TESTING FORUM

ADDENDUM TO INTERLABORATORY TESTING PROGRAM FOR ROCK PROPERTIES, ROUND ONE, *GEOTECHNICAL TESTING JOURNAL*, GTJODJ, VOL. 16, NO. 1, MARCH 1993, PP. 138–163*

Howard J. Pincus[1]

Attached are three revised precision statements, for longitudinal and transverse velocities, indirect tensile strength, and unconfined compressive strength, to replace the corresponding precision statements in the above-cited report and in its abridged version published in the *Geotechnical Testing Journal* (Pincus 1993). Summaries of the revised precision parameters, excerpted from the E 691 printouts, are presented in Table 1.

These revisions result from the ITP/RP Steering Committee's decision to exclude the rock property data submitted by Laboratory 9 from the calculations of the precision measures of repeatability (r) and reproducibility (R).

The rock property test data submitted by Laboratory 9, and especially the data for unconfined compressive strength, were of concern to the Steering Committee from the outset. These concerns were discussed on p. 38 of the report and on pp. 144 and 147 of the GTJ article, but at the time that discussion was written it was decided to include the Laboratory 9 data in the calculations. Subsequent communication with Laboratory 9 and discussion within the Committee led to the request to Laboratory 9 to perform some additional tests, to which Laboratory 9 kindly acquiesced. In advance of the additional testing, the Committee established explicit criteria upon which to base its decision as to whether Laboratory 9's original test data for rock would be included in the calculations for the precision statements; under no circumstances were the re-test data to be substituted for or added to the original data. New, completely finished specimens were sent to Laboratory 9. The additional test data then submitted by Laboratory 9 did not satisfy the Committee's criteria for including the original data in the calculations of the precision measures; hence, the three precision statements have been revised as shown.

It should be noted that the precision data for the elastic modulus in uniaxial compression have not been revised, and that Laboratory 9's pilot data have not been excluded from the pilot data calculations. (Note: There is, however, a minor typographical error in Table A-4c for the uniaxial elastic modulus at 75% UCS in both the report and the GTJ article. The mean value for Barre Granite should be 53.21 GPa, not 53.11 GPa.)

[1]Consultant, P.O. Box 27598, San Diego, CA 92198-1598 and Chairman, Steering Committee, Interlaboratory Testing Program for Rock Properties. The members of the Steering Committee are the *de facto* authors of this paper, but the nominal author is responsible for any shortcomings in presentation.

*The *Geotechnical Testing Journal* article to which this addendum applies is an abridged version of Institute for Standards Research Report No. 1, designated ISR, PS-D18.12-R01, PCN: 33-000002-38, 140 pp., September 1992, printed with limited distribution. That report contains complete documentation of testing protocols and their supplements. The decision to publish the abridged version in the *Geotechnical Testing Journal* was made in May 1992, eight months prior to the author's assuming the post of Technical Editor of the *Journal* (January 1993). The most logical choice for publication of this addendum is the same journal in which the article to which it applies is published.

Reference

Pincus, H. J., 1993, "Interlaboratory Testing Program for Rock Properties, Round One—Longitudinal and Transverse Pulse Velocities, Unconfined Compressive Strength, Uniaxial Elastic Modulus, and Splitting Tensile Strength," *Geotechnical Testing Journal*, Vol. 16, No. 1, pp. 138–163.

Proposed Precision Statement, Standard D 2845, Test Method for Laboratory Determination of Pulse Velocities and Ultrasonic Elastic Constants of Rock

An interlaboratory study of longitudinal and transverse pulse velocity (LPV and TPV) of intact specimens of four rock types was conducted in accordance with Practice E 691 in six laboratories with five replications per rock type. The results of this study are reported in ISR Research Report No. PS D18.12-R01, 1992, and its Addendum, 1994.

The repeatability and reproducibility statistics reported in Table A-1 refer to within-laboratory and between-laboratory precision, respectively. Each entry in the tables has the dimensions of km/s.

The probability is approximately 95% that two test results obtained in the same laboratory on the same material will not differ by more than the repeatability limit r. Likewise, the probability is approximately 95% that two test results obtained in different laboratories on the same material will not differ by more than the reproducibility limit R. The precision statistics are calculated from

$$r = 2\sqrt{2}s_r$$

where s_r is the repeatability standard deviation, and

$$R = 2\sqrt{2}s_R$$

where s_R is the reproducibility standard deviation.

TESTING FORUM

TABLE 1

	$\bar{x}$	s_L	s_r	s_R	r	R
			LPV, km/s			
BG	3.47	0.15	0.08	0.17	0.22	0.48
BS	2.28	0.09	0.06	0.11	0.15	0.30
SL	4.15	0.18	0.10	0.21	0.27	0.58
TM	6.15	0.03	0.16	0.16	0.44	0.45
			TPV, km/s			
BG	2.37	0.28	0.05	0.28	0.14	0.80
BS	1.45	0.20	0.03	0.21	0.07	0.58
SL	2.30	0.20	0.07	0.22	0.21	0.61
TM	3.33	0.18	0.09	0.20	0.25	0.55
			ITS, MPa			
BG	13.66	0.89	1.54	1.78	4.31	4.98
BS	3.85	0.21	0.44	0.49	1.24	1.37
SL	4.92	0.28	0.56	0.62	1.56	1.74
TM	9.39	1.42	1.30	1.92	3.63	5.38
			UCS, MPa			
BG	216.97	8.15	5.60	9.89	15.69	27.70
BS	62.01	5.70	5.63	8.01	15.77	22.44
SL	58.67	3.00	3.24	4.41	9.07	12.36
TM	141.87	11.43	7.29	13.56	20.42	37.96

It should be noted here that the anisotropy for TPV in Barre Granite is about 5%, depending on the orientation of the plane of polarization for shear waves. The data presented here are "average" results.

Proposed Precision Statement, Standard D 3967, Test Method for Splitting Tensile Strength of Intact Rock Core Specimens

An interlaboratory study of splitting (indirect) tensile strength (ITS) of intact specimens of four rock types was conducted in accordance with Practice E 691 in seven laboratories with five replications per rock type. The results of this study are reported in ISR Research Report No. PS D18.12-R01, 1992, and its Addendum, 1994.

The repeatability and reproducibility statistics reported in Table A-2 refer to within-laboratory and between-laboratory precision, respectively. Each entry in the tables has the dimensions of MPa.

The probability is approximately 95% that two test results obtained in the same laboratory on the same material will not differ by more than the repeatability limit r. Likewise, the probability is approximately 95% that two test results obtained in different laboratories on the same material will not differ by more than the reproducibility limit R. The precision statistics are calculated from

$$r = 2\sqrt{2}s_r$$

where s_r is the repeatability standard deviation, and

$$R = 2\sqrt{2}s_R$$

where s_R is the reproducibility standard deviation.

Proposed Precision Statement, Standard D 2938, Test Method for Unconfined Compressive Strength of Intact Rock Core Specimens

An interlaboratory study of unconfined compressive strength (UCS) of intact specimens of four rock types was conducted in

TABLE A-1

	Barre Granite	Berea Sandstone	Salem Limestone	Tennessee Marble
		LPV, km/s		
Mean $\bar{x}$	3.47	2.28	4.15	6.15
Repeatability limit r	0.22	0.15	0.27	0.44
Reproducibility limit R	0.48	0.30	0.58	0.45
		TPV, km/s		
Mean $\bar{x}$	2.37	1.45	2.30	3.33
Repeatability limit r	0.14	0.07	0.21	0.25
Reproducibility limit R	0.80	0.58	0.61	0.55

TESTING FORUM

TABLE A-2

	Barre Granite	Berea Sandstone	Salem Limestone	Tennessee Marble
		ITS, MPa		
Mean $\bar{x}$	13.66	3.85	4.92	9.39
Repeatability limit r	4.31	1.24	1.56	3.63
Reproducibility limit R	4.98	1.37	1.74	5.38

accordance with Practice E 691 in six laboratories with five replications per rock type. The results of this study are reported in ISR Research Report No. PS D18.12-R01, 1992, and its Addendum, 1994.

The repeatability and reproducibility statistics reported in Table A-3 refer to within-laboratory and between-laboratory precision, respectively. Each entry in the tables has the dimensions of MPa.

The probability is approximately 95% that two test results obtained in the same laboratory on the same material will not differ by more than the repeatability limit r. Likewise, the probability is approximately 95% that two test results obtained in different laboratories on the same material will not differ by more than the reproducibility limit R. The precision statistics are calculated from

$$r = 2\sqrt{2}s_r$$

where s_r is the repeatability standard deviation, and

$$R = 2\sqrt{2}s_R$$

where s_R is the reproducibility standard deviation.

TABLE A-3

	Barre Granite	Berea Sandstone	Salem Limestone	Tennessee Marble
		UCS, MPa		
Mean $\bar{x}$	216.97	62.01	58.67	141.87
Repeatability limit r	15.69	15.77	9.07	20.42
Reproducibility limit R	27.70	22.44	12.36	37.96

TESTING FORUM

Awards Presented by ASTM Committee D18

At the June 1993 meeting of Committee D18 in Atlanta, a number of awards were presented by Richard S. Ladd, Chairman of Committee D18 and member of the ASTM Board of Directors. Each of the awards, with their recipients, is listed below. Photos of the award recipients are included if they were available.

Hogentogler Award

The 1993 Hogentogler Award was presented to Andrew J. Bond, Richard J. Jardine, and John C. P. Dalton for their paper "Design and Performance of the Imperial College Instrumented Pile," which appeared in the December 1991 issue of the *Geotechnical Testing Journal.*

Award of Merit and Fellow of ASTM

Robert Stevenson (left) and Vincent Drnevich (right) received the Society's Award of Merit and became Fellows of ASTM. The awards were presented by Nancy Trahey, Chairman of the ASTM Board at the June 1993 meeting in Atlanta. Both Bob and Vince have had long-time associations with Committee D18 on numerous subcommittees and in various leadership positions. Bob is currently 1st Vice Chairman of Committee D18, and Vince is a former Technical Editor of the *Geotechnical Testing Journal.*

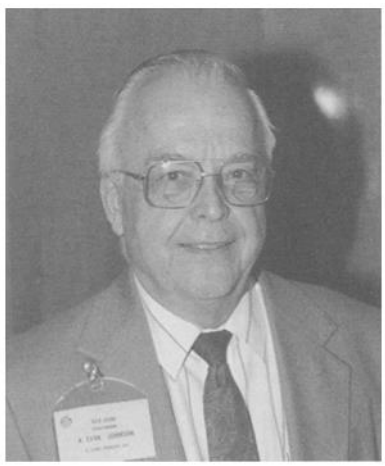
Outstanding Achievement Award

Charles H. McElroy (left), pictured with Richard S. Ladd (right), Chairman of Committee D18, received an Outstanding Achievement Award for special efforts in behalf of ASTM as Secretary of Committee D18 since 1990, member of the Executive Committee since 1985, past Chairman of Subcommittee D18.07 on Identification and Classification of Soils and Subcommittee D18.17 on Rock for Erosion Control, and for being the principal author of four Standards.

TESTING FORUM

Outstanding Achievement Award

Kenneth R. Demars (left) pictured with Richard S. Ladd (right) received an Outstanding Achievement Award for his service to Committee D18 as Chairman and former Secretary of Subcommittee D18.13 on Marine and Freshwater Geotechnics, as primary author of a new Standard, D4373-84 Test Method for Carbonate Content of Soils, and for cochairing ASTM Symposia in 1982, 1985, and 1990 with resulting Special Technical Publications 777, 883, and 1087.



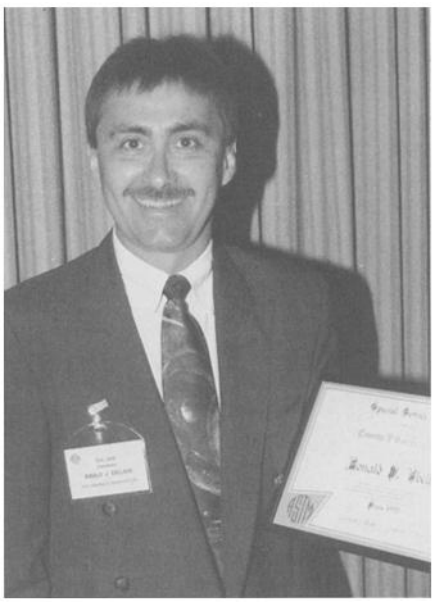
Special Service Awards

A. Ivan Johnson (shown above), C. Bernt Petterson, and James L. Foulton received Special Service Awards for their planning and organizing the June 1990 Symposium on Geographic Information Systems (GIS) and Mapping—Practices and Standards, with the resulting ASTM Special Technical Publication 1126.

Special Service Awards

David M. Nielsen and Martin N. Sara (shown on left with Chairman Richard S. Ladd) were given special service awards for their fine efforts in planning and putting on the ASTM Symposium on Current Practices in Ground Water and Vadose Zone Investigations in 1991 and the resulting ASTM Special Technical Publication 1118.

TESTING FORUM



Special Service Awards

Ronald J. Ebelhar (shown above) received a Special Service Award for his outstanding management and chairmanship of Subcommittee D18.09 on Cyclic and Dynamic Properties of Soils and for assisting with the negative vote resolution of many Standards, especially D 3999-91, Test Method for the Determination of Modulus and Damping Properties of Soils Using the Cyclic Triaxial Apparatus. A Special Service Award was presented to James H. Pielert (not shown) in recognition to the AASHTO Materials Reference Laboratory for sharing its soil proficiency program data with Committee D18 for its use in precision statements.

Technical Editor's Award

The first Technical Editor's Award was given to Kieth Hoddinott (on right in photo) and Tracey O'Shay for their efficient, timely, and professional editing of Special Technical Publication (STP) 1162 *Agricultural Analysis of Soil.*

TESTING FORUM

Larry Johnson

Larry Johnson Dies

Larry Johnson, a member of ASTM Committee D18 on Soil and Rock, died in Vicksburg, Mississippi, on January 15, 1994. He had been awarded two Standard Development Awards and was to receive another at the January 1994 meeting of Committee D18 for his time and effort in developing ASTM D 5333-92, Test Method for Measuring Collapse Potential of Soils. He was a quiet, unassuming, productive contributor to Committee D18 as a section chairman and member of several subcommittees.

Dr. Johnson earned his B.S. in ceramic engineering from the University of Washington, his M.S. and Ph.D. in engineering science from the University of California, Berkeley and his M.S. in civil engineering from Mississippi State University. While in the U.S. Army, he served as a unit commander and was last stationed at the U.S. Army Corps of Engineers Waterways Experiment Station in Vicksburg, Mississippi. After completing army service he remained in Vicksburg working as a research engineer at the Waterways Experiment Station until the time of his death.

Larry Johnson was active in the American Society of Civil Engineers (ASCE), where he was a leader in activities associated with expansive soils. He was also a contributor to the activities of the Transportation Research Board (TRB). He will be remembered in Committee D18 for his many years of service and for sharing his wealth of soil testing experience, especially on the shrink, swell, and collapse of soil.

Dr. Johnson is survived by his wife, Nancy, and two children, Joel and Jenifer.

TESTING FORUM

ASTM to Sponsor June Symposium on Dredging, Remediation, and Containment of Contaminated Sediments

A Symposium on Dredging, Remediation, and Containment of Contaminated Sediments will be held 23–24 June 1994 at the Queen Elizabeth Hotel in Montreal, Quebec, Canada. The symposium is being sponsored by ASTM D18 on Soil and Rock in cooperation with Environment Canada—Contaminated Sediment Removal Program, Toronto, Ontario.

Symposium co-chairmen are: Kenneth R. Demars, University of Connecticut, Storrs, Connecticut; Gregory N. Richardson, Harding and Lawson, Seattle, Washington; Raymond N. Yong, McGill University, Montreal, Quebec, Canada; and Ronald C. Chaney, Humboldt State University, Arcata, California.

The program for the Symposium follows:

Thursday, June 23, 1994

8:30 a.m.
Opening Remarks—K. R. Demars, Symposium Chairman

SESSION I: SEDIMENT CHARACTERIZATION

Session Chairman: R. J. Ebelhar, RUST Environmental, Cincinnati, Ohio

8:40 a.m.
Keynote Paper—On the Fate of Toxic Pollutants in Sediments—R. N. Yong, McGill University, Montreal, Quebec

9:10 a.m.
Undrained Shear Strength of Boston Harbor Mud with a New Automated Fall Cone Device—D. A. Zreik, J. T. Germaine and C. C. Ladd, M.I.T., Cambridge, Massachusetts, USA

9:30 a.m.
Sediment Characterization Methods and Results at Indiana Harbor—D. M. Petrovski, U.S. EPA-Region 5, Chicago, Illinois, USA

9:50 a.m. BREAK

10:10 a.m.
Contaminant Transport and Hydrodynamic Studies in a Complex River System—P. R. Jacobson, Woodward-Clyde Consultants, Plymouth Meeting, Pennsylvania, USA; and E. H. Owens, Woodward-Clyde Consultants, Seattle, Washington, USA

10:30 a.m.
A Quasi-Steady State Pollutant Flux Methodology for Predicting Risk Reduction—L. J. Thibodeaux, K. T. Valsaraj and D. D. Reible, Louisiana State University, Baton Rouge, Louisiana

10:50 a.m.
Characterization of PCB Contamination in Sediment of Twelvemile Creek and Hartwell Lake Near Clemson, South Carolina—J. B. Cange, R. R. Spurling, Bechtel Environmental, Inc., Oak Ridge, Tennessee, USA; and C. M. Zeller, U.S. EPA Region 4, Atlanta, Georgia, USA

11:10 a.m.
Heavy Metal Distribution in Sediments: pH and REDOX Effects—H. A. B. Potter, R. Galvez-Cloutier and R. N. Yong, McGill University, Montreal, Quebec, Canada

11:30 a.m.
Pyrite Oxidation and Subsequent Formation of Iron Minerals and Sulphuric Acid in Recent Marine Sediments—M. Ohtsubo, Kyushu University, Fukuoka-shi, Japan

11:50 a.m.
Heavy Metal Concentration in Bay Sediments of Japan—M. Fukue, Y. Kato, T. Nakamura, Tokai University, Orido, Shimizu, Japan; and S. Yamazaki, Aoki Marine, Co. Ltd, Fukushima-Ku, Osaka, Japan

12:10 p.m. LUNCH (on your own)

SESSION II: DREDGING, TRANSPORT AND HANDLING

Session Chairman: R. C. Chaney, Humboldt State University, Arcata, California

1:10 p.m.
State of the Art Paper: Removal of Contaminated Sediments—J. B. Herbich, Texas A & M University, College Station, Texas, USA

1:40 p.m.
Dredging of Contaminated Sediments Using Innovative Technologies—J. P. Pelletier et al., Environment Canada, Toronto, Ontario, Canada

2:00 p.m.
Data Requirements for Advancing Techniques to Predict Dredge-Induced Sediment and Contaminant Releases—D. E. Averett and P. A. Zappi, U.S. Army Engineers, Waterways Experiment Station, Vicksburg, Mississippi, USA

TESTING FORUM

2:20 p.m.
Design and Construction of New Dredging and Dredge Material Transport Equipment—J. Berube, Centre Saint-Laurent, Montreal, Quebec, Canada

2:40 p.m.
Development of Solidification Technique of Dredged Sediments—S. Yamazaki, Aoki Marine Co. Ltd, Osaka, Japan; H. Yasuii, San O Co. Ltd, Mukou, Kyoto, Japan; and M. Fukuej, Tokai University, Orido, Shimizu, Japan

3:00 p.m. BREAK

SESSION III: MANAGEMENT STRATEGIES
(with Panel Discussion)

Session Chairman: W. F. Bohlen, University of Connecticut, Storrs, Connecticut, USA

3:20 p.m.
Strategies for Management of Contaminated Sediments—M. R. Palermo, U.S., Army Waterways Experiment Station, Vicksburg, Mississippi, USA

3:40 p.m.
Port Hope Harbor Remedial Action Plan—S. Weston, Environment Canada—Contaminated Sediment Removal Program, Toronto, Ontario, Canada

4:00 p.m.
Critical Analysis on Sediment Quality Criteria and Hazard/Risk Assessment Tools—R. Galvez-Cloutier, R. N. Yong, J. Chan, and E. Bahout, McGill University, Montreal, Quebec, Canada

4:20 p.m.
Regulatory Strategies for Remediation of Contaminated Sediments—H. Zar, U.S. EPA-Region 5, Chicago, Illinois, USA

4:40 p.m.
PANEL DISCUSSION—Sediment Management Strategies—Regulatory Issues and The Role of Standardization—M. Palermo, U.S. Army WES, Vicksburg, Mississippi, USA; S. Weston, Environment Canada, Toronto, Ontario, Canada; R. Galvez-Cloutier, McGill University, Montreal, Quebec, Canada; H. Zar, U.S. EPA-Region 5, Chicago, Illinois, USA

Friday, June 24, 1994

SESSION IV: RESTORATION/REMEDIATION

Session Co-Chairmen: J. P. Pelletier, Environment Canada, Toronto, Ontario, Canada

D. Petrovski, U.S. EPA-Region 5, Chicago, Illinois, USA

8:30 a.m.
Keynote Paper: Promising Treatment Technologies—A Review of the ARCS Program—S. Garbaciak, Jr., R. G. Fox, M. L. Tuchman, D. C. Cowgill, D. Dennis-Flagler, U.S. EPA-Great Lakes, Chicago, Illinois, USA; S. J. Yaksich, U.S. Army Engineer District, Buffalo, New York, USA; D. E. Averett, U.S. Army Waterways Experiment Station, Vicksburg, Mississippi, USA and D. Timberlake, U.S. EPA Risk Reduction Engineering Laboratory, Cincinnati, Ohio, USA

9:00 a.m.
In Situ Treatment of Contaminated Aquatic Sediments—J. Babin, Limnofix, Inc., Mississauga, Ontario, Canada; and T. Murphy, Canada Centre for Inland Waters, Burlington, Ontario, Canada

9:20 a.m.
An Applications Analysis of the MecTool Remediation System for the Lachine Canal Project—R. H. Kappler, Millgard Environmental Corp., Livonia, Michigan, Canada; and D. Z. Maat, Groundwater Technology Canada Ltd, Mississauga, Ontario, Canada

9:40 a.m.
In-Situ Bioremediation of Contaminated Sediments—J. T. Olsta, Environmental Planning Group, Inc., Barrington, Illinois; and B. Malherbe, HAECON, N.V., Gent-Drongen, Belgium

10:00 a.m. BREAK

10:20 a.m.
Feasibility Study Results for Remediation of PCB Contaminated Fish and Sediments in Hartwell Lake—R. R. Spurling, J. B. Cange and C. M. Zeller, Bechtel Environmental, Inc., Oak Ridge, Tennessee, USA

10:40 a.m.
Biostimulant Pellets for In-Situ Bioremediation of PCB Contaminated Sediments—J. K. Park, M. Hollifield and W. C. Boyle, University of Wisconsin, Madison, Wisconsin, USA

11:00 a.m.
Remediation of Contaminated Sediments in a River Environment—P. R. Jacobson and J. J. Mazza, Woodward-Clyde Consultants, Plymouth Meeting, Pennsylvania, USA

11:20 a.m.
Contaminated Sediment Remediation Research at the U.S. Bureau of Mines—J. P. Allen, I. G. Torres and M. V. Hoffman, U.S. Bureau of Mines, Salt Lake City, Utah, USA

11:40 a.m.
New In Situ Procedures for Measuring Trace Metals in Pore Waters—W. Davison and H. Zhang, Lancaster University, Lancaster, UK

12:00 Noon LUNCH (on your own)

1:00 p.m.
In Situ Bioremediation of Contaminated Sediments Through Dredging—J. Paquin, Sanexen Environmental Services, Inc., Longueuil, Province of Quebec, Canada; P. Beaudry, Huntsman Chemical Company, Inc., Canada; Y. Lefebvre, Ministry of Environment of Quebec, Province of Quebec, Canada; and J.-R. Michaud, Environment-Canada, Canada

SESSION V: CONTAINMENT AND ISOLATION

Session Chairman: P. Selvadurai, McGill University, Montreal, Quebec, Canada

1:20 p.m.
State of the Art—Pathway Control Utilizing Containment Structures—G. N. Richardson, Harding Lawson Assoc, Seattle, Washington, USA; D. M. Petrovski, U.S. EPA-Region 5, Chicago, Illinois, USA; R. C. Chaney, Humboldt State University, Arcata, California, USA and K. R. Demars, University of Connecticut, Storrs, Connecticut, USA

1:50 p.m.
Elimination of Coal Tar Seepage into Surface Waters Using Interlocking Sheet Piles—M. D. Boscardin, R. F. Murdock and B. I. Collingwood, GEI Consultants, Inc., Winchester, Massachusetts, USA

2:10 p.m.
Modelling of Air Emissions from Contaminated Dredged Materials—K. T. Valsaraj, L. J. Thibodeaux and D. D. Reible, Louisiana State University, Baton Rouge, Louisiana, USA

2:30 p.m.
Soil-Bentonite Design Mix for Slurry Cutoff Walls used as Containment Barriers—N. S. Rad and R. C. Bachus, GeoSyntec Consultants, Atlanta, Georgia, USA

2:50 p.m. BREAK

3:10 p.m.
The Construction of a Plastic Hydraulic Barrier using a Cement-Bentonite Mix—J. H. Deschenes, Geoconseil, Montreal, Quebec, Canada; M. Massiera, University of Moncton, Moncton, New-Brunswick, Canada; and J. P. Tournier, James Bay Corporation, Montreal, Quebec, Canada

3:30 p.m.
Long-Term Behavior of Vertical Cut-Off Walls—Laboratory and In situ Tests—H. L. Jessberger, M. Geil and K. Kruse, Jessberger and Partners, Bochum, Germany

3:50 p.m.
Mercury Sediment Disposal Work in Minimata Bay—K. Yoshinaga, H. Sato, T. Tokube and E. Umeda, Kumamoto Port Construction Office, Kumamoto, Japan

4:10 p.m.
New Developments in Slurry Wall Construction for the Remediation of Contaminated Sites—R. Hollenweger and L. Martinenghi, Swiss Federal Institute of Technology, Zurich, Switzerland

4:30 p.m.
Closing Remarks—R. Yong, Symposium Chairman

Additional Information for Authors

The *Geotechnical Testing Journal* (GTJ) is a quarterly publication sponsored by ASTM technical committee D-18 on Soil and Rock, with support from D-35 on Geosynthetics, D-4 on Road and Paving Materials, and D-34 on Waste Management. Each published paper and technical note has been peer-reviewed. Papers and technical notes are open to brief written comments in the Discussion section of the Journal, which also includes authors' written responses.

The Technical Editor may consider a paper submitted to the Journal as a Technical Note if: it gives a reasonably brief description of ongoing studies with or without providing interim, tentative data, and/or conclusions; it reports phenomena observed in the course of research requiring further study; it provides mathematical procedures for facilitating reduction and analysis of data; or it reports promising new materials prior to undertaking extensive research to determine their properties.

The decision as to whether a manuscript is published as a paper or a technical note resides with the Technical Editor.

The guidelines below describe our manuscript selection, peer review, revision, and publication processes. Following these guidelines will ensure expeditious handling of submitted material.

Submission

The name, mailing address, position, affiliation, and telephone and fax number of each author must be supplied in a cover letter. The submitting author is to provide the names, affiliations, addresses, and telephone numbers of five to six individuals who are qualified to review impartially the paper and the research leading to it, and who are not employed at the same institution or company as any of the authors. While these names may or may not be used for the review, we will add them to our pool of potential reviewers. Also, a statement is to be included that the paper has not been published and is not under consideration for publication elsewhere. All permissions for previously published material used in the paper must be submitted in writing at this time.

The submitting author must also affirm that all those listed as co-authors have agreed (a) to be listed and (b) to submit the manuscript to ASTM for publication.

Five copies of the manuscript with clear copies of each figure are required. Original art work and computer disks should accompany the final revision.

Manuscript Instructions*

Word Processing Instructions

The hard-copy text can be produced on any letter-quality printer. Text is to be printed double-spaced with left and right margins of 1 in. (25.4 mm) using left justification. New paragraphs are to be indented five spaces, and end-of-line returns are not to be used.

The *revised* manuscript is to be sent on a $5^1/_4$ in. (133 mm) or $3^1/_2$ in. (89 mm) disk preferably in WordPerfect 5.1, with the corresponding hard copies. ASTM can convert from other word-processing packages as well.

Abstract and Keywords

An abstract of 100–150 words and a list of 5–10 keywords that can be used to index the manuscript are required.

Trademarks

Commercialism is to be avoided by using generic terms whenever possible. Trademarks and trade names are to be capitalized if their use is unavoidable.

SI Units

Society policy requires the use of SI units in all publications (including figures and tables). If in.-lb. units must be used to describe materials and present test results, SI equivalents must follow in parentheses (See ASTM Standard for Metric Practice E380 for further information on SI units.)

Figures

Each figure is to be simple and uncluttered. All illustrations are to be placed together at the end of the manuscript with a separate sheet of figure captions. Consecutive Arabic (not Roman) numerals are required. The size of type in illustrations must be large enough to be legible after reduction. All lettering, lines, symbols, and other marks must be drawn in black India ink on white paper. Computer graphics must be produced by a laser printer. Photographs must be high-contrast black and white. SCALE MARKERS MUST BE SHOWN ON ALL PHOTOMICROGRAPHS AND ALL FIGURES THAT ARE REPRESENTATIONS OF EQUIPMENT OR SPECIMENS.

Tables

All tables are to be placed together at the end of the manuscript preceding the illustrations. Tables are to be numbered in Arabic and are cited in numerical order in the text. It is better to use several small simple tables than one large, complex table.

References

References shall be cited in the text by author's last name and date of publication. References shall be listed together at the end of the text in alphabetical order by author's last name. They must contain enough information to allow a reader to consult the cited material with reasonable effort.

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