GeoTechTools
Your Decision Making Solution

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www.GeoTechTools.org
Did you know...

...That up to half of all construction claims in highway works are related to geotechnical issues.

www.GeoTechTools.org
Geotech Tools: Geo-construction Information & Technology Selection Guidance for Geotechnical, Structural, & Pavement Engineers was developed by a SHRP 2 project with the goal of making geotechnical solutions more accessible to public agencies in the United States. This website is a toolkit of geotechnical information to address all phases of decision making from planning to design to construction. Transportation projects can be designed to be built faster, to be less expensive, and/or to last longer with use of these tools. Anyone involved in planning, design, and construction of transportation infrastructure will benefit from the information and resources available here. The information in the system is also applicable to non-transportation works and beyond the United States. We invite your comments and feedback on any aspect of the system. A Users’ Guide to the Information and Guidance System is available. First time users are encouraged to review the User’s Guide.

What’s New
Click here to download an icon for GeoTechTools.

Catalog of Technologies
The Catalog of Technologies provides a listing of all the technologies. For each technology, the following information is available:
- Technology Fact Sheet
- Photos
- Case Histories
- Design Guidance
- QC/QA Procedures
- Cost Estimating
- Specifications
- Bibliography

Technology Selection
Technology Selection is an interactive tool to identify candidate technologies for specific geotechnical applications using project information and constraints. Final technology selection requires project-specific engineering. Technologies can also be accessed by classification or through a catalog of specific technologies.

Contribute
This is a living system; it is updated based upon your input. Users are strongly encouraged to contribute technical updates/corrections, case histories, cost information, photographs, and references to enhance and expand this web-based system. Users are also encouraged to report any bugs or glitches. All issues can be submitted through the SUBMIT A COMMENT link.

A case history template is available in MS Word format.

Opening Page
Technologies Addressed

- Aggregate Columns
- Beneficial Reuse of Waste Materials
- Bio-Treatment for Subgrade Stabilization
- Blast Densification
- Bulk-Infill Grouting
- Chemical Grouting/Injection Systems
- Chemical Stabilization of Subgrades & Bases
- Column-Supported Embankments
- Combined Soil Stabilization with Vertical Columns
- Compaction Grouting
- Continuous Flight Auger Piles
- Deep Dynamic Compaction
- Deep Mixing Methods
Technologies Addressed (con.)

- Drilled/Grouted & Hollow Bar Soil Nailing
- Electro-Osmosis
- Excavation & Replacement
- Fiber Reinforcement in Pavement Systems
- Geocell Confinement in Pavement Systems
- Geosynthetic Reinforced Construction Platforms
- Geosynthetic Reinforced Embankments
- Geosynthetic Reinforcement in Pavement Systems
- Geosynthetic Separation in Pavement Systems
- Geosynthetics in Pavement Drainage
- Geotextile Encased Columns
- High-Energy Impact Rollers
- Hydraulic Fill + Vacuum Consolidation + PVDs
- Injected Lightweight Foam Fill
Technologies Addressed (con.)

- Intelligent Compaction
- Jet Grouting
- Light Weight Fills
- Mechanical Stabilization of Subgrades & Bases
- MSE Walls
- Micro-Piles
- Onsite Use of Recycled Pavement Materials
- Partial Encapsulation
- PVDs & Fill Preloading
- Rapid Impact Compaction
- Reinforced Soil Slopes
- Sand Compaction Piles
- Screw-In Soil Nailing
- Shoot-In Soil Nailing
- Shored MSE Walls
- Traditional Compaction
- Vacuum Preloading w/ & w/o PVDs
- Vibrocompaction
- Vibro-Concrete Columns
Deep Mixing Methods
Aggregate Columns

Light Weight Fill
Column Supported Embankments
Catalog of Technologies

About the Technologies Listed
Included are ground improvement and geoconstruction technologies that are used for the following elements of construction:

- New embankment and roadway construction over unstable soils
- Roadway and embankment widening
- Geotechnical pavement components (base, subbase, and subgrade)
- Working platforms

An exception is that two traditional technologies—excavation and replacement, and traditional compaction—are included as often used “base” technologies, to which ground improvement and geoconstruction methods are often compared.

Click here to view Catalog of Technologies with SHRP 2 R02 ratings that also allows comparison of selected technologies.

Technology

- Aggregate Columns
- Beneficial Reuse of Waste Materials
- Bio-treatment for Subgrade Stabilization
- Blasting Densification
- Bulk-Infill Grouting
- Chemical Grouting/Injection Systems
- Chemical Stabilization of Subgrades and Bases
- Column-Supported Embankments
- Combined Soil Stabilization with Vertical Columns
- Compaction Grouting
- Continuous Flight Auger Piles
- Deep Dynamic Compaction
- Deep Mixing Methods
- Drilled/Grouted and Hollow Bar Soil Nailing
- Electro-Osmosis
SHRP 2 Ratings for Rapid Impact Compaction

<table>
<thead>
<tr>
<th>Potential Contribution to SHRP 2 Renewal Objectives</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of Technology Establishment</td>
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<tr>
<td>----------------------------------</td>
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<tr>
<td>2</td>
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</tbody>
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(Rating Scale: 1 = not established or low applicability, 5 = well established or high applicability)

See the SHRP 2 R02 Technology Ratings Summary for a legend and description of rating development.
PVDs are band shaped (rectangular cross-section) products consisting of a geotextile filter material surrounding a plastic core that allow water flow. PVDs are used to accelerate the consolidation rate and strength gain of saturated, soft foundation soils by reducing drainage path lengths. Fill loading consists of a temporary surcharge load placed on the top of embankment to accelerate settlement in foundation soils. Advantages include reduced construction time, low cost, no spoil, durable and extensive experience. This technique is applicable to new embankments on unstable soils and embankment widening.
Research & Vetting Process

1,000s pages Tech Docs

100s page Summaries

38 Post-Doc & Grad Students

38 Post-Doc & Grad Students & 12 Principal Investigators & Advisory Board & Peer Reviewers

8 Tools – 2 to 40 pages each
Value Added

The system *collects, synthesizes, integrates, and organizes* a vast amount of *critically important information* about geotechnical solutions on a *readily accessible* website.
Okay, So It Is WikiGeotech?
A Comprehensive Web-Based Information & Guidance System for

- Embankment, Ground Improvement & Pavement Applications
- Project Development and Delivery Options
Construction over Unstable Soils

Construction over Stable/Stabilized Soils

Geotechnical Pavement Components (Base, Subbase, and Subgrade)

Working Platforms
Project Management

Example Guide Illustration:

- Initiate and Align
- Plan the Work
- Endorse the Plan
- Work the Plan
- Transition and Closure

Manage Change

After: http://www.wsdot.wa.gov/Projects/ProjectMgmt/PMOG.htm
Constraints & Risks Similarities

Examples

• Constraint: 3-inch Settlement Limit
• Risk: Settlement exceeds 3 inches

• Constraint: 90% Settlement by 3 months
• Risk: 90% Settlement takes more than 3 months
Typical Constraints

General
- Schedule/Time
- Cost/Budget
- ROW Limits
- Traffic Flow
- Weather
- Environmental

Geotech-Related
- Subsurface Conditions
- Time of settlement
- Vibrations
- Noise
- Proprietary
Implementation Goal

Integration of GeoTechTools into Practice – both program delivery and project development
Primary Audience

• Public agency personnel at Local, State and Federal levels
  – Geotechnical Engineers
  – Civil/Structural/Bridge Design & Construction Engineers, Pavement Design & Construction Engineers
  – Project Planners/Managers, Research, Maintenance, District Engineers

• Consultants, Contractors, A/E's

• Academics/Students
Goal of GeoTechTools Project

To make geotechnical solutions more accessible to public agencies in the U.S. for rapid renewal and improvement of the transportation infrastructure.

“Project Vision”
Thank You!

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