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Project Background

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Research Team

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- Roger Walker
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- Robert Lytton
- Dan Zollinger

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Develop Plans Concerning The Application Of Nondestructive Testing Procedures For

- Bridges
- Pavements
- Earthworks
- Tunnels
- Other Structures (i.e., retaining walls)

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Examined NDT for Three Different Applications

- **Design**
- **Construction (QA Tools)**
- **Performance Monitoring**

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NDT Plan Focus

- NDT technologies that can produce results ideally in real time or at least within 48 hours.
- Emphasis on 100% coverage devices
- Emphasis on in situ testing

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Information Gathering

- **Literature review on NDT applications**
- **Questionnaires sent to 50 Departments of Transportation and Europe (FEHRL)**
- **Received 21 responses from the DOT's, and two responses from FEHRL members**
- **Visits to six DOT's (California, Florida, New York, Minnesota, Texas, Washington)**
- **Visits to faculty and researchers in Florida, Washington, and California**
- **Brainstorming session with Academia and NDT Consulting Industry**

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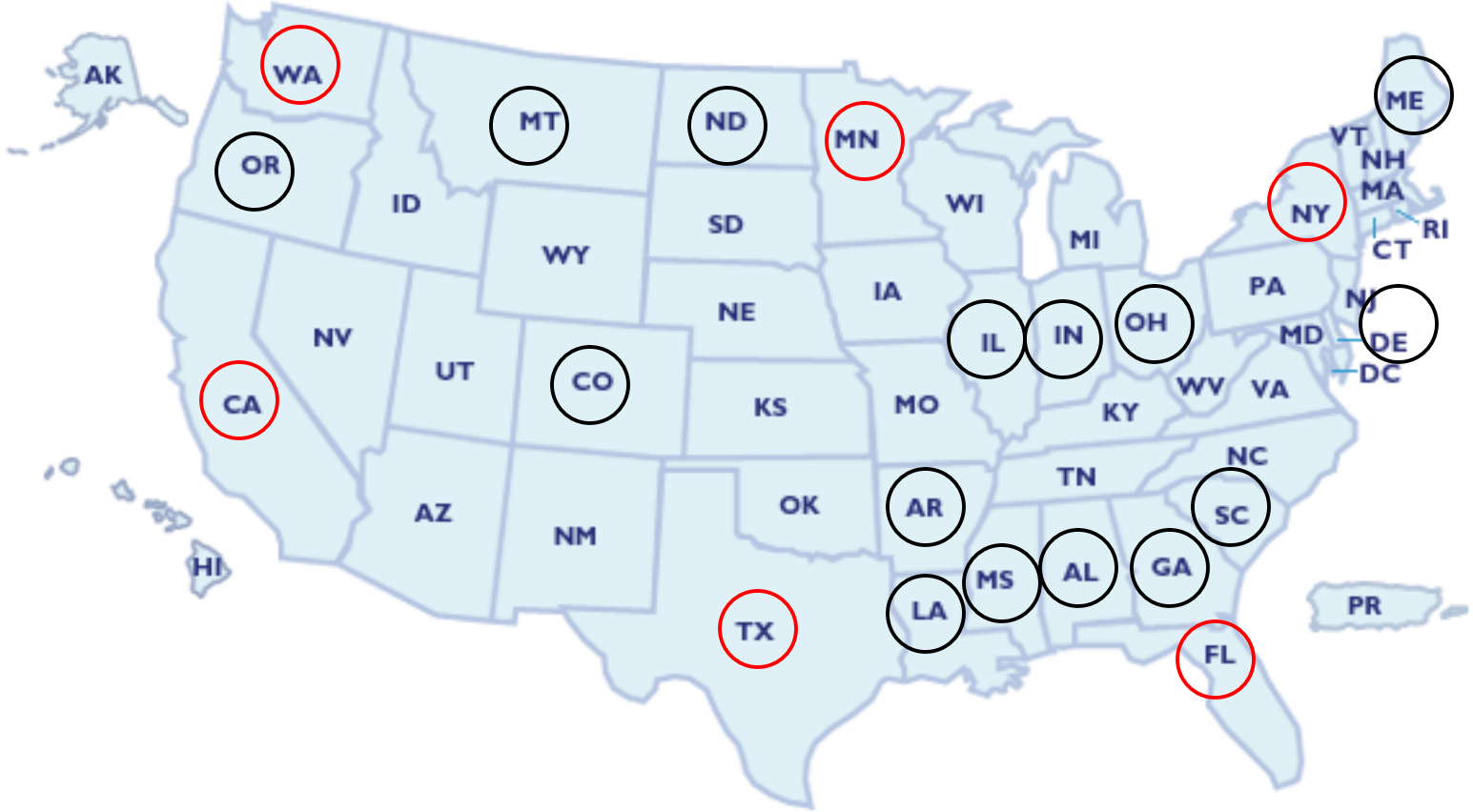
STATES THAT RESPONDED TO THE QUESTIONNAIRES



Map Source: www.gneil.com/

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NDT used by 21 DOT's (based on responses)

- **Seventeen DOT's use Falling Weight Deflectometers for testing pavements;**
- **Fifteen use inertial profilers for pavement ride quality measurements;**
- **Thirteen use Nuclear Density Gauges for testing pavements and earthworks;**
- **Ten use Crosshole Sonic Logging for drill shaft integrity testing;**

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NDT used by DOT's

- Ten use Ultrasonic Testing (UT) for bridge components such as pins and hangers;
- Nine use magnetic particle testing for bridge components;
- Eight use friction (skid resistance) measurement vehicles for pavements;
- Seven use profilographs for pavement ride quality measurements;

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NDT used by DOT's

- Six use rebound hammers (also known as Swiss or Schmidt hammers) for testing hardened concrete;
- Five use covermeters or pachometers to detect the depth of reinforcing steel in reinforced concrete;
- Four used Ground Penetrating Radar for testing Infrastructure;

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NDT used by DOT's

- **Three use the MIT-Scan device for locating and measuring placement of dowel bars in jointed concrete pavement; and**
- **Three used Acoustic Emission testing on bridge components**

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Successful Implementation

- **Obtaining upper management support**
- **Continuous communication between NDT developers and users,**
- **Extensive training and technology transfer**
- **The team noted that DOT's involved in implementing NDT technologies had at least one employee dedicated to that technology or technologies.**

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Successful Implementation

- In many instances NDT implementation is often more challenging than the original development.
- Implementation certainly may require a different set of skills than the science and engineering required to develop and prototype equipment.

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Successful Implementation Involves

- Working within organizations,
- Establishing specifications,
- Providing training,
- Setting goals,
- Documenting benefits and
- Establishing overall good communication channels within the agency and externally with contractors and trade organizations.