



Technology & Development Status Report

Engineering Program

FY 2009



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PROJECT: **Time Domain Reflectometry to Detect Slope Instability** **CENTER:** [SDTDC](#)

Number: 2E21L39 **PROGRAM LEADER:** [Alan Yamada](#)

SPONSOR: [WO-ENG](#) **Project Leader:** Charles Aldrich

Proposer: Gordon Hanek, Mark Truebe

PROJECT OBJECTIVES

TDR technology is based on sending an electrical impulse down a cable and monitoring the reflective pulses that are returned from the broken end or distressed portion of the cable. In recent years, TDR's have been found to be useful to determine landslide depths and approximate rates of movement. The TDR cable is installed and backfilled in a borehole that intersects the potential slide plane. The probable advantage of using a TDR, when compared to the more common method, using a slope inclinometer (SI), is relative simplicity and lower cost. With a SI, a special grooved casing is installed in the borehole, and periodic readings are made using an expensive "torpedo" tool that is slid down the casing. As landslide deflection occurs, the casing can be distorted and/or sheared, causing the tool to become wedged. If the TDR cable is damaged, its cost is minor compared to that of the SI casing and torpedo. Both technologies use a readout box at the ground surface when taking intermittent readings.

Six sites with known landslides are to be instrumented with TDR's on the Willamette and Umpqua National Forests. These, along with several other older TDR installations will be monitored regularly over a period of three years to evaluate the effectiveness of the technology.

Changes to objectives:

SIGNIFICANT ACCOMPLISHMENTS

- The TDR's at the new sites were installed during the fall-winter of '02-'03. An additional deeper TDR was installed February 2004 to capture additional data that was missed by the shallower installation. Monitoring of the installations is being performed on approximate two-week intervals during the active season.

Output:

Planned: A technical report evaluating the feasibility of using TDR's for slope monitoring will be prepared. Advantages disadvantages will be discussed. If TDR's are feasible, guidelines on the use of the technology will be presented.

Actual:

