Designation: D4544 – 12

Standard Practice for Estimating Peat Deposit Thickness[1]

This standard is issued under the fixed designation D4544; the number immediately following the designation indicates the year of original adoption or, in the case of revision, the year of last revision. A number in parentheses indicates the year of last reapproval. A superscript epsilon (ε) indicates an editorial change since the last revision or reapproval.

1. Scope*

1.1 This practice uses a technique of probing to estimate the thickness of surficial peat deposits overlying mineral soil or bedrock.

1.2 *This standard does not purport to address all of the safety concerns, if any, associated with its use. It is the responsibility of the user of this standard to establish appropriate safety and health practices and determine the applicability of regulatory limitations prior to use.*

1.3 *This practice offers a set of instructions for performing one or more specific operations. This document cannot replace education or experience and should be used in conjunction with professional judgment. Not all aspects of this practice may be applicable in all circumstances. This ASTM standard is not intended to represent or replace the standard of care by which the adequacy of a given professional service must be judged, nor should this document be applied without consideration of a project's many unique aspects. The word "Standard" in the title of this document means only that the document has been approved through the ASTM consensus process.*

1.4 The values stated in SI units are to be regarded as standard. No other units of measurement are included in this standard.

2. Referenced Documents

2.1 *ASTM Standards:*[2]

D653 Terminology Relating to Soil, Rock, and Contained Fluids

D3740 Practice for Minimum Requirements for Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction

D6026 Practice for Using Significant Digits in Geotechnical Data

3. Terminology

3.1 For definitions of common terms used in this standard, refer to Terminology D653.

3.2 *Definitions of Terms Specific to This Standard:*

3.2.1 *peat*—a naturally occurring organic substance derived primarily from plant materials.

4. Summary of Practice

4.1 The resistance to penetration of a pushed or driven rod will increase sharply at the boundary of a peat layer with underlying mineral soil or bedrock. When this abrupt change is measured in a series of probings with an appropriate spacing, the thickness and areal extent of peat can be defined and the volume of peat may be calculated.

4.2 Sampling of the peat may be required to determine the peat characteristics.

4.3 All measured and calculated values shall conform to the guidelines for significant digits and rounding established in Practice D6026.

5. Significance and Use

5.1 This practice allows the determination of the depth at which the resistance to penetration of a pushed or driven rod increases sharply. When the overlying material is peat and the underlying one is mineral soil or bedrock, the depth of change may be interpreted as the thickness of peat. Successive areal determinations of this depth, in combination with surface measurements of the lateral extent of peat will allow calculation of the volume of peat in the deposit.

NOTE 1—The quality of the result produced by this standard is dependent on the competence of the personnel performing it, and the suitability of the equipment and facilities used. Agencies that meet the criteria of Practice D3740 are generally considered capable of competent and objective testing/sampling/inspection/etc. Users of this standard are cautioned that compliance with Practice D3740 does not in itself assure reliable results. Reliable results depend on many factors; Practice D3740 provides a means of evaluating some of those factors.

6. Interferences

6.1 Sampling of the zone of contact of peat with underlying material is usually necessary to verify the interpretations of material change from the rod penetration resistances.

[1] This practice is under the jurisdiction of ASTM Committee D18 on Soil and Rock and is the direct responsibility of Subcommittee D18.22 on Soil as a Medium for Plant Growth.

Current edition approved July 1, 2012. Published September 2012. Originally approved in 1986. Last previous edition approved in 2008 as D4544 – 86(2008). DOI: 10.1520/D4544-12.

[2] For referenced ASTM standards, visit the ASTM website, www.astm.org, or contact ASTM Customer Service at service@astm.org. For *Annual Book of ASTM Standards* volume information, refer to the standard's Document Summary page on the ASTM website.

***A Summary of Changes section appears at the end of this standard**

6.2 Where the peat – mineral transition zone is of significant thickness, or where the peat is underlain by soft clays or marls, further sampling and testing will be required (see 7.2).

6.3 The frequency of sampling is highly dependent upon the physical details of the deposit.

6.4 Penetration of the rod may be prevented by wood pieces in the peat deposit. Data should be examined and rechecked if this occurrence is suspected.

6.5 The thin and flexible nature of the rod strings will limit the depths of penetrating and sampling.

7. Apparatus

7.1 *Graduated Steel Rods*—Penetration is achieved with graduated steel rods of 9.5 ± 1.0-mm diameter and 1.0- or 1.2-m length, which can be threaded together to penetrate a range of thickness. The rods are ringed at 200-mm intervals for easy estimation of depth. A ring with a short threaded end is screwed into the last section and another rod or stick inserted horizontally to facilitate pulling out the rod.

7.2 *Piston-Type Sampler*—Sampling is achieved, as necessary, with a piston-type or similar exploratory type sampler, the head of which is threaded into the bottom rod.

8. Procedure

8.1 Align the rod vertically.

8.2 Penetrate the peat with the rod by pushing or driving. Add sections of rod as required.

8.3 Measure the thickness of peat when the resistance to penetration of the rod increases sharply owing to the resistance of the material underlying the peat to the nearest 0.1 m. It may be possible to hear the scraping of the rod in the underlying soil, especially when it is sand.

8.4 Pull up the rod and seek verification of the resistance change by the presence of mineral material in the threads of the bottom rod.

8.5 Record the lateral position of the sounding.

8.6 Repeat steps 8.1-8.5 as necessary to define the thickness of the peat and its lateral extent.

8.7 At selected locations, attach the sampler and obtain peat and peat – mineral soil contact zone samples. When a piston-type sampler is attached to the bottom rod, the head is pushed down until resistance is met, the rod is pulled up until the central core catches at the end of the outer cylinder, and the open cylinder is then pushed a little further to obtain mineral material.

9. Report

9.1 Record as a minimum the following general information:

9.1.1 Name and location of project; names of field party,

9.1.2 Technician name and date.

9.2 Record as a minimum the following test information:

9.2.1 A map of the positions penetrated or sampled. Show surface elevations and water levels, where available,

9.2.2 A table of peat depths showing aerial locations and noting whether depth was determined by penetration or sampling,

9.2.3 Descriptions of samples taken, along with locations, and

9.2.4 Any test data run on samples taken, and

10. Keywords

10.1 deposit thickness; peat; probing

SUMMARY OF CHANGES

Committee D18 has identified the location of selected changes to this practice since the last issue, D4544-86(2008), that may impact the use of this practice. (Approved July 1, 2012)

(*1*) Revised the scope to make it more general.
(*2*) Expanded Section 9 Report.
(*3*) Added Terminology D653 to Section 3.
(*4*) Added a units statement as new 1.4.
(*5*) Deleted old footnotes 2, 3, and 4.