

Multi-Media Review of Soil Nails and Ground Anchors from a CD

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The work described continues Trevor Smith's long interest in demonstrating university roles in bridging the gap between state-of-knowledge and state-of-practice, and with these Multi-media approaches hopes the industry can finally claim to be High Tech too! (Editor)

Better than digital sliced bread!

With all the rapid advances over the last decade in ground anchor and soil nail technology, it has been difficult for designers, contractors and academics to keep pace with knowledge transfer in easy accessible form. To deliver a quality installation it is well understood many components must come together, often in difficult and uncomfortable site conditions, to form a satisfactory anchor system. Recognizing the greater degree of uncertainty, as well as the consequences of unsatisfactory performance, soil anchor and nail systems undergo a higher proportion of testing compared to other foundation engineering technologies. The unique and critical role played by the field inspectors received some attention back at the beginning of the growth curve when FHWA published the *Soil Nail Field Inspectors Manual* 10 years ago. Exploiting the explosion in pc processing speeds and computer literacy the knowledge base has now gone digital with multi-media, CD based, review and training material accessible via laptop pc's in the field.

Under FHWA sponsorship, Portland State University was required to study the possible marriage of computer learning technologies, using videographers, animators, and software designers, to the real world site 'feel' of construction activity using ADSC construction experts and Technical Affiliates on camera. It worked! The result was an exciting first; a 100% digital and portable CD product for anyone requiring an introduction to drilled

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soil nail and ground anchor technology, especially those involved in field anchor installation, testing and inspection. No longer will limited access to paper manuals (at some

point out of print) handicap the spread of new geo-technologies. At the present time the first CD titled *An Introduction to the Inspection of Ground Anchors and Soil Nails* is complete and the second project, now nearing completion, is a pair of CD's titled *Ground Anchor Inspection: 1 of 2 Preconstruction* and *Ground Anchor Inspection: 2 of 2 During Construction*, both follow the outline of the 1994 FHWA Inspection Manual and AASHTO Task Force 27.

The on-screen look of the CD's are illustrated in Figure 1 below, and they follow a natural Windows® environment user control; this screen is taken from the CD *An Introduction to The Inspection of Ground Anchors and Soil Nails*. On the right hand side can be seen the major section content list with the section the User is presently exploring expanded into its sub-sections for easy navigation reference. Showing on-screen is a video piece that runs 30 seconds (when activated) of the Inspector and their trusty flashlight in use for a soil nail inspection. Just a mouse click control lets you rewind, skip on, or continue in this section, while moving back to the main navigation area on the right hand side quickly moves you to all other parts of the CD. So, by design, the product works equally well as a

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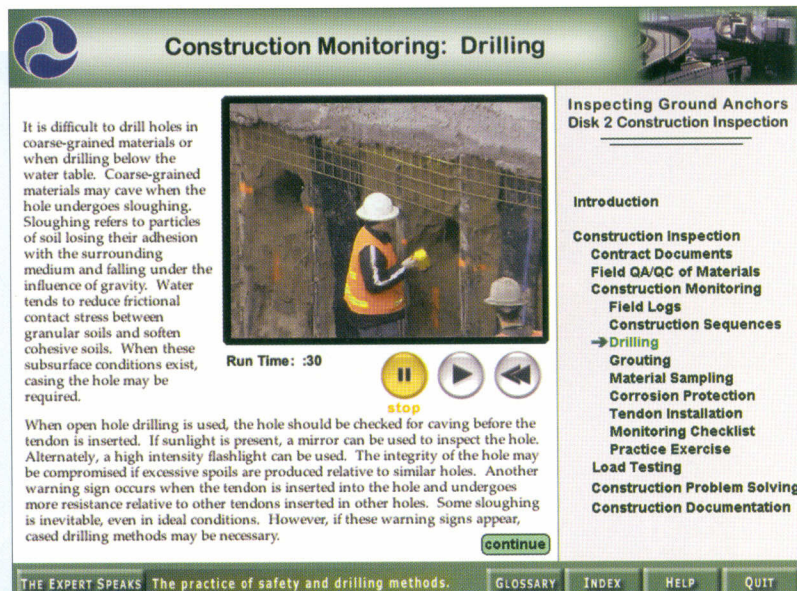


Figure 1 Illustration of the navigation features.

first time through introductory source to the topic, and also as a complete reference work for future contracts, both in the office and out in the field.

Along the bottom are other resources and tools. Mouse clicking on 'The Expert Speaks' brings up a short segment of on camera discussion by the topic chosen expert, a glossary is a complete set of descriptions for the novice and the Index has alphabetical mouse clickable links sending you straight to that topic on the CD.

In digital form many new features can be developed and so the product has an entirely user-friendly feel in use - better represented by the analogy of exploring the surface of a ball rather than reading a book. The Ground Anchor Inspection CDs features include: Animation, Roll Over highlight descriptions, Dual Navigation via traditional Table of Contents list and direct Index links, Expert Speaks video, real world action to

illustrate good QA/QC, and finally User Self Assessment by multiple choice and computer mouse Drag

Users will also see, and hear the experts stress the importance of soil identification, record keeping and an introduction to soil sampling.

and Drop features. There is even a virtual world, computer animated, Creep Load Test for the user to monitor and evaluate satisfactory performance. Of special significance are the very comprehensive corrosion protection schematic sequences detailing current design and construction practice for Bar and Multi-strand tendons, under both Class 1 and Class 2 protection. Users will also see, and hear the experts stress the importance of soil identification,

record keeping and an introduction to soil sampling.

One example of the highly innovative corrosion protection sequence of 'roll over' screens is illustrated in Figure 2, taken from *Ground Anchor Inspection: Preconstruction* CD (1 of 2). This shows the anchor cover and transition zone for bar tendons. Each feature labeled is 'highlighted' by the computer mouse, which then shows in color, and one click leads to expanded images and a full text description, as well as audio narration. The closing 'Quit' screen sequences activated on the lower right hand side reminds viewers of the single most important concern around all construction activity - safety!

The minimum hardware and software requirements are: Windows® based pc running a Pentium II processor at 200+ MHz, 64MB of RAM, sound card with speaker, standard VGA video, and of course a CD-

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MULTI-MEDIA Contd.

Corrosion Protection: Typical Diagrams

Anchorage Cover and Trumpet Transition Zone for Strand Tendons

Inspecting Ground Anchors
Disk 1 - Preconstruction

Introduction

- ↓ Preconstruction
- Ground Anchor Elements
- Know Your Design
- Corrosion Protection
- Critical Elements
- Typical Diagrams
- Practice Exercise
- Construction Practices
- Contractor's Role
- Preconstruction Checklist

Roll over components with mouse and click to investigate.

The trumpet transition zone is of particular interest since this area is most likely to undergo corrosion due to the presence of water from wall drainage and proximity to oxygen at the wall face. As a first priority, it is critical that seals and covers be installed correctly.

continue

THE EXPERT SPEAKS The levels and needs for corrosion protection. GLOSSARY INDEX HELP QUIT

Figure 2 The anchorage cover and trumpet transition zone roll over screen.

ROM drive. The operating system should be Windows® 95, 98, ME, NT or 2000.

ADSC member contractors Mal-

colm Drilling of Kent, Washington, and DBM of Federal Way, Washington, specialty strand and bar tendon fabricators, together with a selection

of state DOT geotechnical engineers, private consultants and ADSC Technical Affiliates participated in the development of these products. Their help is gratefully acknowledged. To order this emerging library of Multi-Media education products, contact their home website, accessible at www.ocate.edu/civil.htm at the Oregon Center of Advanced Technology Education (OCATE).

Even those within the drilling industry that are “computer challenged” can be reassured that a mouse click with any finger, of any hand, is all the computer skills you need!

A 3rd CD module close to completion from the PSU group, which may be of interest to geotechnical consultants and contractors working in environmentally sensitive areas, is the *Introduction to the Endangered Species in Highway Construction*. This is slated to appear in early summer 2003.■