TESTING FORUM

Task Group Report

Review of ASTM Committee D-18 on Soil and Rock and Planning Recommendations for the 1980s

In December 1978, A. Ivan Johnson, chairman of ASTM Committee D-18 on Soil and Rock, appointed a task group to study the objectives, programs, and organization of Committee D-18 and recommend changes that should be made in order to meet the challenges the task group believed likely to develop during the 1980s. The Task Group on Committee D-18 Organization and Objectives for the 1980s consisted of Adrian Pelzner, who served as its chairman; Woodland Shockley; Richard Gray; and Richard Lounsbury. A condensed version of the report submitted by the task group follows. The full report is available on request from Kenneth Pearson of the ASTM Standards Development Division, 1916 Race Street, Philadelphia, Pa. 19103.

The task group was commended by Johnson for the excellent job it did in compiling and evaluating the information. It is now incumbent on Committee D-18 to build further on its strengths and to diligently attack the weaknesses brought out in the report. Revisions of the committee's bylaws in line with the report's recommendations are already in progress. Comments and suggestions are invited. These may be sent to the *Geotechnical Testing Journal's* editor or to Chairman A. Ivan Johnson.

Background and Contributions of Committee D-18

Any organization should periodically look at itself to determine both how well it is doing its job and the direction in which it should be heading. This self-examination was first undertaken by Committee D-18 in 1945 and resulted in a reorganization of the entire committee. In the late 1960s and early 1970s the committee was reexamined in connection with a revision of the bylaws, but no deliberate attempt was made at that time to look to the future of the committee. The present assessment of Committee D-18 in the 1980s will review the work of the committee and recommend the overall direction the committee should take in the future and how it should go about accomplishing its objectives in the next ten years.

The task group on D-18 in the 1980s took the accomplishments of the committee as a starting point for its review. In so doing, the group found that Committee D-18 can be very proud of its many substantial contributions. These are outlined below.

Standards

Committee D-18 is responsible for the development and maintenance of the 72 existing standards and has 21 more in various stages of development. More than 50 D-18 standards have been approved as American National Standards by the American National Standards Institute (based on the *1979 Annual Book of ASTM Standards,* Part 19). In addition, ten of the committee's standards have been approved for use by agencies of the Department of Defense for listing in the DOD *Index of Specifications and Standards.* There are also many federal, state, local, and private agencies making use of D-18 standards. ASTM's Headquarters staff and members of the committee have received hundreds of inquiries on the use, applicability, and interpretations of standards under the jurisdiction of the committee, reflecting widespread use of the committee's standards by the engineering profession. However, the task group also determined that from 1957 to 1978 an average of only 2.5 new standards were developed each year. In the same period about one new tentative procedure was established and one standard revised per year. The task group considered this to be a very low level of productivity, and one calling for substantial improvement.

Symposia

One of the strengths of Committee D-18 has been the many symposia that it has sponsored. The first D-18 symposium was sponsored in 1939. Since 1949 the committee has sponsored a symposium practically every year, usually at the annual meeting of the Society. These symposia have been well attended, not only by members of the committee and the Society, but also by interested engineers and others who are not ASTM members. D-18 symposia have stimulated interest in the activities of the committee, increased attendance at meetings, and provided a source of new members. The proceedings of most of the symposia have been published by the Society as special technical publications (STPs). To date 43 STPs have been published under Committee D-18 auspices; they have been among the most widely distributed books published in ASTM's STP series, thus attesting to the valuable contribution that the committee has made to the professional literature. However, there is general agreement in D-18 that symposia need to address the main mission of Committee D-18, the production of standards; this objective, it is felt, should receive first priority. In the task group's review of past symposia, little correlation was found between specific symposia and the development of standards.

The task group feels that substantial improvements need to be made in the management of symposia. Such subjects as the suitability of the symposium for the development of standards and the use of Committee D-18 members' time in connection with symposia need to be carefully scrutinized.

Subcommittees of Committee D-18

Committee D-18 has continually tried to respond to the expanding needs of geotechnical engineering. At its inception the committee operated in the traditional civil engineering areas of soil mechanics and highway engineering. In 1964, responding to the needs of the emerging field of rock mechanics, the committee established a subcommittee in that area and changed its name to

include rock. In early 1977 a subcommittee on marine geotechnics was established, again responding to the needs emerging from the extensive domestic and international activity in offshore oil exploration. In the same year, the subcommittee on permeability and capillarity of soils expanded its scope to include the hydrologic properties of soil and rock. Again responding to the current emphasis on environmental concerns, a new subcommittee on soil and rock pollution was formed in 1977. Other new areas that the committee is concerned with are geotextiles for engineering use, grouting, rock for erosion control, and peats and related materials. The committee can indeed be proud of its record in demonstrating that it can respond to changing needs of the profession.

Another area in which Committee D-18 is active is the development of criteria for the evaluation for laboratories engaged in soil and rock testing and inspection. A draft standard practice for this program is currently being evaluated. One of the criteria for evaluating laboratories has to do with the qualifications of the laboratory technicians who supervise and perform the tests. Recognizing a need in this area, the committee established a subcommittee on education and training to establish the qualifications for laboratory technicians and to develop training courses and procedures.

This reaction to new opportunities, problems, technologies, and regulations has resulted in the formation of new subcommittees, as can be seen in the expanding subcommittee structure of D-18. The dates of activation of newer subcommittees are given in Table 1; as the table shows, D-18's response to current developments has accelerated in the last three years.

New Journal

A recent contribution to the Society and to the engineering profession is the *Geotechnical Testing Journal.* The journal was established in March 1978 after several years of planning and development. The reception of the journal has been outstanding, and close to 1500 subscriptions have been received to date. The journal provides a forum on soil and rock testing, particularly for information leading to the development of new standards and the improvement of existing ones.

At times subcommittees of D-18 have used the journal for publications of methods designed to be developed into standards. The task group feels that subcommittees should employ this approach much more extensively. The journal is a powerful tool for the development of standards, and subcommittee chairmen should strongly recommend that members make greater use of the journal.

In summary, Committee D-18 has made important and continuous contributions to the engineering profession. It has developed a large body of standards that are in widespread use, and contributes to the knowledge of the profession through its successful journal and its popular STPs.

The Need for Accelerated Development of Standards in the 1980s

The task group fully recognizes the important contributions made by Committee D-18. However, the group concluded that D-18 must make some changes in its mode of operation in order to be responsive to the ever-changing, ever-increasing needs and concerns of industry, government, and society at large. In the last decade, there has come into existence a bewildering array of laws, regulations, and rules. There are regulations for safety, health, environment, and liability, to name but a few. Frequently, such regulations require new test methods and specifications. In order to be effective and responsive, such test methods and specifications must be rapidly and efficiently delivered. Large federal and state programs involving such important and diverse issues as dam safety, clean water, and hazardous wastes cannot be delayed for the development of a new test method.

It is one thing to identify the need for a test method and deliver it in a reasonable time for use in a critical situation, perhaps six months. It is another thing to develop such a test method in a deliberate, step-by-step manner in an unreasonable time—perhaps three to five years or more. The task group found that all too frequently, "new" D-18 test methods and specifications lagged in their development time compared to those of other ASTM committees.

A review of the records of standards development in all ASTM committees revealed a minimum development period of two years. The upper limit may vary from four to six years, depending on several factors. Considerations that strongly influence the time required for standards development include the activity or inactivity of the originating subcommittee and the sometimes controversial character of the subject matter of the standard under development. D-18's track record suggests that the committee's productivity is very low and that it is slower in developing standards than most ASTM committees.

In the opinion of the task group, the 1980s will bring urgent demands for quick development and delivery of test methods, specifications, and standard practices. Energy-related matters, including restoration of land from strip-mining operations and disposal of hazardous nuclear wastes, are issues that are already with us at the beginning of the 1980s. By the end of the decade there probably will be many other as yet unidentified issues that will require test methods and specifications. These needs can be filled by Committee D-18, provided it responds in a timely and efficient manner.

The task group reviewed the standards development history of D-18. The standards that were developed in the 1950s, 1960s, and the early 1970s were, and are, good standards: they have withstood the test of time. However, the task group concluded that the development of these standards was generally not subjected to pressures for quick delivery: there seemed to be ample time and resources available. In many instances, the development of D-18 standards was assigned to members' technical staff as a regular paid work assignment. There was time for development, round robin testing, first drafts, second drafts, subcommittee ballots, negative votes; for sending standards back to the subcommittee for resolution, forward to the main committee for balloting, back to the subcommittee for resolution of negative votes, forward to the main committee for reballoting, approval, and finally, years after the initiation of the development cycle, publication in the

TABLE 1—*Subcommittees of Committee D-18.*

Year	Subcommittee	Title and Task Groups
...	D18.01	Surface and Subsurface Reconnaissance
...	D18.02	Sampling and Related Field Testing for Soil Investigations
		D18.02.01 Nuclear Methods
		D18.02.02 In-Place Vane Shear Testing
		D18.02.03 Diamond Core Drilling
		D18.02.04 Auger Sampling
		D18.02.05 Sampling of Soils
		D18.02.06 Cone Penetration Test
		D18.02.07 The Pressure Meter
		D18.02.08 Packaging, Transportation and Storage of Samples
...	D18.03	Texture, Plasticity and Density Characteristics of Soils
		D18.03.01 Grain Size and Specific Gravity
		D18.03.02 Atterberg Limits
		D18.03.03 Moisture Density Relations
		D18.03.04 Densities of Granular Soils
1977	D18.04	Hydrologic Properties of Soil and Rocks (title and scope change)
...	D18.05	Structural Properties of Soils
		D18.05.01 Triaxial Testing
		D18.05.02 Direct Shear Testing
		D18.05.03 Swelling Properties
		D18.05.04 Consolidation Properties
...	D18.06	Physico-Chemical Properties of Soils and Rocks
...	D18.07	Identification and Classification of Soils
...	D18.08	Special and Construction Control Tests
		D18.08.01 Base Courses and Subgrades for Highways and Airports
		D18.08.02 Earth Dams and Embankments
		D18.08.03 Nuclear Methods
...	D18.09	Dynamic Properties of Soils
...	D18.10	Bearing Tests of Soils in Place
...	D18.11	Deep Foundations
...	D18.12	Rock Mechanics
		D18.12.01 Classification and Nomenclature
		D18.12.02 Deformation Moduli
		D18.12.03 Strength
		D18.12.04 In-Situ Stress and Strain
		D18.12.05 Reinforcement
1977	D18.13	Marine Geotechnics
1977	D18.14	Soil and Rock Pollution
		D18.14.01 Mass Transport
		D18.14.02 Siting
		D18.14.03 Monitoring
		D18.14.04 Erosion
1978	D18.15	Stabilization by Additives
		D18.15.01 Stabilization with Portland Cement
		D18.15.02 Stabilization with Bituminous Materials
		D18.15.03 Chloride Stabilization, Calcium Chloride Stabilization, and Sodium Chloride Stabilization
		D18.15.04 Stabilization with Lime and Other Admixtures
1978	D18.94	Education and Training
	D18.95	Information Retrieval and Data Automation
	D18.96	Research Steering
	D18.97	Special Awards
	D18.98	Hogentogler Award
	D18.99	Evaluation of Data
1979	D18.16	Grouting
1979	D18.17	Rock for Erosion Control
1979	D18.18	Peats and Related Materials
	D18.91	Editorial
	D18.92	Papers
	D18.93	Nomenclature for Soil and Rock
1980	D18.19	Geotextile Applications

Annual Book of ASTM Standards. While the task group fully recognizes the merits of this democratic process, the group concluded that the process is too cumbersome and time-consuming to be suitable for those situations requiring the rapid delivery of test methods and specifications.

Further, the group concluded that the present work situation of most of Committee D-18's membership does not permit the commitment of extensive time or resources to standardization work. Members are subject to too many work demands and there are fewer people to meet them. Other priorities prevail.

The task group felt that the early part of the standards development cycle, that is, up to the first draft of a test method or specifications, can and should be greatly accelerated for those situations needing a quick response. The recommendations in the summary of this report will emphasize the need to pursue this acceleration of the development of standards. For exigent situations, the ASTM Regulations Governing Technical Committees provide a means for delivering methods and procedures in minimum time in the form of emergency standards or proposals. These short-term measures may be implemented and then followed with full consensus standards if the need persists

Current Activities and Participation

Included in the committee's scope are the production of standard specifications and practices relating to the properties and behavior of soil and rock for engineering purposes. The committee's purposes and responsibilities also include the advancement and dissemination of knowledge, stimulation of research, development of methods of sampling and testing, and the formulation of uniform, widely accepted systems of nomenclature and definitions.

In this review of the committee's progress in fulfilling these responsibilities, D-18's achievements and contributions have been noted. The task group has carefully examined trends in its membership growth and current activities, particularly in relation to the participation of its members in meetings, balloting, and standards development. The task group noted some deficiencies in the operational aspects of Committee D-18.

D-18 has five officers, 18 technical subcommittees, and nine administrative subcommittees. In some cases, individuals serve in several positions. However, if there were no duplication of people, 64 positions would be available in the committee for officers, subcommittee chairmen, or section chairmen.

Committee membership was 382 plus four affiliates as of 23 August 1979. The membership consists primarily of personnel from consulting (34%), academic (23%), and government (22%) organizations. More than 50% of the members have joined D-18 in the last five years.

From 1968 to 1979, membership increased from 170 to 382. However, there was no corresponding increase in standards productivity. Before 1977, D-18 met only at the Society's Annual Business Meeting in June. Since then, it has met in January as well. However, there has not been an increase in attendance at meetings corresponding to the increased membership.

There has been concern over low activity on the part of some subcommittee members in D-18 for some years. In many subcommittees, a small group undertakes most of the work; usually the same people are the best meeting attendees and ballot returners.

Summary

The task group on D-18 in the 1980s considered the need for accelerated standards development in the coming decade and ways to address concerns identified in this review.

The many contributions of D-18 were noted. Among these are the 72 standards developed and maintained by the committee and the 21 in preparation. The task group recognized a low level of productivity in the development of standards and the need for an acceleration of standards development.

D-18's symposia have made valuable contributions. Symposia have resulted in increased attendance at meetings and have added significant contributions to the literature. Most symposia have resulted in STPs. Symposia have produced some standards, but not, in the task group's opinion, enough to justify the resources expended in developing the symposia. There is a need for review of future symposium topics to assess the potential for standards development. The task group thinks this should be the thrust of future symposia.

D-18 has responded to the new situations, problems, and the needs by establishing new subcommittees. Since 1964, and especially in the past three years, new subcommittees have been organized to meet the new rules, regulations, and problems of the times. Presently, D-18's coverage of the field of geotechnical engineering appears adequate, but continuing review is necessary to keep abreast of developments in the 1980s and to be responsive to needs for new subcommittees.

Another recent contribution of Committee D-18 is the *Geotechnical Testing Journal.* The journal, first published in March 1978, has had an outstanding reception. The journal has a great potential for the development of new standards; this potential is however not being fully exploited by the subcommittees.

The task group reviewed the record of D-18 standards development and found that one of the most pressing problems in the committee's plans for the 1980s is the need for accelerated development of standards. This has not been a problem in the past, but the 1980s will bring even greater demands for test methods, specifications, and standard practices concerning energy, waste disposal, and as yet unidentified problems. It is proposed that task groups composed of D-18 members and outsiders be used to develop special situation and quick-response standards. ASTM regulations provide the means for rapid approval and dissemination of emergency standards.

Committee D-18 needs to publicize the value of standards in geotechnical engineering. It should be emphasized that D-18 is a standards-developing group. Appointments of individuals to subcommittees should be for a finite period, perhaps two years. Reappointment should be contingent on the member's contribution to developing and revising standards.

Special recognition and appreciation should be extended to committee members and outsiders who have contributed significantly to the development of standards. The employers of

the committee members should also be thanked for their support of ASTM activities.

The task group believes that the appointment of a vice-chairman for new standards development would greatly expedite the development of standards. Such an action would provide needed administrative control in establishing task forces and in securing funding to develop and write quick-response standards.

Recommendations

The low level of standards development, inadequate activity by D-18 members in working on standards, poor attendance at meetings, and relatively low return of ballots by members prompted the task group to make recommendations to improve D-18's achievements in these areas. As a result of this review, the task group recommends that the committee should:

1. Recognize the need for increased productivity in developing standards and the need for acceleration of the development of standards.
2. Prepare for the rapid delivery of draft standards through the use of task groups composed of members and outside experts. If quick-response tests and specifications cannot be approved in the required time, the use of emergency standards and proposals should be considered.
3. Create a vice-chairman for new standards development to expedite standards development. The duties of this vice-chairman would include identification of the need for a standard, recruitment of specialists to write the standard, arranging funding for work on the standard, and submission of the draft standard for approval.
4. Orient future symposia toward the production of new standards and examine proposed content of symposia to assess the potential for stimulating standards development.
5. Develop publicity on the value of standards in geotechnical engineering and emphasize that D-18 is a standards-writing group.
6. Appoint members to a subcommittee for a definite period, perhaps two years.
7. Decline to reappoint members if they do not contribute to standards development and revision.
8. Recognize members who contribute significantly to standards development by awarding certificates of achievement, notifying employers of the award, and thanking employers for their support.
9. Establish a periodic review procedure of the committee's and subcommittees' structure and scope to ensure that D-18 is responsive to the demands of the 1980s.
10. Review existing and newly formed subcommittees to determine their effectiveness.

Committee D-18 News

Joint Geotextile Subcommittee Formed

A joint ASTM subcommittee on geotextiles and geotextile applications was formed by ASTM Committees D-13 on Textiles and D-18 on Soil and Rock at their June meetings in Chicago during the ASTM Meeting Week there. The new group is an offshoot of two existing ASTM subcommittees, D13.61 on Geotechnical Fabrics and D18.19 on Geotextiles and Their Applications. D13.61, formed late in 1977, was the first ASTM activity concerned with geotextiles. The subcommittee has been a large group since its beginning and has begun work on more than 40 standards, ten of which are currently undergoing balloting. The subcommittee is also coordinating a second International Conference on Geotextiles, slated for 1982.

The chairwoman of the new group, Trudy Raumann of the Monsanto Triangle Park Development Center, has expressed confidence that the combined approach will alleviate duplication of efforts in the area of geotextile standards development. However, each branch of the joint group will retain a separate title and scope appropriate to its parent committee. Standards relating to geotextile fabrics will remain in the province of D-13, while applications of geotextiles will be the responsibility of Committee D-18. Minutes of the joint subcommittee's activities will be communicated to both main committees, and the standards it produces will be published in Parts 19, 32, and 33 of the *Annual Book of ASTM Standards.*

The new group's next meeting is scheduled for the 19 to 21 January 1981 meeting of Committee D-18 in Ft. Lauderdale. For further information, contact Trudy Raumann, Monsanto Triangle Park Development Center, Inc., P.O. Box 12274, Research Triangle Park, N.C. 27709 (919/549-8111), or Kenneth C. Pearson, ASTM Standards Development Division, 1916 Race St., Philadelphia, Pa. 19103 (215/299-5520). Membership is open to all who are interested.

Training Aids Registry

Subcommittee D18.94 on Education and Training is preparing a registry of training aids for current ASTM standards. The materials to be included will illustrate how the tests should be performed. Anyone who has slides, filmstrips, transparencies, films, video or audio tapes, or other materials in this line, or anyone who knows of a source for materials useful for training for the performance of ASTM tests, is requested to contact R. N. S. Rao, Prairie View A&M University, Box 2345, Prairie View, Tex. 77445, or William Blase, Soiltest, Inc., Evanston, Ill. 60202.

Marine Organic Soils

At its meeting in Chicago on 26 June 1980, held in conjunction with ASTM's June Meeting Week, Subcommittee D18.13 on Marine Geotechnics held a brief seminar on marine organic soils. The program was attended by five subcommittee members and 13 visitors, and was organized and chaired by Surendra K. Saxena of the Illinois Institute of Technology. Presentations included a

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talk by Saxena entitled "Engineering Properties of New Jersey Tidal Marsh Sediments and South Florida Mangroves," one by R. Bennett entitled "Total Organic Carbon Content of East Coast Shelf and Slope Sediments," and an address by A. G. Young, "Undrained Strength of Gaseous Gulf of Mexico Sediments." It was concluded that the form and quantity of organic matter can vary considerably but that geographic organic patterns do exist and that organic matter will affect engineering properties and behavior. For example, seafloor samples that experience elevated temperatures during storage may be disturbed by accelerated bacterial decomposition of organic matter. Gaseous soils, for their part, may be disturbed as a result of hydrostatic pressure release during coring, necessitating the use of specially designed in-situ test equipment for soil data of adequate quality.

Road Engineering Conference

The third conference of the Road Engineering Association of Asia and Australasia will take place in Taipei, Taiwan, 20-24 April 1981, with post-conference tours scheduled for 25-27 April. The theme of the third conference is "Road Engineering and Energy Conservation." The conference is organized for the benefit of members of the Road Engineering Association of Asia and Australasia, the China (Taiwan) Road Federation, and the Chinese (Taiwanese) Institute of Engineers, who are the sponsors of the conference. However, any person who is interested in the conference is welcome to participate. A formal letter of invitation to participate may be arranged by writing to the Secretary-General, Organizing Committee, III REAAA Conference, c/o Moh and Associates, 11th floor, 75, Nanking East Road, Section 4, Taipei, Taiwan.

Loss Prevention Supplement

The Association of Soil and Foundation Engineers has published a supplement to its *Directory of Publications and Loss Prevention Aids*. The supplement describes some 15 publications and loss prevention aids developed recently by ASFE, including case histories, magazine article reprints, and manuals. The new supplement is available without charge. Requests should be sent on company letterhead to the Association of Soil and Foundation Engineers, 8811 Colesville Rd., Suite 225, Silver Spring, Maryland 20910 (301/565-2733).

LETTER

Soil Bearing Footing Area Tests

To the editor:

We refer to the letter under the above heading in your Journal, Vol. 2, No. 2, June 1979, requesting information on portable bearing capacity testing devices.

In South Africa such a device is in fairly common use. It is called the dynamic cone penetrometer (DCP) and is in effect a scaled-down version of an SPT (standard penetration test) device. Reference is made to this in *Proceedings of the European Symposium on Penetration Testing* (Stockholm, 1974) in the paper discussing procedures in South Africa, pages 201-215. The version most generally used is that described as the CBR penetrometer but now known simply as the DCP. Its use for road work is common, and hence the parameter usually obtained is the CBR (California Bearing Ratio). Considerable work has been carried out by E. G. Kleyn of the Transvaal Roads Department in Pretoria on providing correlations between penetration resistance and CBR values; the DCP is now used with confidence.

In order to make use of this equipment for measurement of density or undrained shear strengths for bearing capacity estimations, there is no generally accepted method and there is a tendency to view the CBR obtained in a qualitative manner rather than quantitatively. However, the CBR test can be viewed as a bearing capacity test; by using conventional bearing capacity equations it can be shown for cohesive materials that:

$$q_{\text{allowable}} = 23 \times \text{CBR kPa} \quad (1)$$

where the CBR is expressed as a percentage in the normal way and q is the bearing capacity.

Similarly, for cohesionless materials the DCP can be related through CBR results to q_c, the CPT (static cone penetration test) cone value, or to the SPT value; when used with the bearing capacity equation given by Sanglerat in *The Penetrometer and Soil Exploration* (Elsevier, New York, 1972) this becomes:

$$q_{\text{allowable}} = q_{c/10}$$

and also

$$\text{CBR} = q_{c/280}$$

(also quoted by Sanglerat) where q_c is in kPa; hence

$$q_{\text{allowable}} = 28 \text{ CBR kPa} \quad (2)$$

An average of Eqs 1 and 2 is accepted as being suitable and convenient:

$$q_{\text{allowable}} = 25 \text{ CBR kPa} \quad (3)$$

The above are for shallow foundations and no account is taken of the possible influence of depth or overburden pressure on the penetration test result.

We should point out that the equipment is very simple and rugged and can be operated rapidly by one person and easily carried in a car. We therefore believe that it is entirely suitable for the requirements mentioned in the letter in your journal.

Yours faithfully,
G. Jones
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