# OHIO DEPARTMENT OF TRANSPORTATION
# OFFICE OF GEOTECHNICAL ENGINEERING
# RESEARCH IMPLEMENTATION PLAN

**Title:** Inclinometer - Time-Domain Reflectometry Comparative Study

**State Job Number:** 14798
**PID Number:** 76104
**Research Agency:** Ohio University
**Researcher(s):** Shad Sargand, James Shinn
**Technical Liaison(s):** Alexander Dettloff
**Research Manager:** Karen Pannell
**Sponsor(s):** Tim McDonald, Gene Geiger
**Study Start Date:** 2/18/2002
**Study Completion Date:** 6/18/2004
**Study Duration:** 28 Months
**Study Cost:** $80,732.13
**Study Funding Type:** 80 Federal / 20 State from ODOT SPR (2)

**STATEMENT OF NEED**:
ODOT currently uses slope indicator probing to analyze subsurface conditions at roadway landslide locations. However, the current method is subject to several limitations, and time domain reflectometry (TDR) has been proposed as an alternative to overcoming some of these limitations.

**RESEARCH OBJECTIVES**:
- Complete a side-by-side comparison of Time Domain Reflectometry (TDR) and slope inclinometer probing on the technical basis of accuracy and dependability.

- Complete a side-by-side comparison of Time Domain Reflectometry (TDR) and slope inclinometer probing on the basis of cost and relative ease of installation and data collection.

**RESEARCH TASKS**:
Conduct the preliminary site characterization, install the instrumentation, monitor the sites and perform all analyses required for the above comparisons.

**RESEARCH DELIVERABLES**:
Quarterly reports will be provided. All findings and recommendations will be included in a final report to be issued in draft form as per ODOT requirements.

**RESEARCH RECOMMENDATIONS**:
TDR monitoring was not demonstrated to be more accurate, reliable, or easier to implement. Additionally, TDR monitoring can not determine the rate, magnitude, or direction of shear failure. The material cost is slightly lower, but does not offset the loss in performance. No implementation of TDR monitoring is advised.

**PROJECT PANEL COMMENTS**:

N/A

**IMPLEMENTATION STEPS & TIME FRAME**:
No implementation of TDR monitoring is advised.

**EXPECTED BENEFITS**:
No benefits can be expected.

**EXPECTED RISKS, OBSTACLES, & STRATEGIES TO OVERCOME THEM**:
No implementation of TDR monitoring is advised.

**OTHER ODOT OFFICES AFFECTED BY THE CHANGE**:
No implementation of TDR monitoring is advised.

**PROGRESS REPORTING & TIME FRAME**:
No implementation of TDR monitoring is advised.

**TECHNOLOGY TRANSFER METHODS TO BE USED**:

- The Final Report was posted on the R&D web site. Thus, making it available to all users world wide.
- The Final Report was distributed to all other state departments of transportation in addition to national libraries and repositories.

**IMPLEMENTATION COST & SOURCE OF FUNDING**:
No implementation of TDR monitoring is advised.

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**Approved By**: (attached additional sheets if necessary)

Office Administrator(s):

Signature: Gene Geiger Office: OGE Date: 10/6/2005

Division Deputy Director(s):

Signature: Tim McDonald Division: PM Date: 10/11/2005