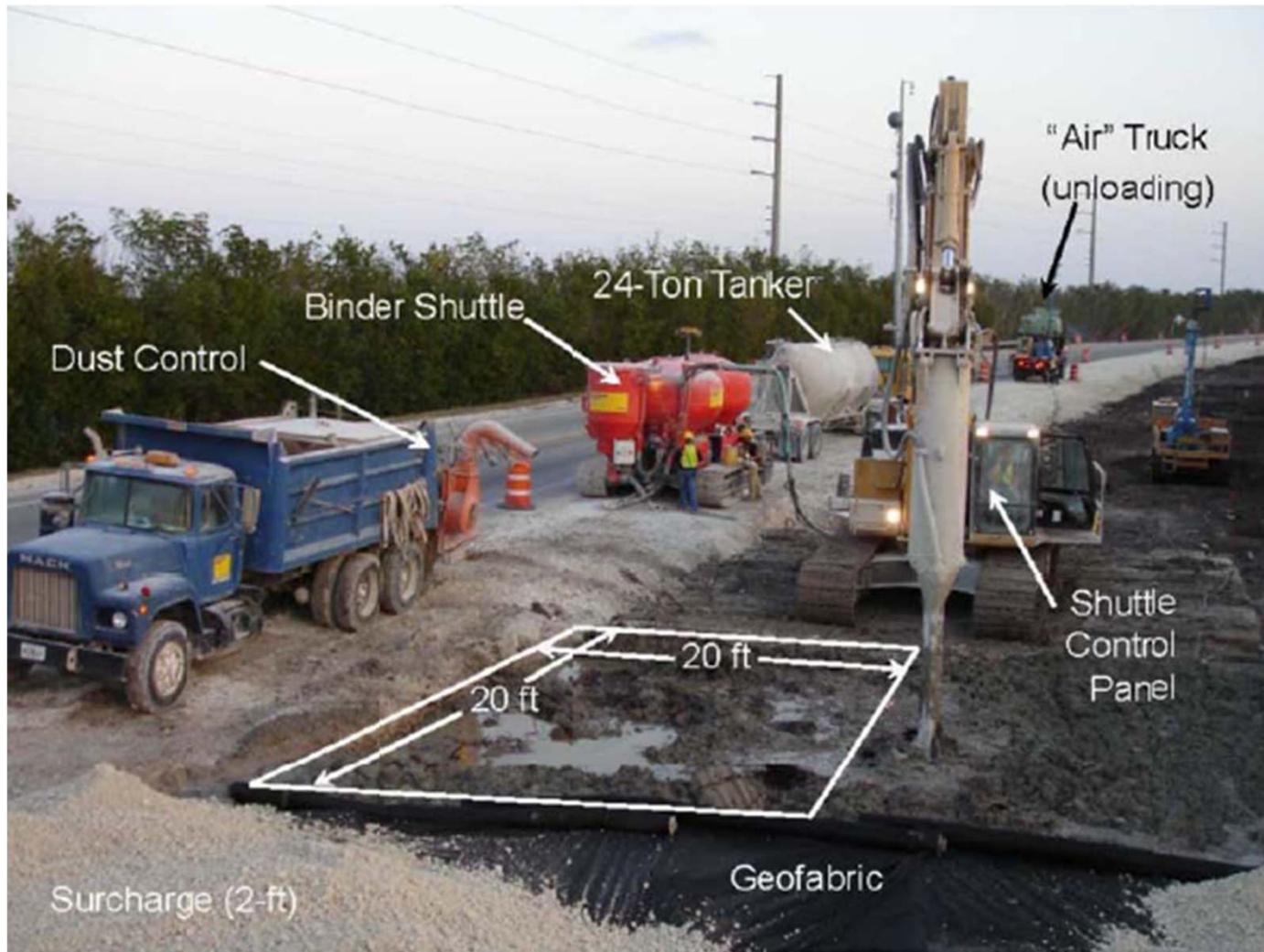


# Soil Mixing

(Dry Method at Marco Island Airport)



# Soil Mixing (Dry Method at Jewfish Creek)



# Quality Assurance Methods



# Research Approach

- Task 1 Literature Review
- Task 2 Laboratory Testing
- Task 3 Field Testing and Exploration
- Task 4 Cost Evaluation
- Task 5 Reporting

# Task 1

- Search of past and present soil mixing procedures
- Poll contractors
- Poll District Geotechnical Engineers
- Identify organic soil type prevalent in Florida
- Summarize findings

# Task 2

- Laboratory organic soil chemistry and pH neutralizing agents
- Small scale mixing ratios
- Small scale test bed 10 x 10 soil mixing bed
- Obtain large quantities of various soil types identified in Task 1
- Test various mixing energies, pH neutralizers and binder proportions

# Small scale test bed



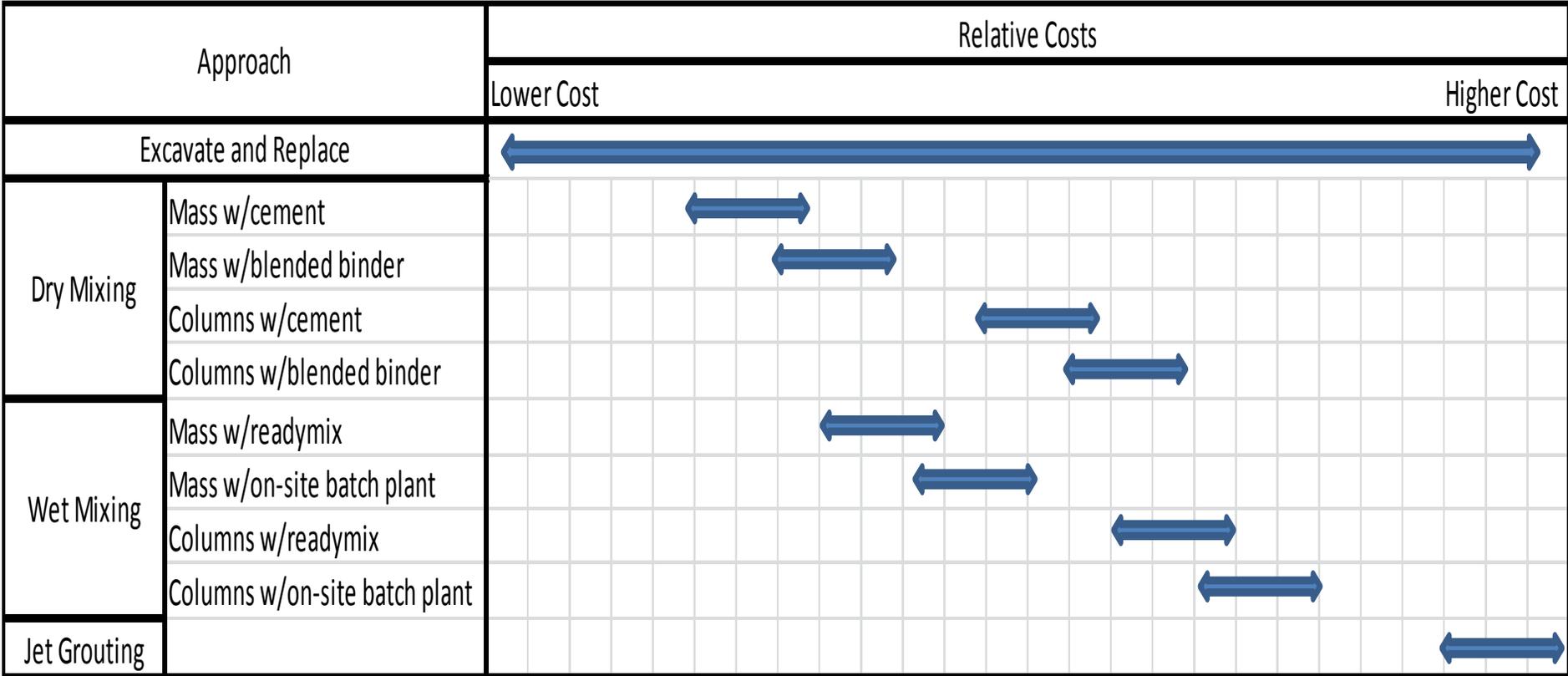
# Task 3

- Quarterly Site surveys
  - SR 33
  - Marco Island Airport
  - Jewfish Creek Roadway corridor Quarterly Site surveys
- Sites identified by DGs in Task 1

# Task 4

- Cost analysis
- Unit pricing from contractors and state pay items, etc

# Task 4



# Task 5

- Progress reports
- Final reports
- Recommendations and guidelines