Geotechnical
Environmental and
Water Resources
Engineering

GEI Consultants

Transfer of Fugro RCTS Report for Natural Soils
Transmittal Letter No. 3

July 10, 2008
Project 07223

Mr. Frank X. Bellini
Field Project Manager
AREVA NP, INC.
Solomon Pond Park
400 Donald Lynch Boulevard
Marlborough, MA 01752

Dear Mr. Bellini:

Re: Transmittal No. 3 – Resonant Column Cyclic Torsional Shear Tests (RCTS) Report for Natural Soils
Nine Mile Point Site Characterization
Oswego, New York

The purpose of this letter is to document GEI Consultants, Inc.'s transmittal (via hardcopy and your ftp site) of the Fugro RCTS Test Report for Natural Soils dated July 9, 2008. This document has been reviewed and revised under the guidance of Larry Peterson for AREVA and Herb Scribner for GEI. This Transmittal is being prepared according to the AREVA NP, INC. Purchase Order and Scope of Work provided in our proposal dated July 6, 2007, which is the basis of our current contract with AREVA.

Documents

This Letter of Transmittal No. 3 transfers Fugro RCTS Tests Report for Natural Soils dated July 9, 2008 for the Nine Mile Point Site Characterization Project; it includes one RCTS test and report.

1. **Resonant Column Cyclic Torsional Shear Tests (RCTS) Report for Natural Soils.**

All test samples were managed and tested in accordance with the following AREVA-approved procedures:

- 38-9058206-004: GEI Procedure 124 R4 - Transportation and Tracking of Soil and Rock Samples.
- 38-9080235-000: GEI Procedure 109 - Resonant Column Cyclic Torsional Shear CCyTS).
- 38-9065537-001: GEI Procedure 101 R1- Water Content Measurement.

Prior to testing, all Fugro personnel involved in the work were trained to the procedures.

Please call me, Tom Kahl or Robert Lambe if you have questions regarding this Transmittal Letter.

Sincerely,

GEI CONSULTANTS, INC.

Herbert C. Scribner
QA Manager

HCS/bdp

FUGRO CONSULTANTS, INC.

6100 Hillcroft (77081)
P.O. Box 740010
Houston, Texas 77274
Tel: 713-369-5400
Fax: 713-369-5518

July 8, 2008

Mr. Thomas W. Kahl
Senior Vice President
GEI Consultants, Inc.
400 Unicorn Park Drive
Woburn, MA 01801

Dear Mr. Kahl:

RE: Letter of Transmittal
Resonant Column Cyclic Torsional Shear Tests
Natural Samples
Nine Mile Point Unit 3
Oswego, New York

Test Results Summary

Fugro performed two RCTS tests on remolded specimens of natural samples provided by GEI Consultants, Inc. The **final** reports of the tests along with Dr. Kenneth Stokoe's approval sheet are presented in Attachment A.

Test Procedures

All test samples were managed and tested in accordance with the following AREVA-approved procedures:

- 38-9058206-004: GEI Procedure 124 R4- Transportation and Tracking of Soil and Rock Samples
- 38-9080235-000: GEI Procedure 109- Resonant Column Cyclic Torsional Shear (RCCyTS)
- 38-9065537-001: GEI Procedure 101 R1- Water Content Measurement

Prior to testing, all Fugro personnel involved in the work were trained to the procedures.

Test Documents

Copies of completed test forms related to the testing required by the above-referenced procedures are contained in Attachment B.

Please call me at if you have any questions.

Sincerely,

Jiewu Meng, PhD, P.E.
Project Engineer

Bill DeGroff, P.E.
Laboratory Department Manager

Enclosure(s)

ATTACHMENT A

FUGRO #0411-08-1696

RCTS TEST APROVAL

PROJECT SITE/NAME	Nine-Mile Point

Test ID	Sample ID	Depth B.S. (Ft)	Approved By (Initials)	Date
RCTS#C	Natural-1	---	KHS	4 July '08
RCTS#D	Natural-2	---	KHS	4 July '08

Two RCTS tests for the site referenced above were tested, and two reports were prepared, by Fugro Consultants, Inc.

I have reviewed the data and associated results listed above and found them to be reasonable.

Approved By:

K. H. Stokoe

Dr. Kenneth Stokoe

APPENDIX C

Specimen NATURAL

Borehole ---NA
Sample ---1
Depth = --- ft (--- m)
Total Unit Weight = 124.3 lb/ft^3
Water Content = 7.5 %
Estimated In-Situ Mean Effective
Stress = 13 psi

FUGRO JOB #: 0411-08-1696
Testing Station: RC7

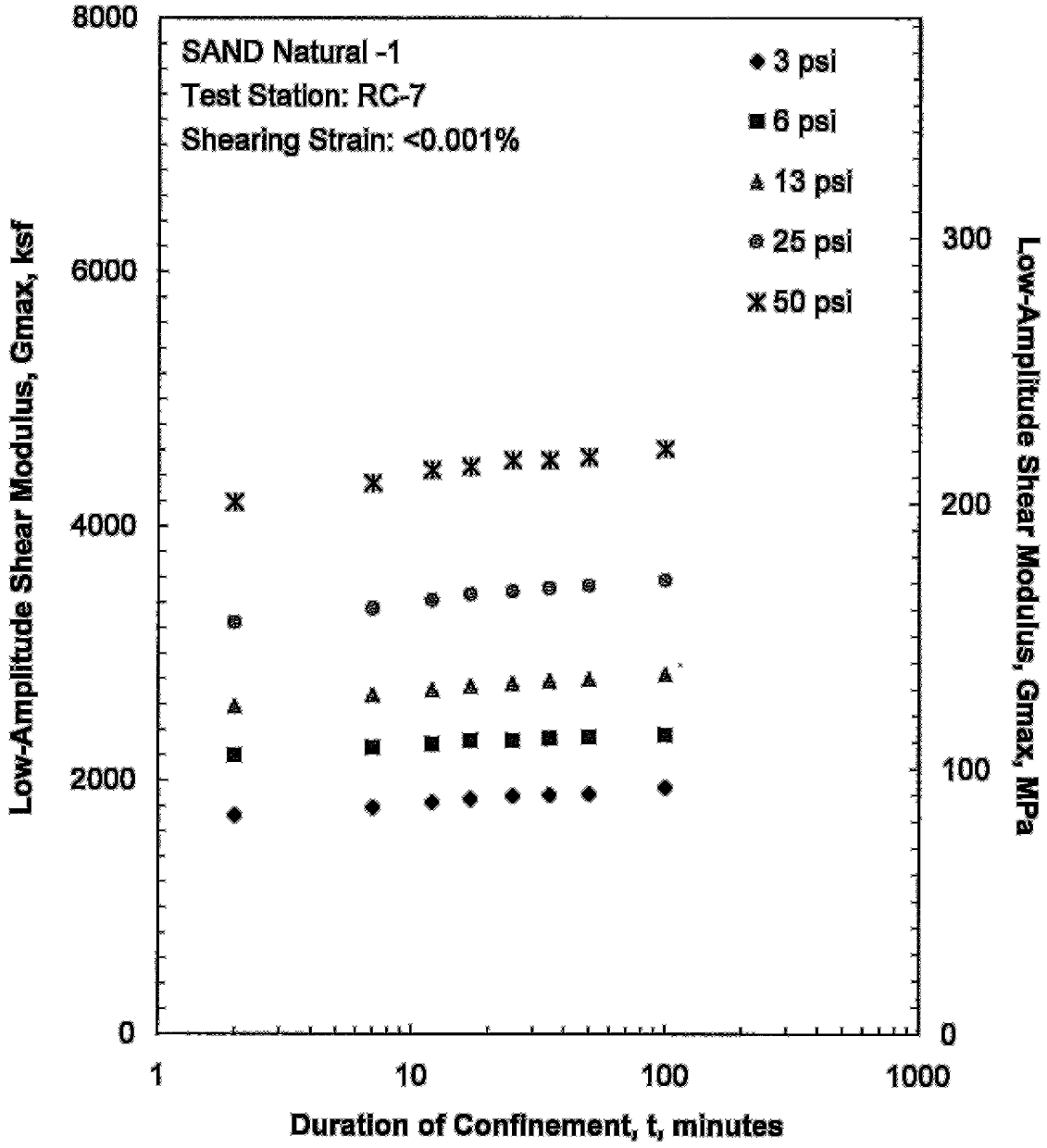

Figure C.1 Variation in Low-Amplitude Shear Modulus with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

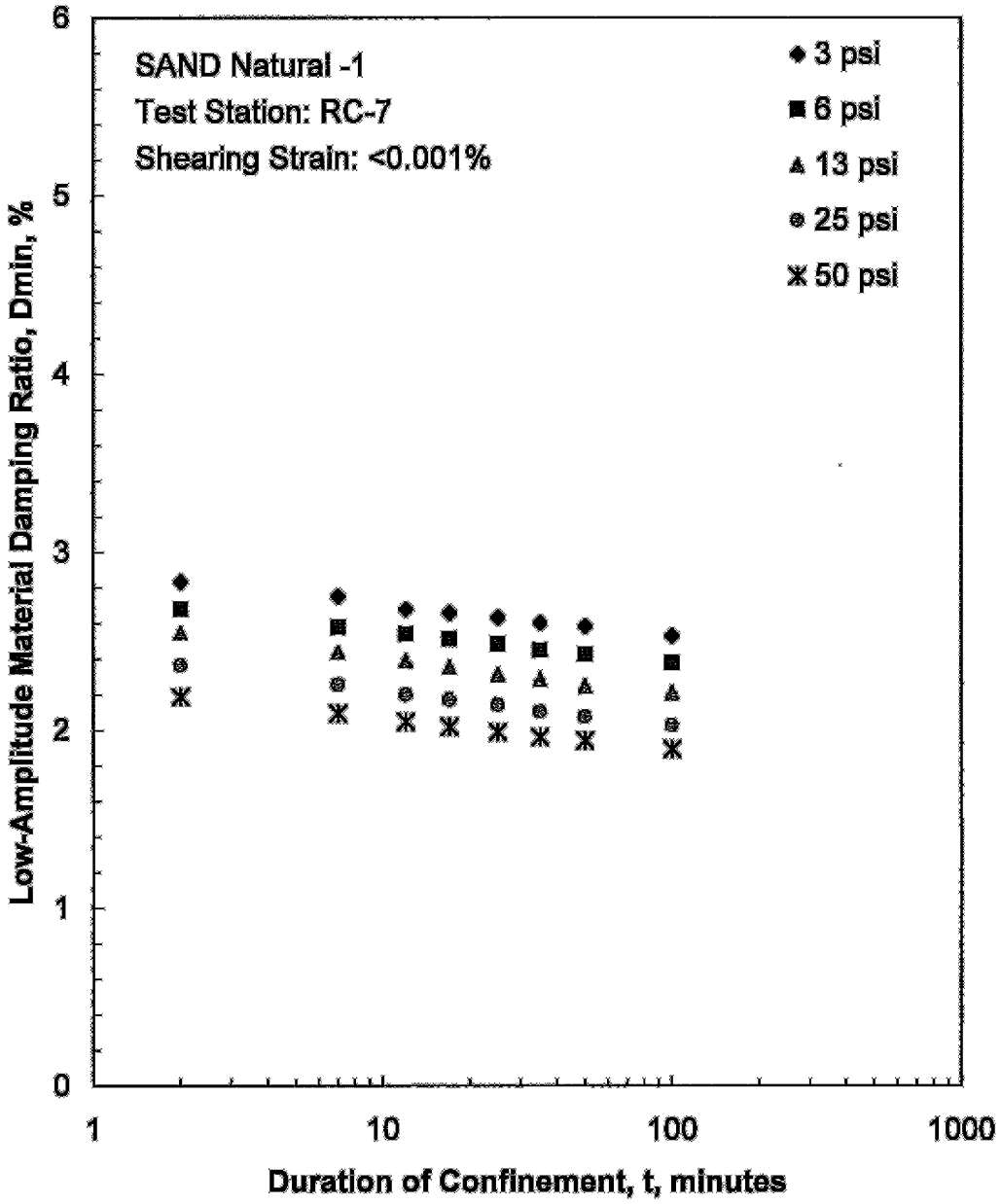

Figure C.2 Variation in Low-Amplitude Material Damping Ratio with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

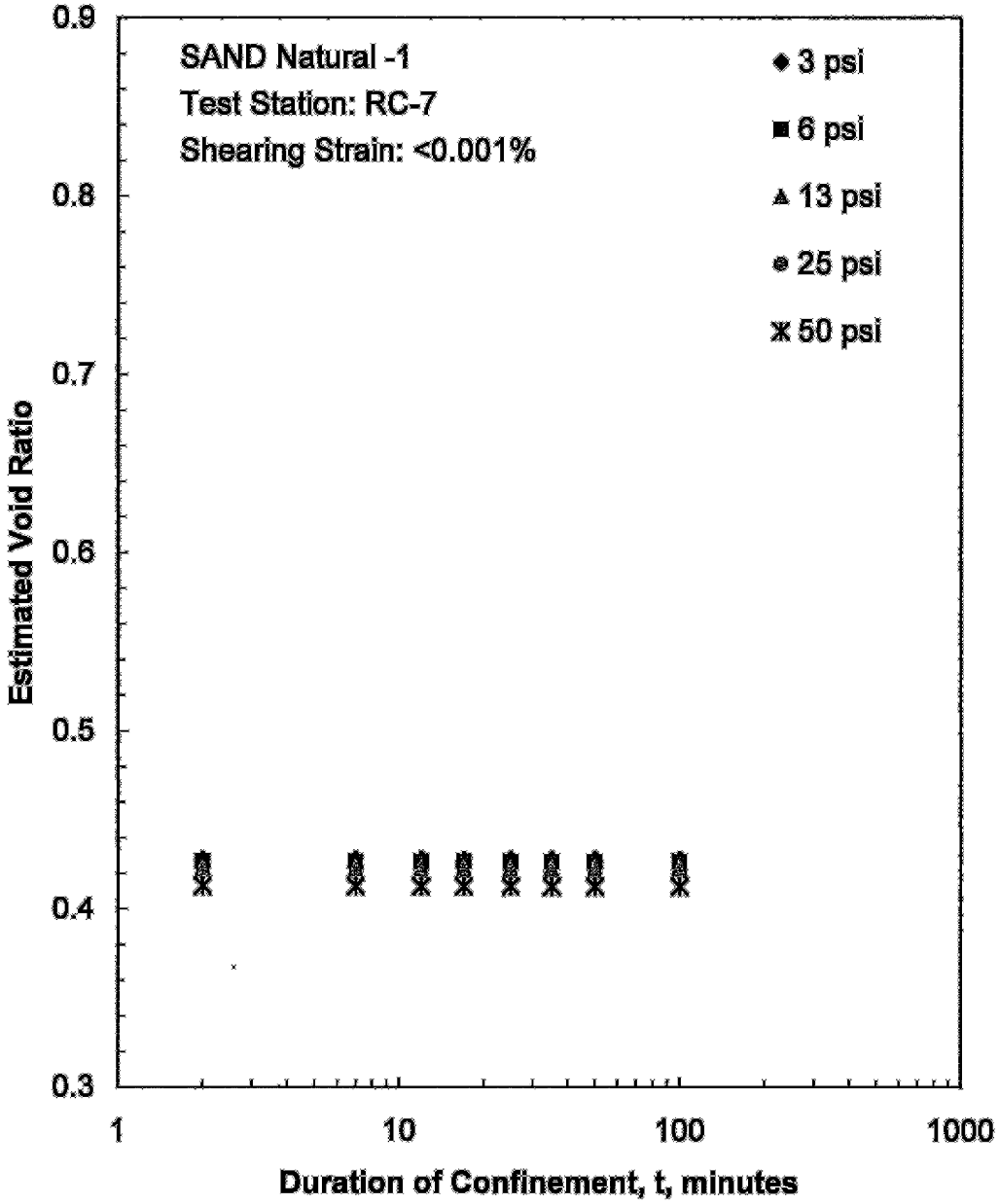

Figure C.3 Variation in Estimated Void Ratio with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

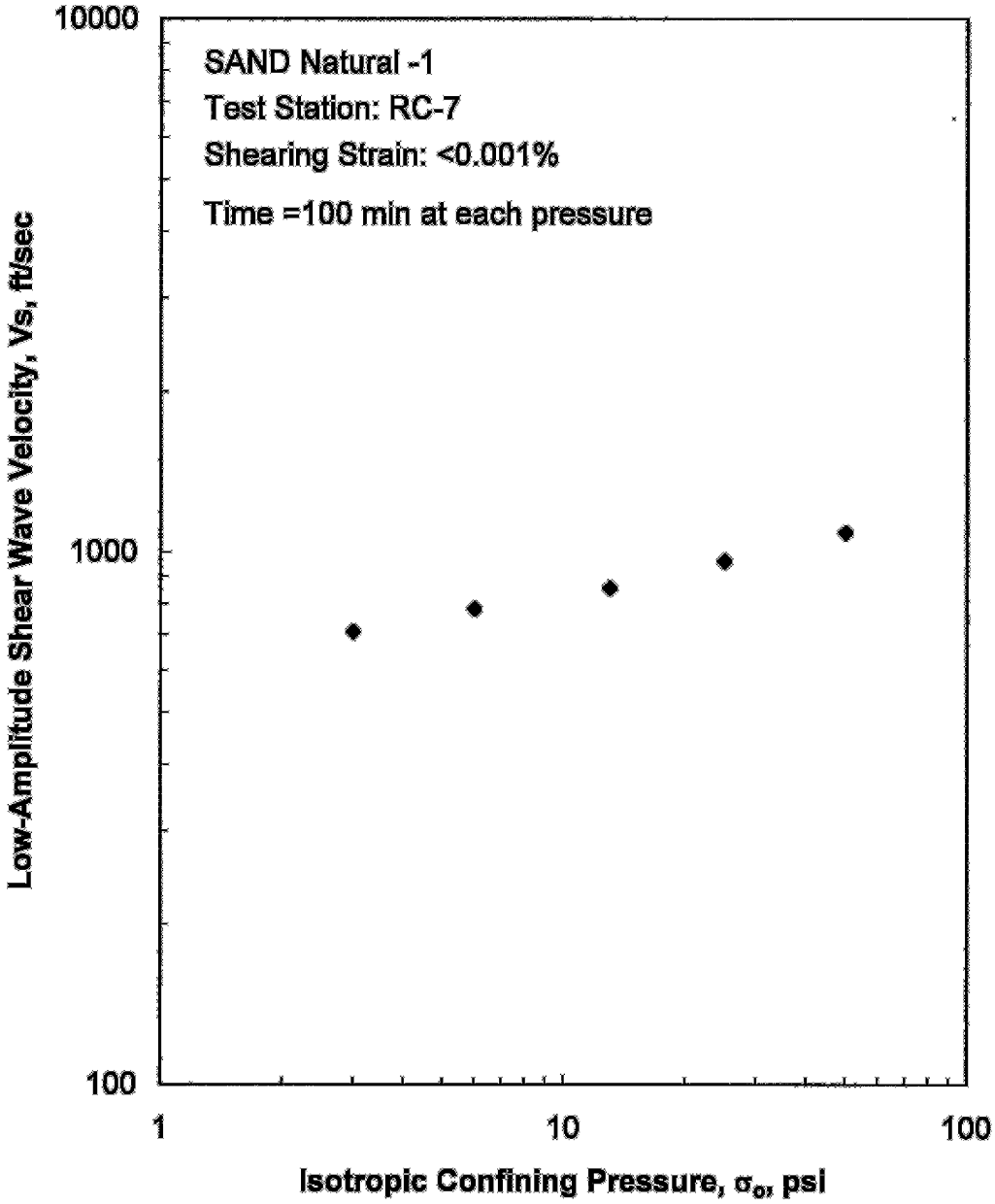

Figure C.4 Variation in Low-Amplitude Shear Wave Velocity with Isotropic Confining Pressure from Resonant Column Tests

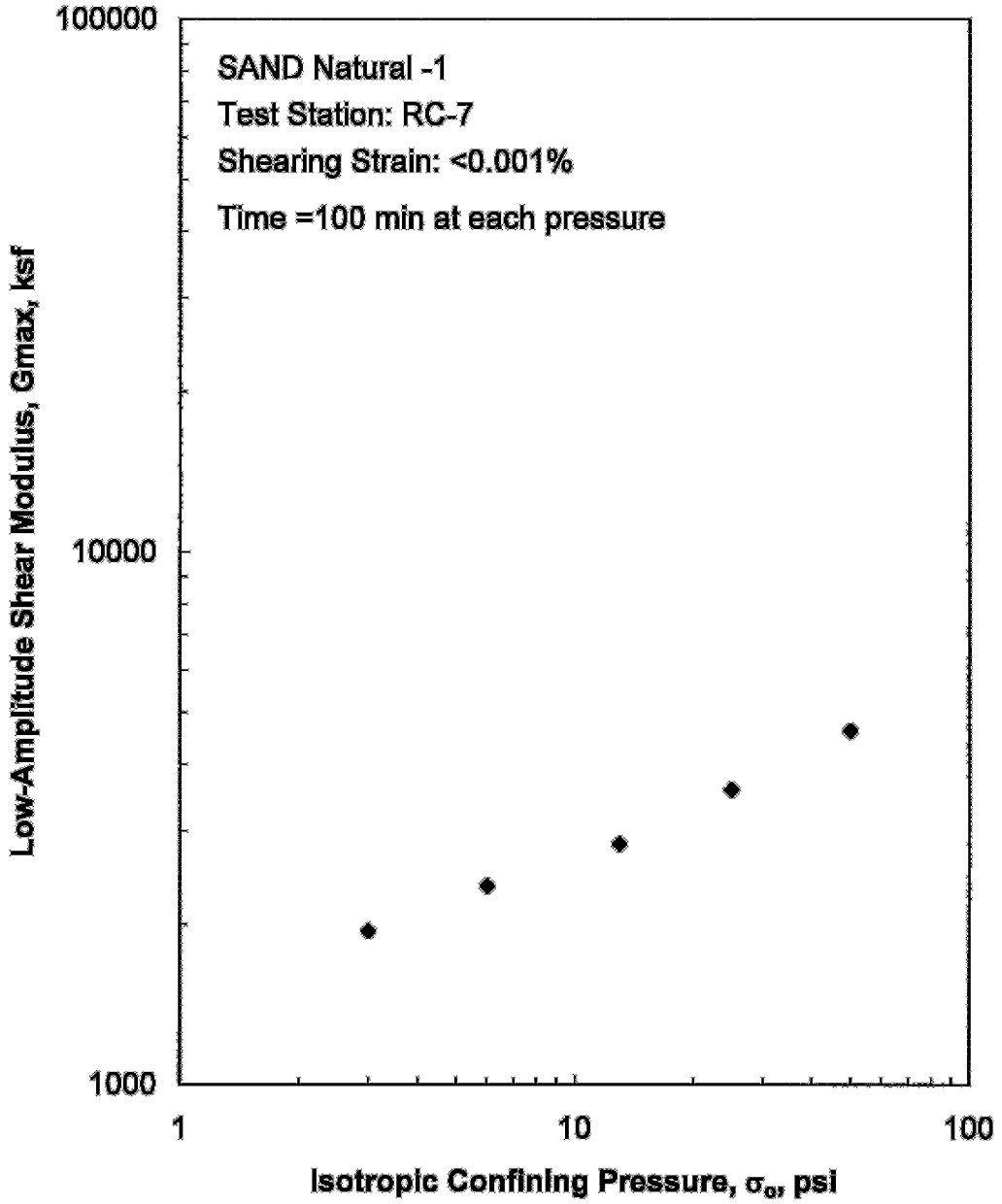

Figure C.5 Variation in Low-Amplitude Shear Modulus with Isotropic Confining Pressure from Resonant Column Tests

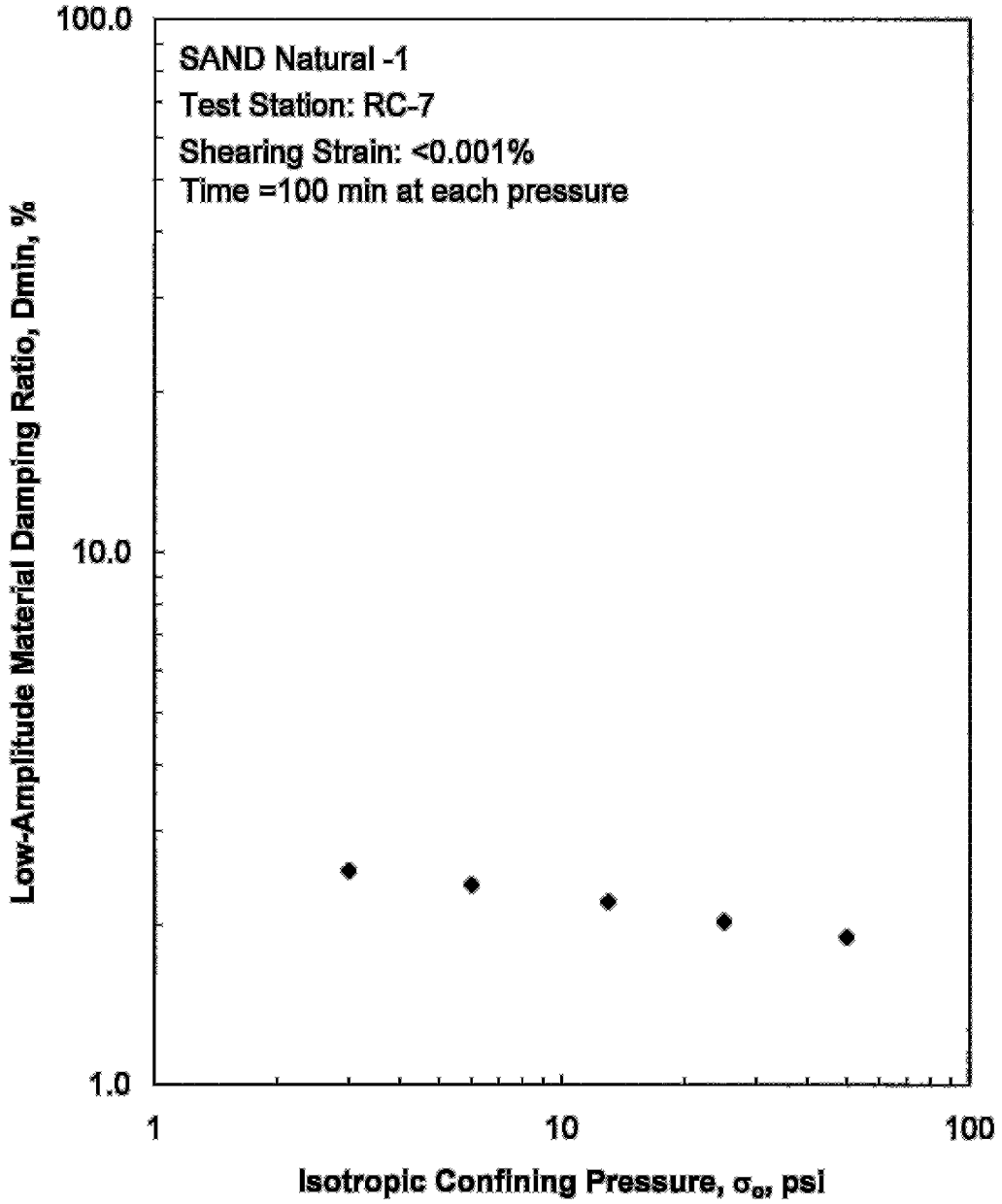

Figure C.6 Variation in Low-Amplitude Material Damping Ratio with Isotropic Confining Pressure from Resonant Column Tests

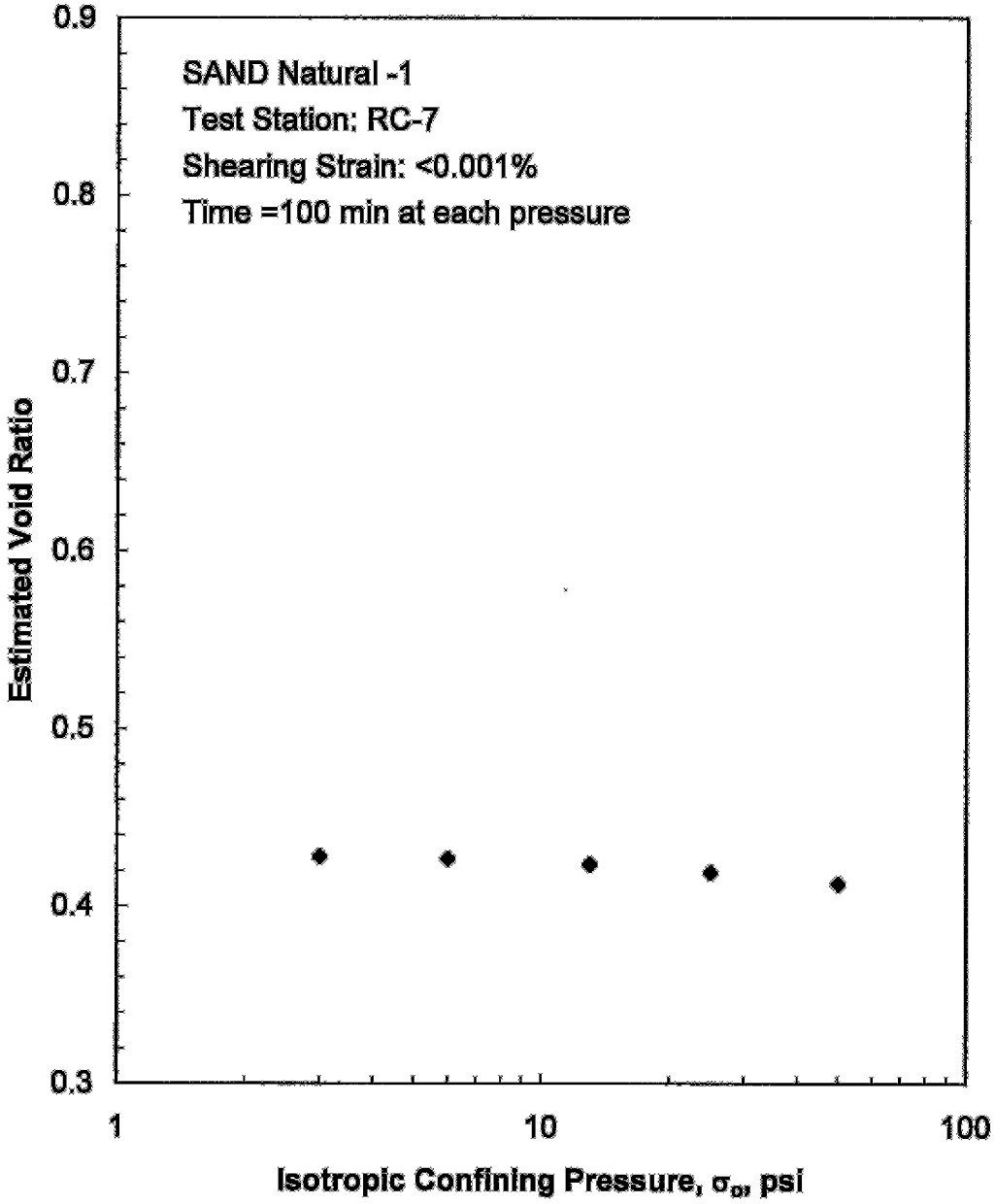

Figure C.7 Variation in Estimated Void Ratio with Isotropic Confining Pressure from Resonant Column Tests

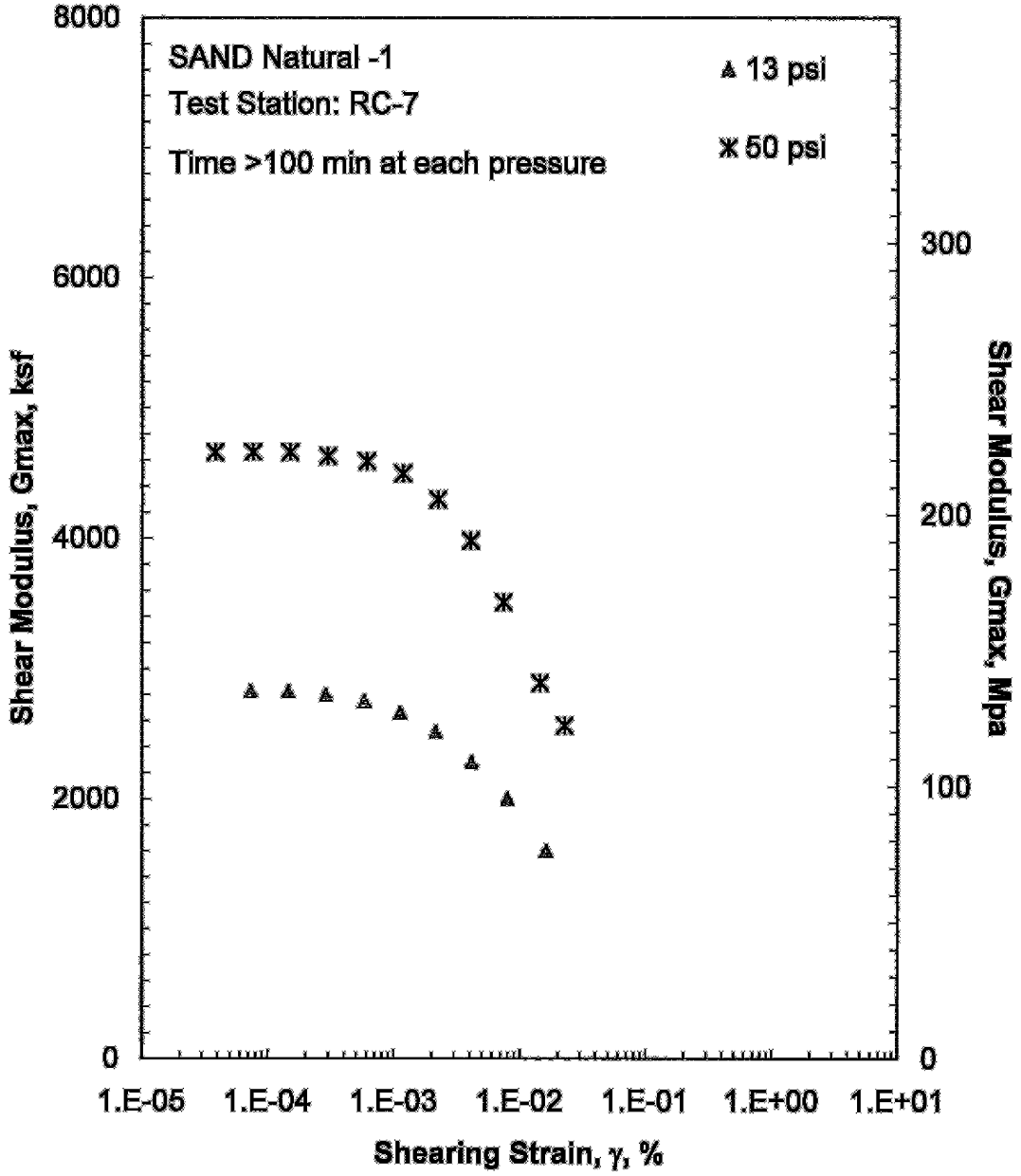

Figure C.8 Comparison of the Variation in Shear Modulus with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

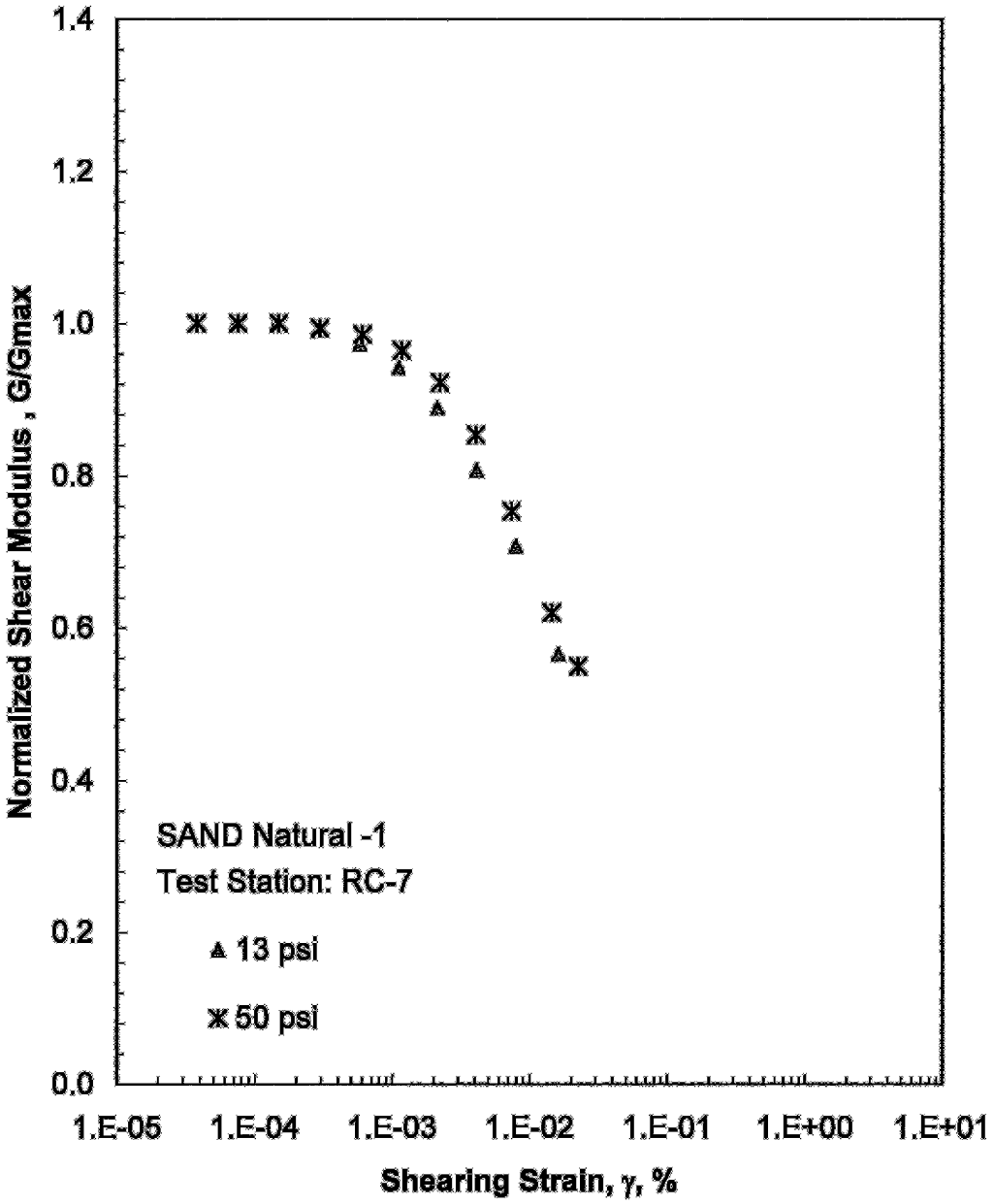

Figure C.9 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

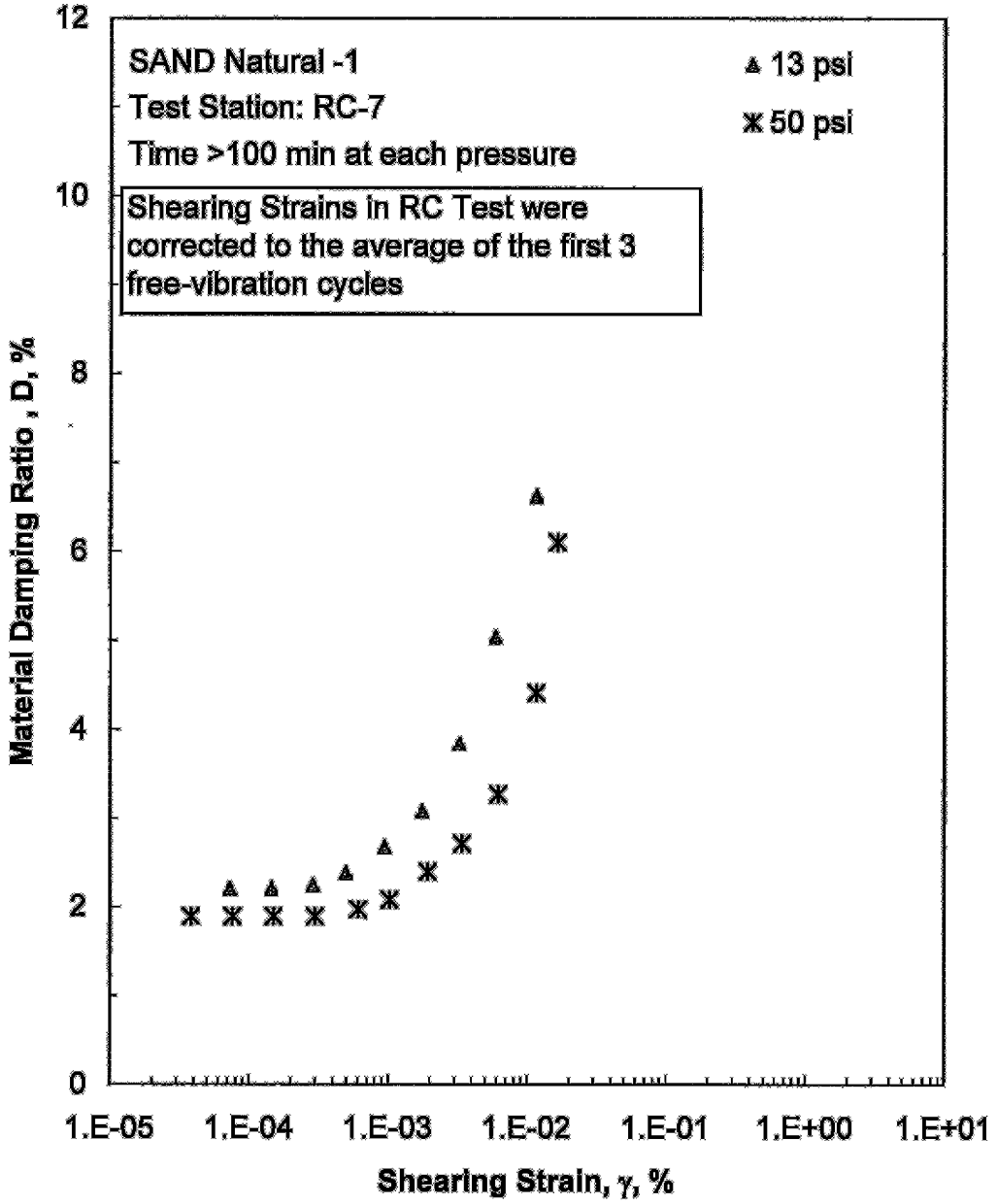

Figure C.10 Comparison of the Variation in Material Damping Ratio with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

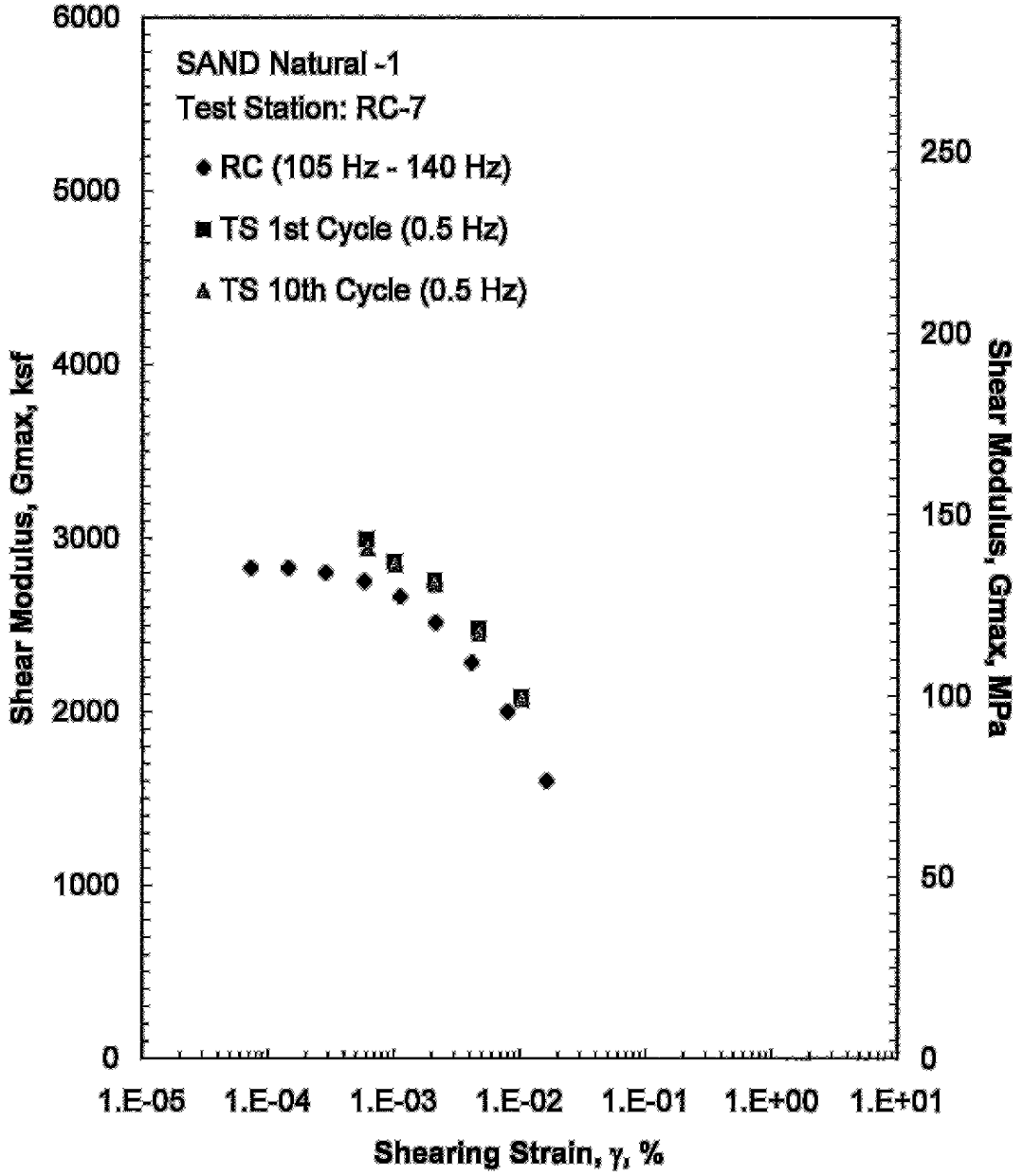

Figure C.11 Comparison of the Variation in Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 13 psi from the Combined RCTS Tests

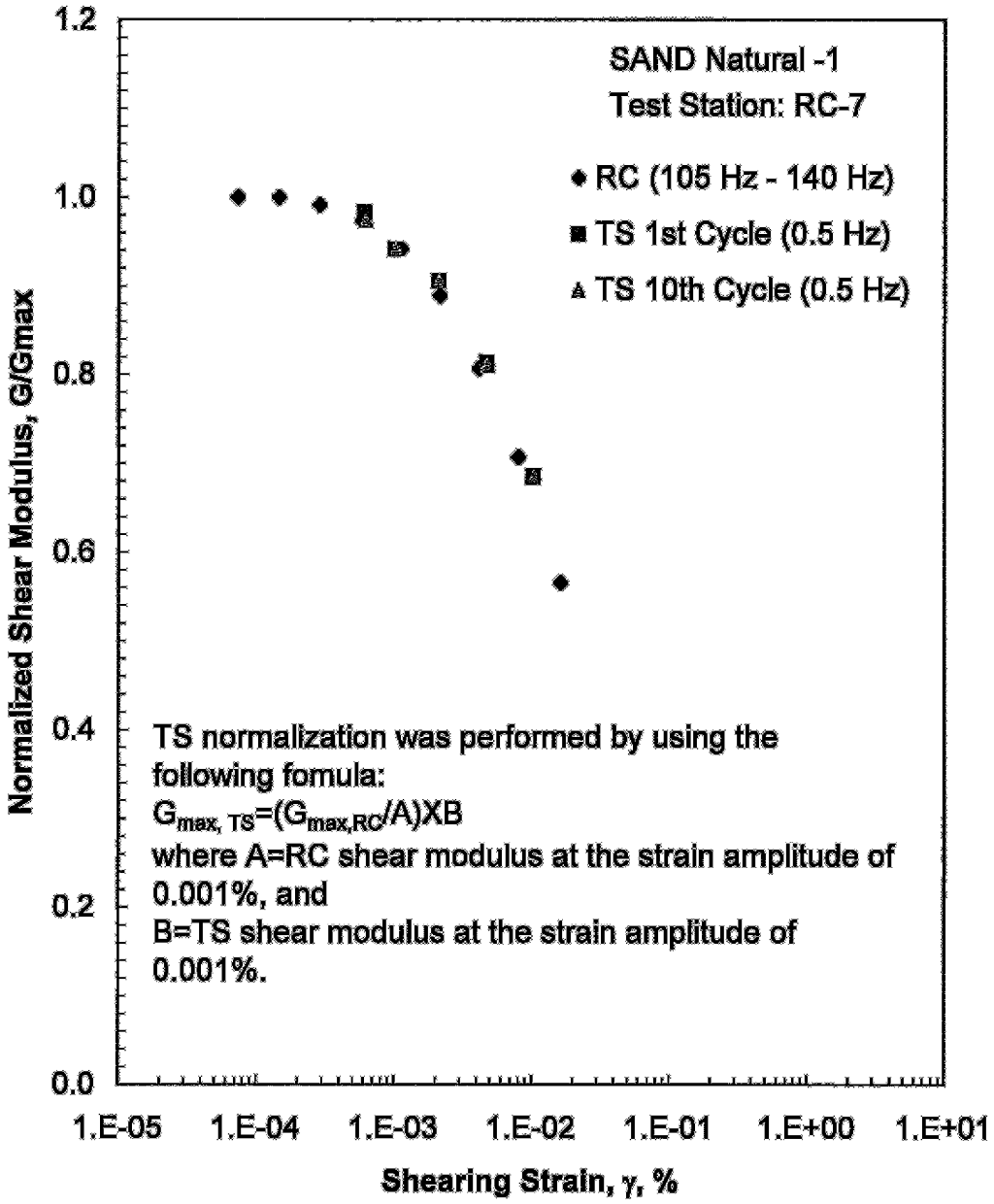

Figure C.12 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 13 psi from the Combined RCTS Tests

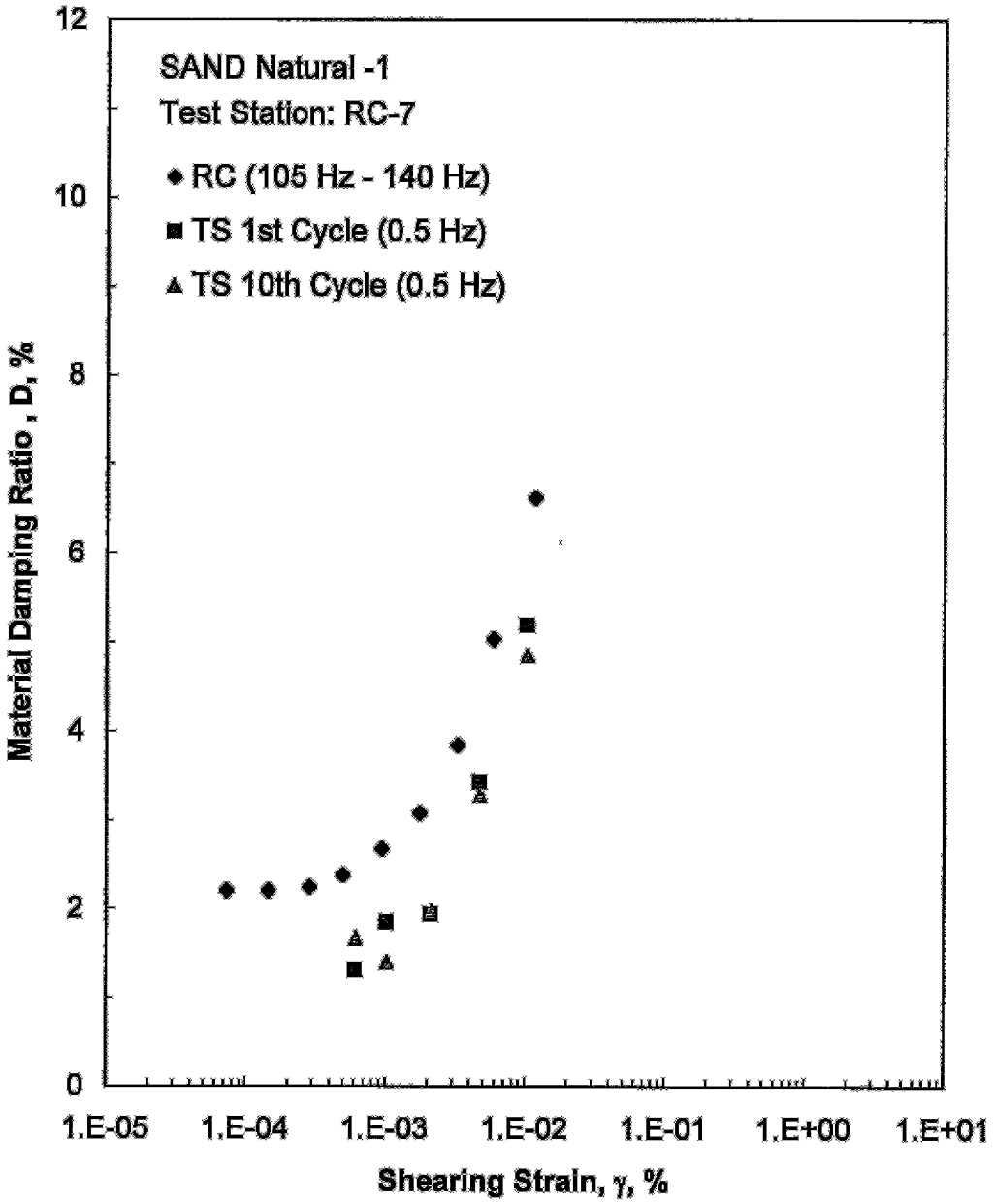

Figure C.13 Comparison of the Variation in Material Damping Ratio with Shearing Strain at an Isotropic Confining Pressure of 13 psi from the Combined RCTS Tests

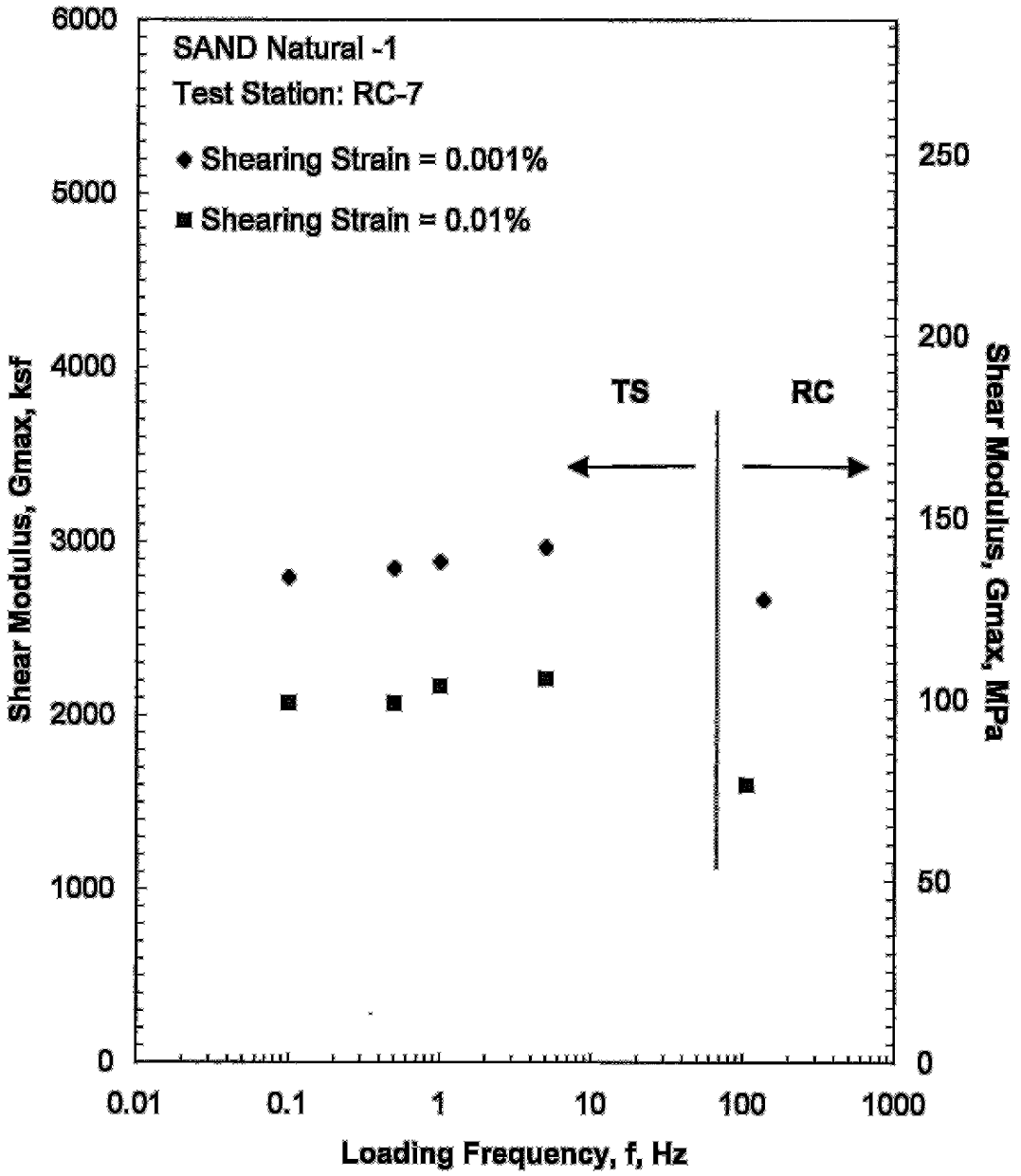

Figure C.14 Comparison of the Variation in Shear Modulus with Loading Frequency at an Isotropic Confining Pressure of 13 psi from the Combined RCTS Tests

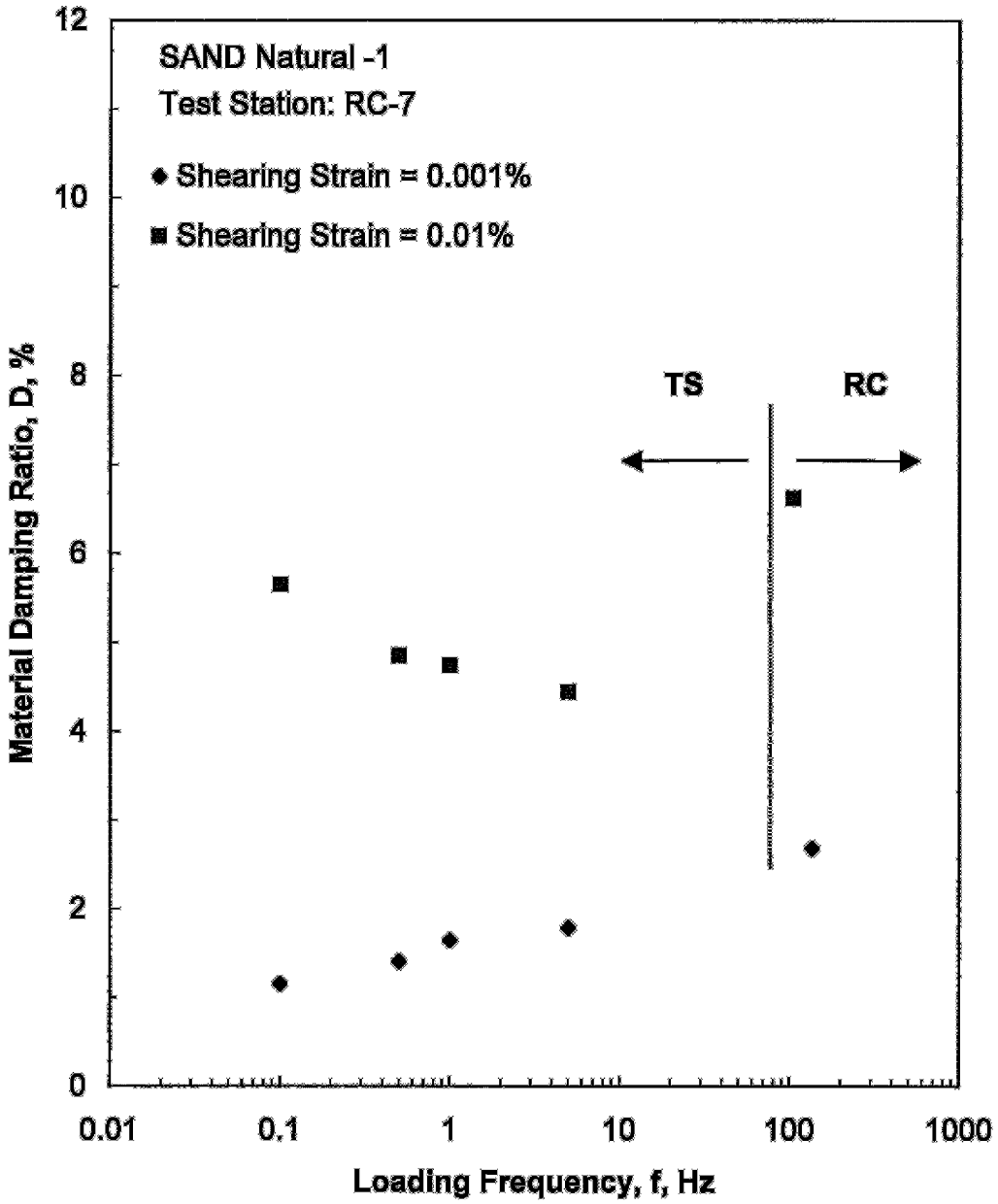

Figure C.15 Comparison of the Variation in Material Damping Ratio with Loading Frequency at an Isotropic Confining Pressure of 13 psi from the Combined RCTS Tests

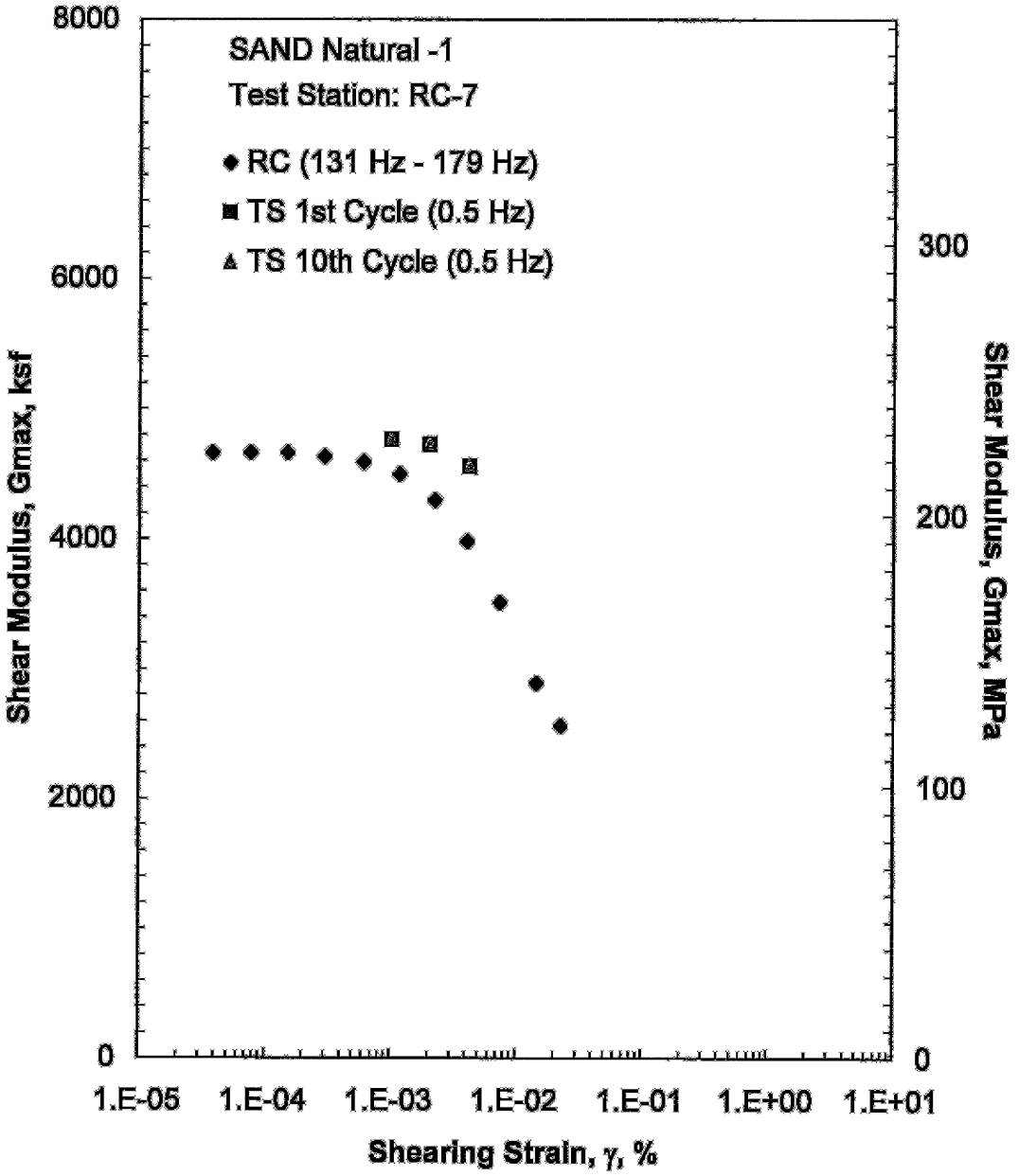

Figure C.16 Comparison of the Variation in Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 50 psi from the Combined RCTS Tests

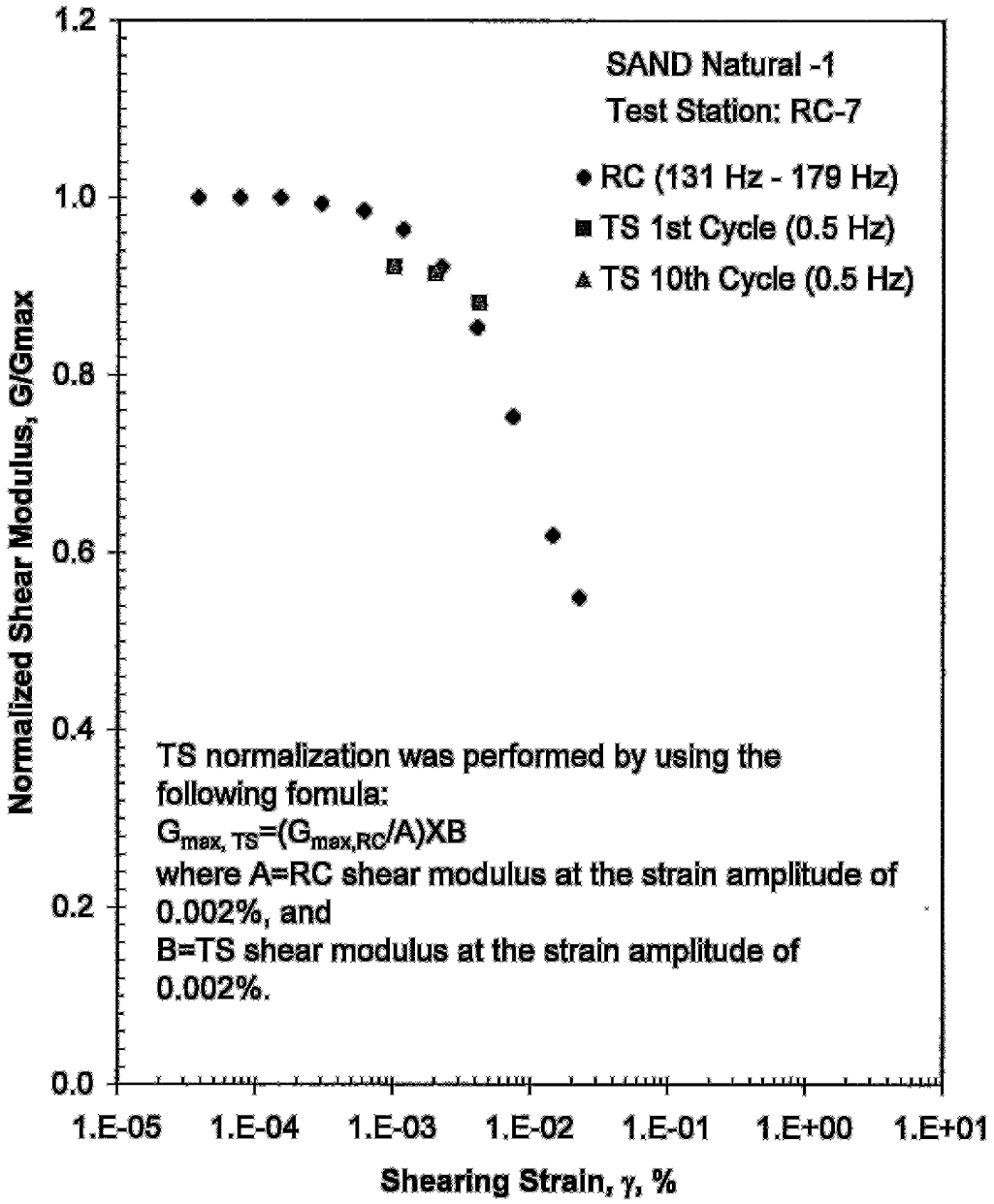

Figure C.17 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 50 psi from the Combined RCTS Tests

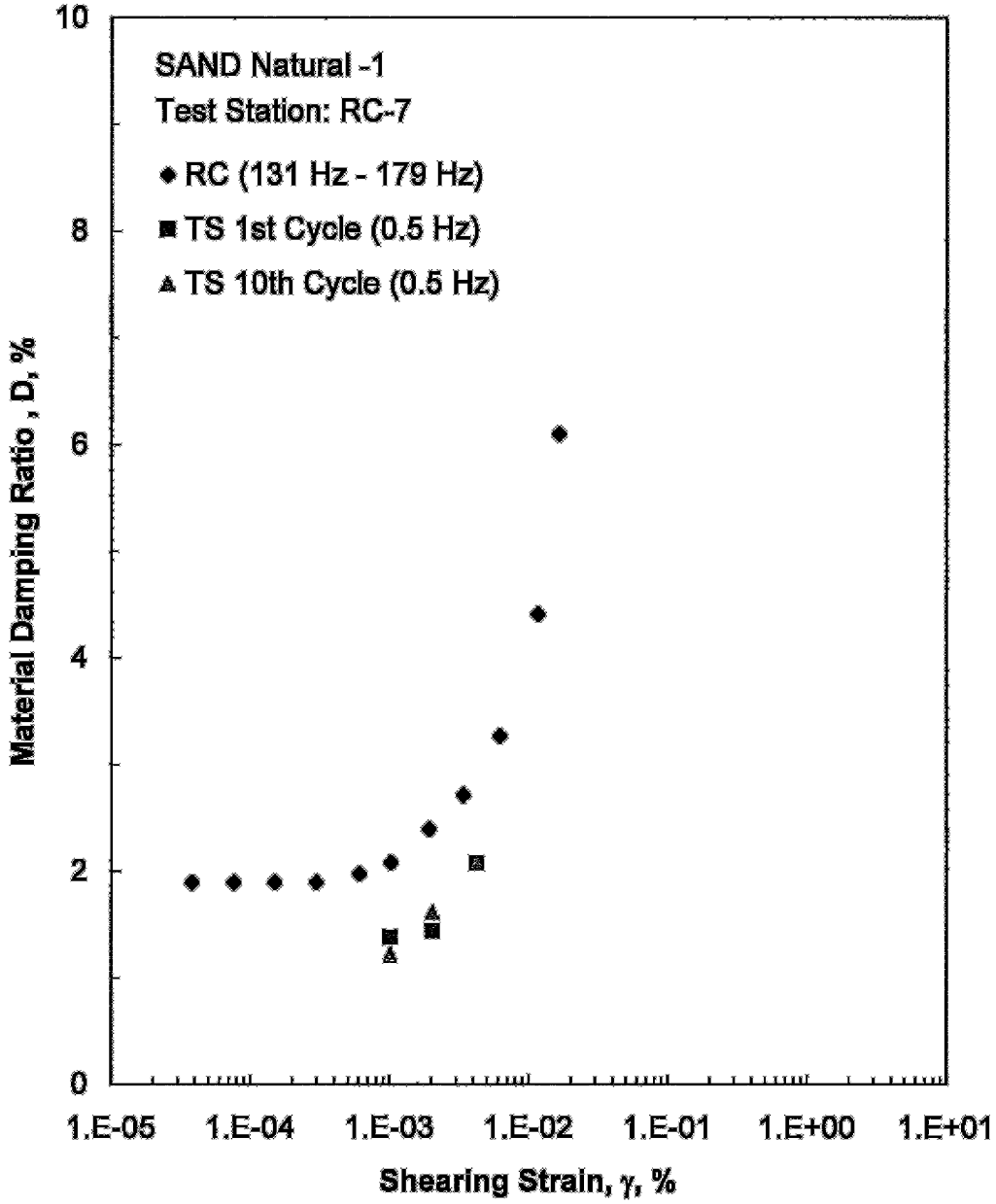

Figure C.18 Comparison of the Variation in Material Damping Ratio with Shearing Strain at an Isotropic Confining Pressure of 50 psi from the Combined RCTS Tests

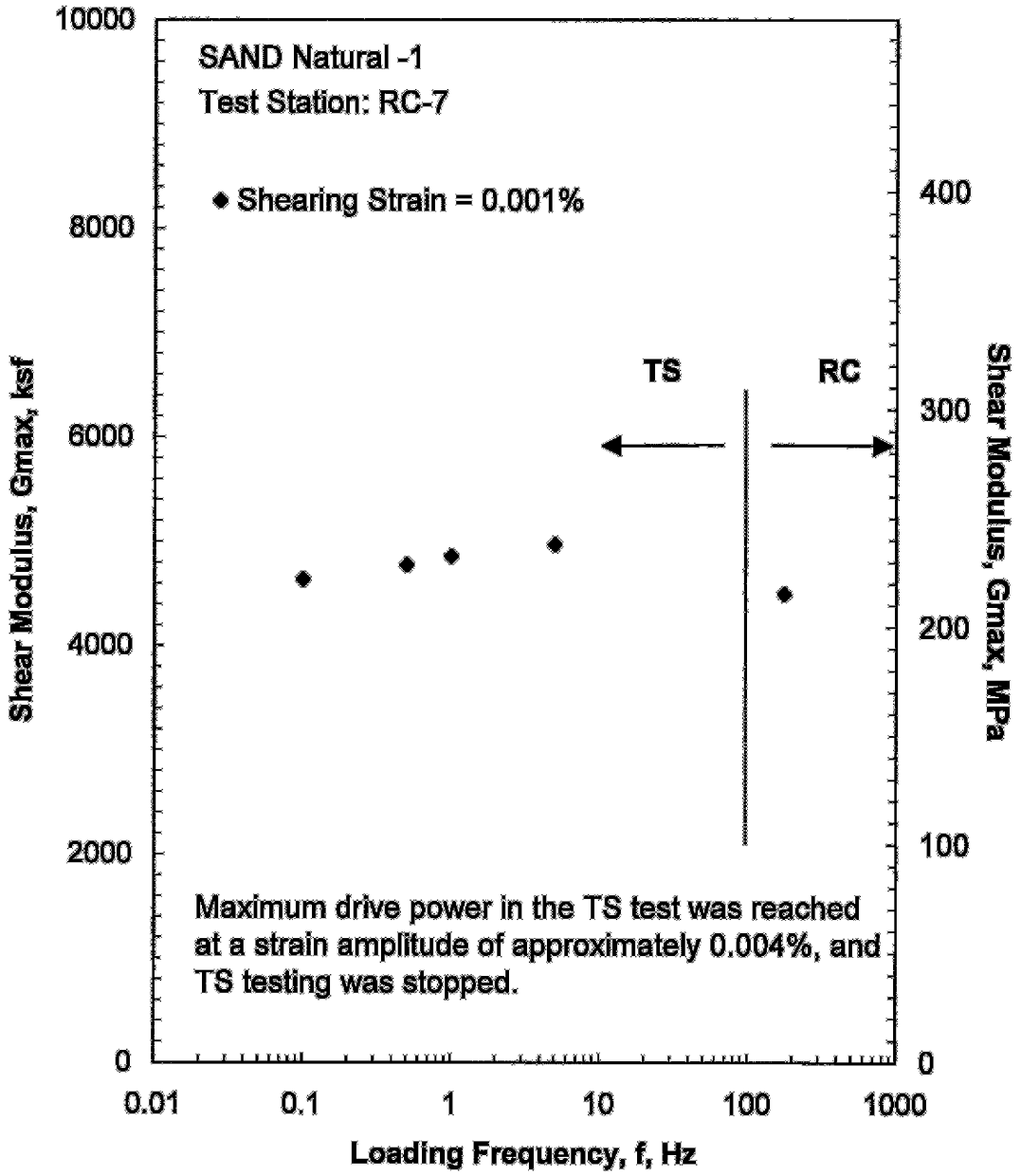

Figure C.19 Comparison of the Variation in Shear Modulus with Loading Frequency at an Isotropic Confining Pressure of 50 psi from the Combined RCTS Tests

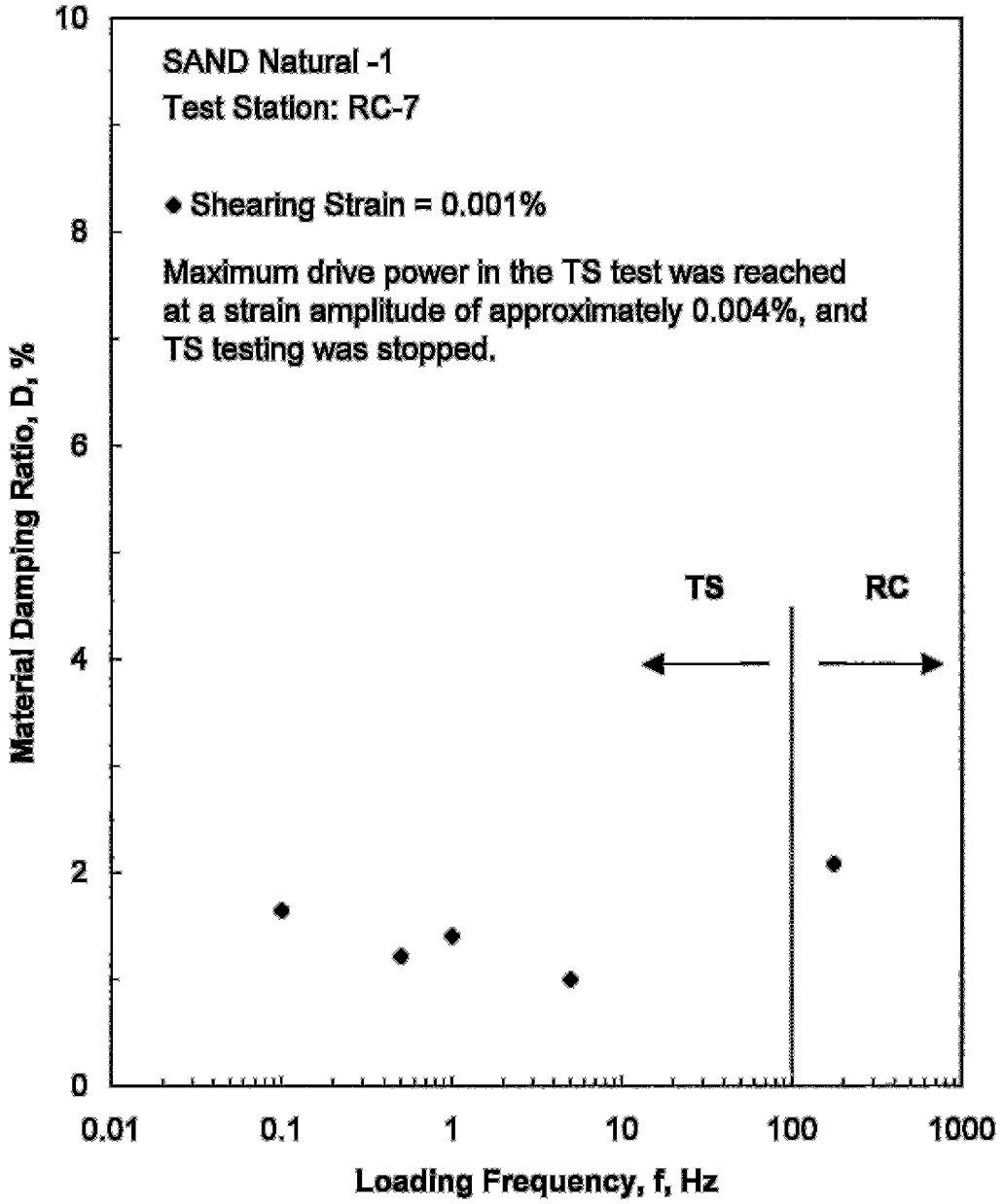

Figure C.20 Comparison of the Variation in Material Damping Ratio with Loading Frequency at an Isotropic Confining Pressure of 50 psi from the Combined RCTS Tests

Table C.1 Variation in Low-Amplitude Shear Wave Velocity, Low-Amplitude Shear Modulus, Low-Amplitude Material Damping Ratio and Estimated Void Ratio with Isotropic Confining Pressure from RC Tests of Specimen NATURAL

Isotropic Confining Pressure, σ_o			Low-Amplitude Shear Modulus, G_{max}		Low-Amplitude Shear Wave Velocity, Vs	Low-Amplitude Material Damping Ratio, Dmin	Estimated Void Ratio, e
(psi)	(psf)	(kPa)	(ksf)	(MPa)	(fps)	(%)	
3	432	21	1942	93	708	2.53	0.43
6	864	41	2359	113	780	2.38	0.43
13	1872	90	2831	136	854	2.21	0.42
25	3600	172	3577	172	958	2.03	0.42
50	7200	345	4610	221	1085	1.89	0.41

Table C.2 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen NATURAL; Isoptropic Confining Pressure, σ_o= 13 psi (1.9 ksf = 90 kPa)

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average[+] Shearing Strain, %	Material Damping Ratio[x], D, %
7.30E-05	2827	1.00	7.30E-05	2.21
1.45E-04	2827	1.00	1.45E-04	2.21
2.87E-04	2802	0.99	2.87E-04	2.25
5.82E-04	2751	0.97	4.95E-04	2.38
1.12E-03	2662	0.94	9.41E-04	2.68
2.14E-03	2513	0.89	1.75E-03	3.08
4.14E-03	2282	0.81	3.27E-03	3.84
7.96E-03	1999	0.71	5.89E-03	5.04
1.62E-02	1599	0.57	1.17E-02	6.62

[+] Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

[x] Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table C.3 Variation in Shear Modulus, Normalized Shear Modulus and Material Damping Ratio with Shearing Strain from TS Tests of Specimen NATURAL; Isotropic Confining Pressure, σ_o= 13 psi (1.9 ksf =90 kPa)

First Cycle				Tenth Cycle			
Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %	Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %
6.07E-04	2992	0.98	1.31	6.18E-04	2939	0.97	1.67
1.01E-03	2867	0.94	1.85	1.02E-03	2843	0.94	1.40
2.11E-03	2756	0.91	1.94	2.13E-03	2734	0.91	1.98
4.69E-03	2478	0.81	3.43	4.75E-03	2447	0.81	3.28
1.02E-02	2087	0.69	5.19	1.03E-02	2068	0.68	4.85

Table C.4 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen NATURAL; Isoptropic Confining Pressure, σ_o= 50 psi (7.2 ksf = 345 kPa)

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average[+] Shearing Strain, %	Material Damping Ratio[x], D, %
3.80E-05	4661	1.00	3.80E-05	1.89
7.60E-05	4661	1.00	7.60E-05	1.89
1.50E-04	4661	1.00	1.50E-04	1.89
2.97E-04	4631	0.99	2.97E-04	1.89
6.06E-04	4591	0.99	6.06E-04	1.97
1.17E-03	4494	0.96	1.02E-03	2.08
2.23E-03	4298	0.92	1.92E-03	2.39
4.08E-03	3980	0.85	3.38E-03	2.71
7.43E-03	3510	0.75	6.17E-03	3.26
1.45E-02	2889	0.62	1.16E-02	4.41
2.26E-02	2561	0.55	1.65E-02	6.10

[+] Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

[x] Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table C.5 Variation in Shear Modulus, Normalized Shear Modulus and Material Damping Ratio with Shearing Strain from TS Tests of Specimen NATURAL; Isotropic Confining Pressure, σ_o= 50 psi (7.2 ksf = 345 kPa)

First Cycle				Tenth Cycle			
Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %	Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %
1.01E-03	4764	0.92	1.38	1.01E-03	4773	0.92	1.21
2.03E-03	4726	0.91	1.44	2.03E-03	4735	0.91	1.61
4.22E-03	4555	0.88	2.07	4.21E-03	4567	0.88	2.07

APPENDIX D

Specimen NATURAL

Borehole ---NA
Sample ---2
Depth = --- ft (--- m)
Total Unit Weight = 124.3 lb/ft^3
Water Content = 7.4 %
Estimated In-Situ Mean Effective
Stress = 13 psi

FUGRO JOB #: 0411-08-1696
Testing Station: RC7

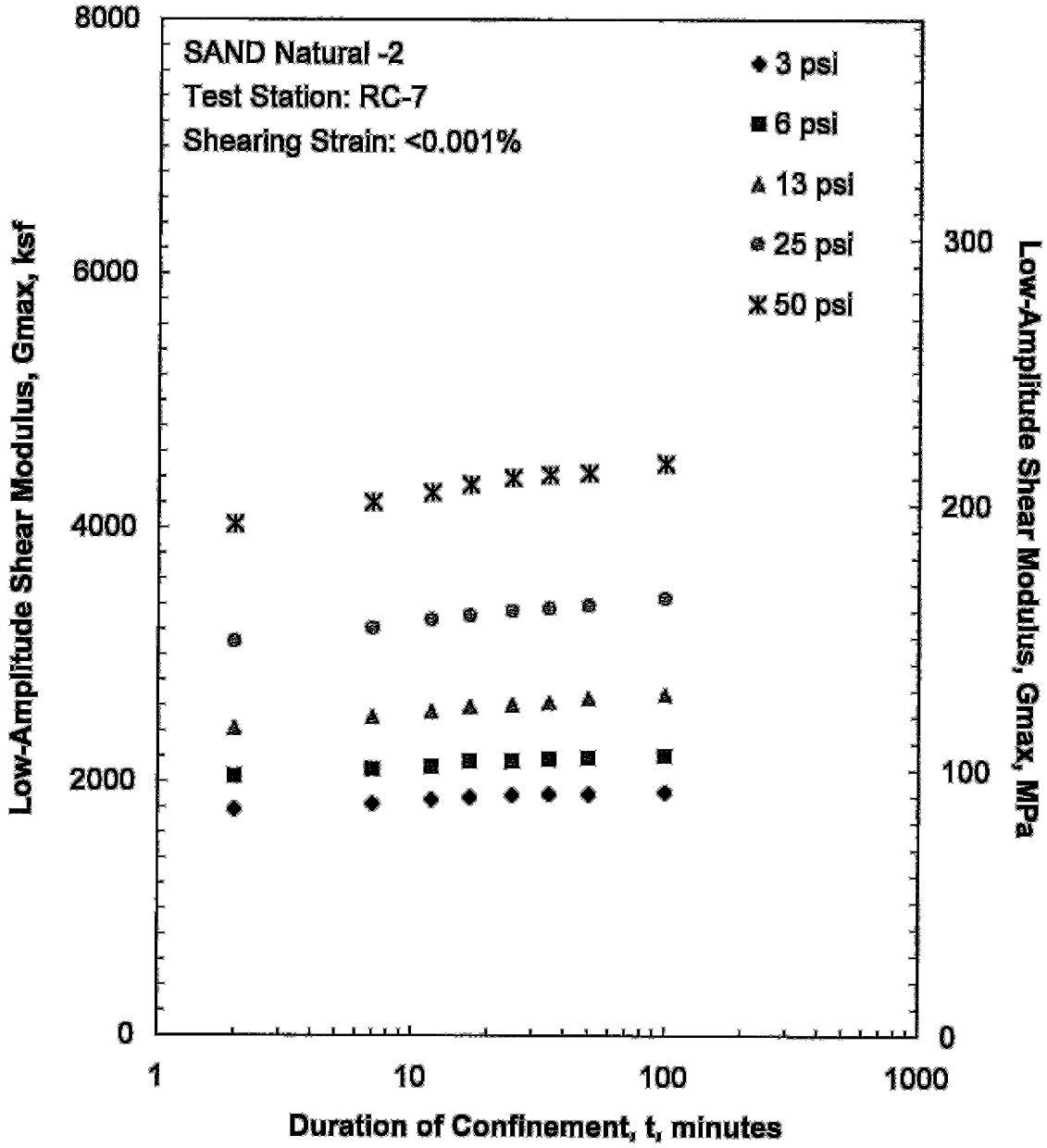

Figure D.1 Variation in Low-Amplitude Shear Modulus with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

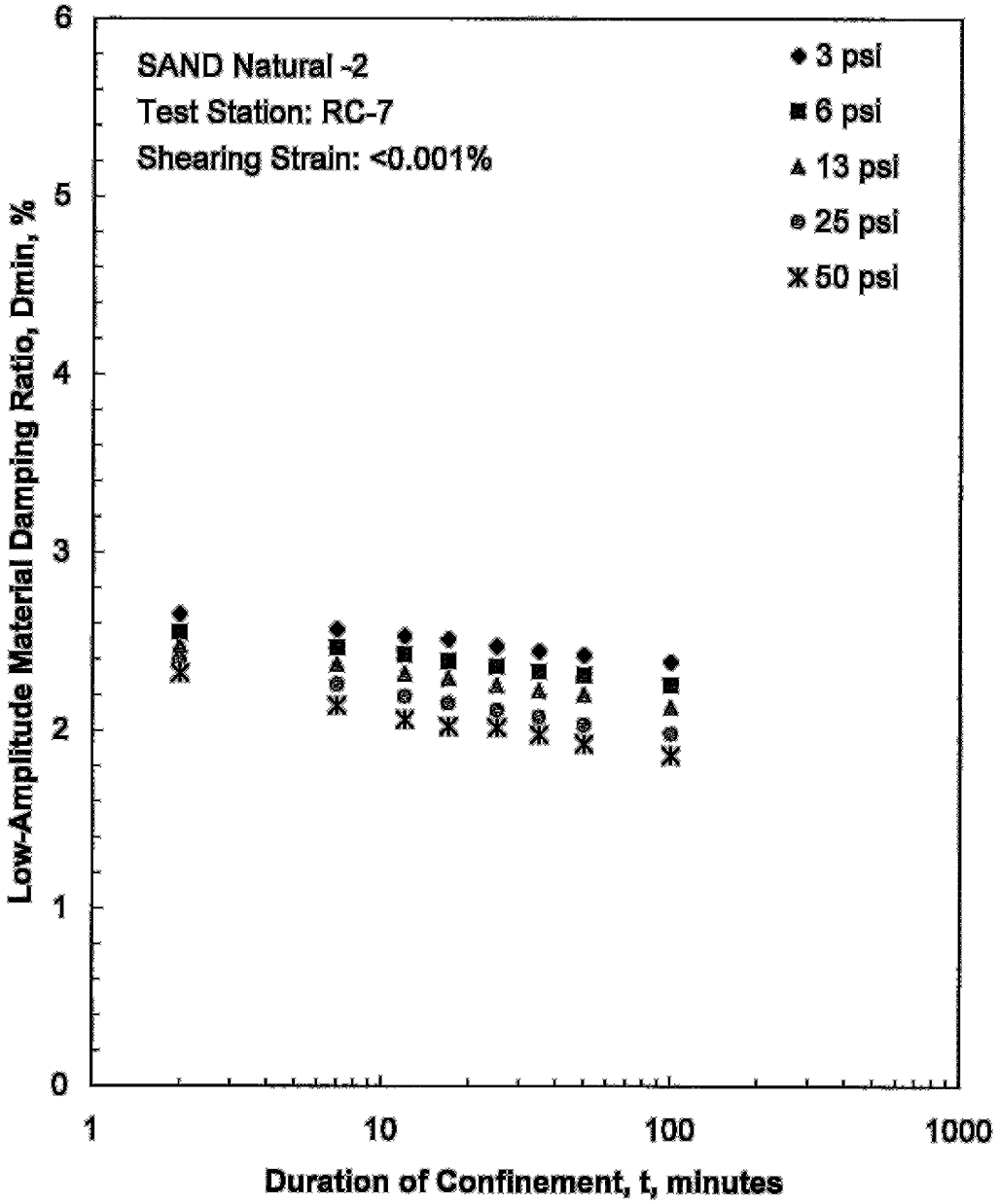

Figure D.2 Variation in Low-Amplitude Material Damping Ratio with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

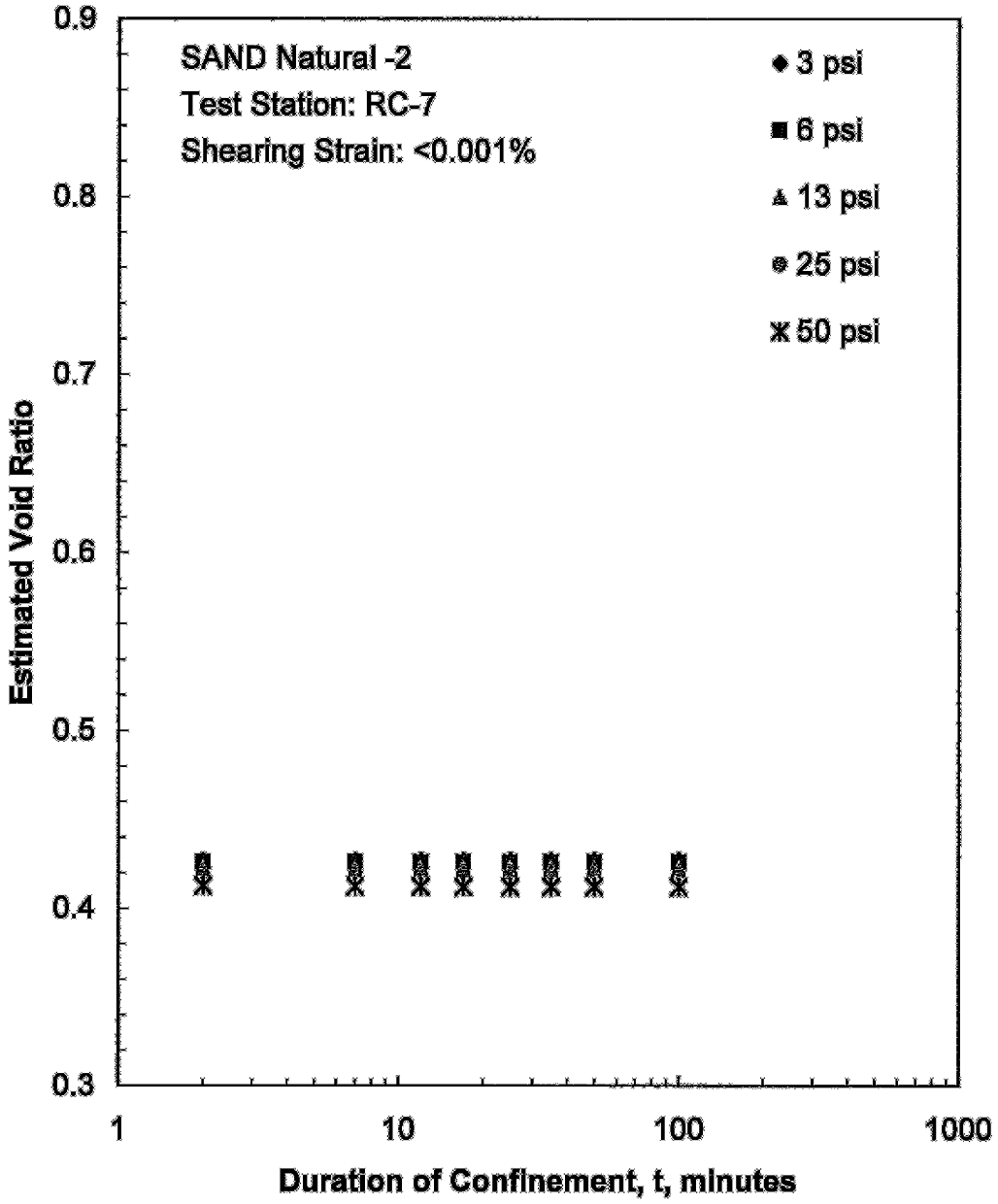

Figure D.3 Variation in Estimated Void Ratio with Magnitude and Duration of Isotropic Confining Pressure from Resonant Column Tests

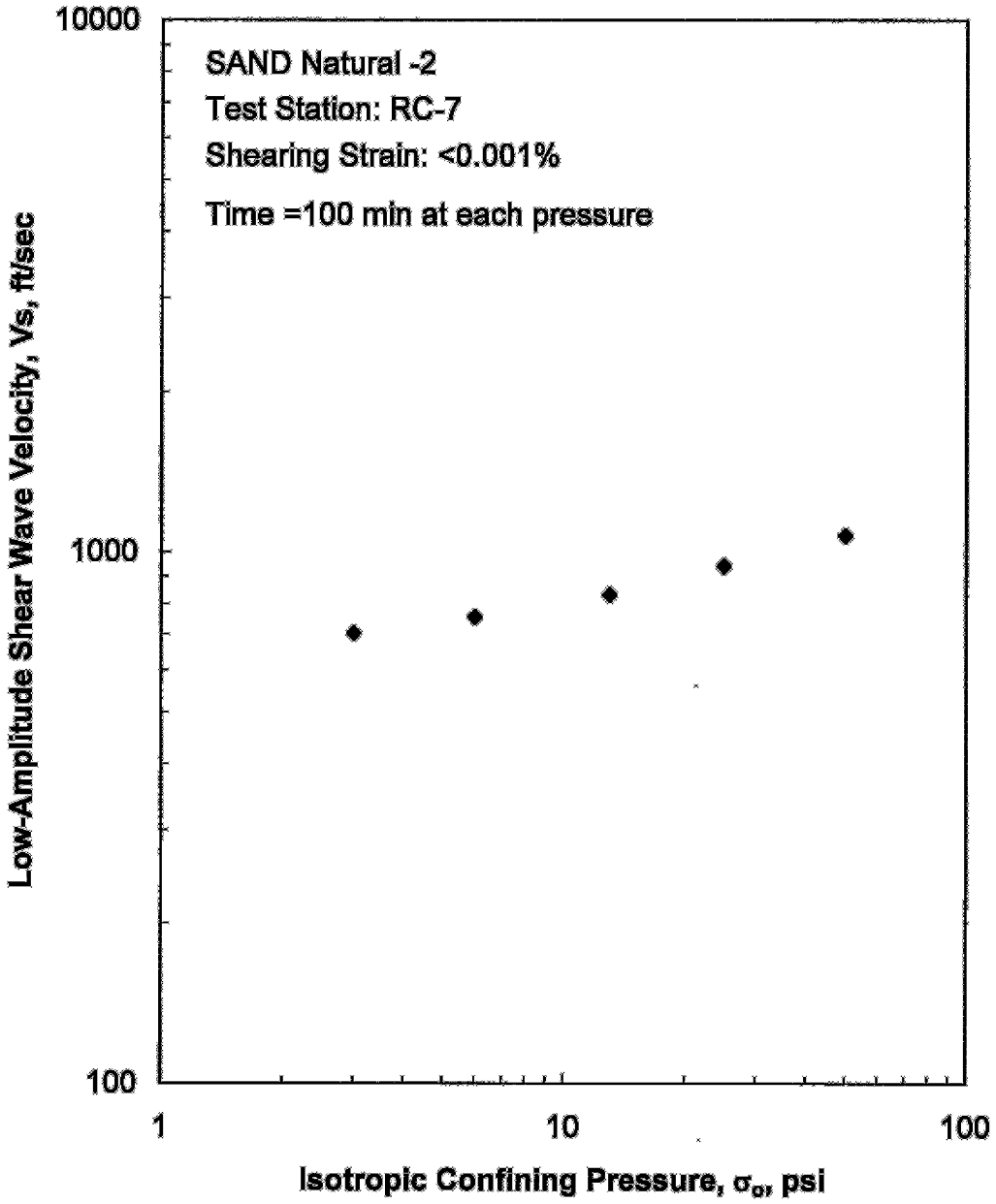

Figure D.4 Variation in Low-Amplitude Shear Wave Velocity with Isotropic Confining Pressure from Resonant Column Tests

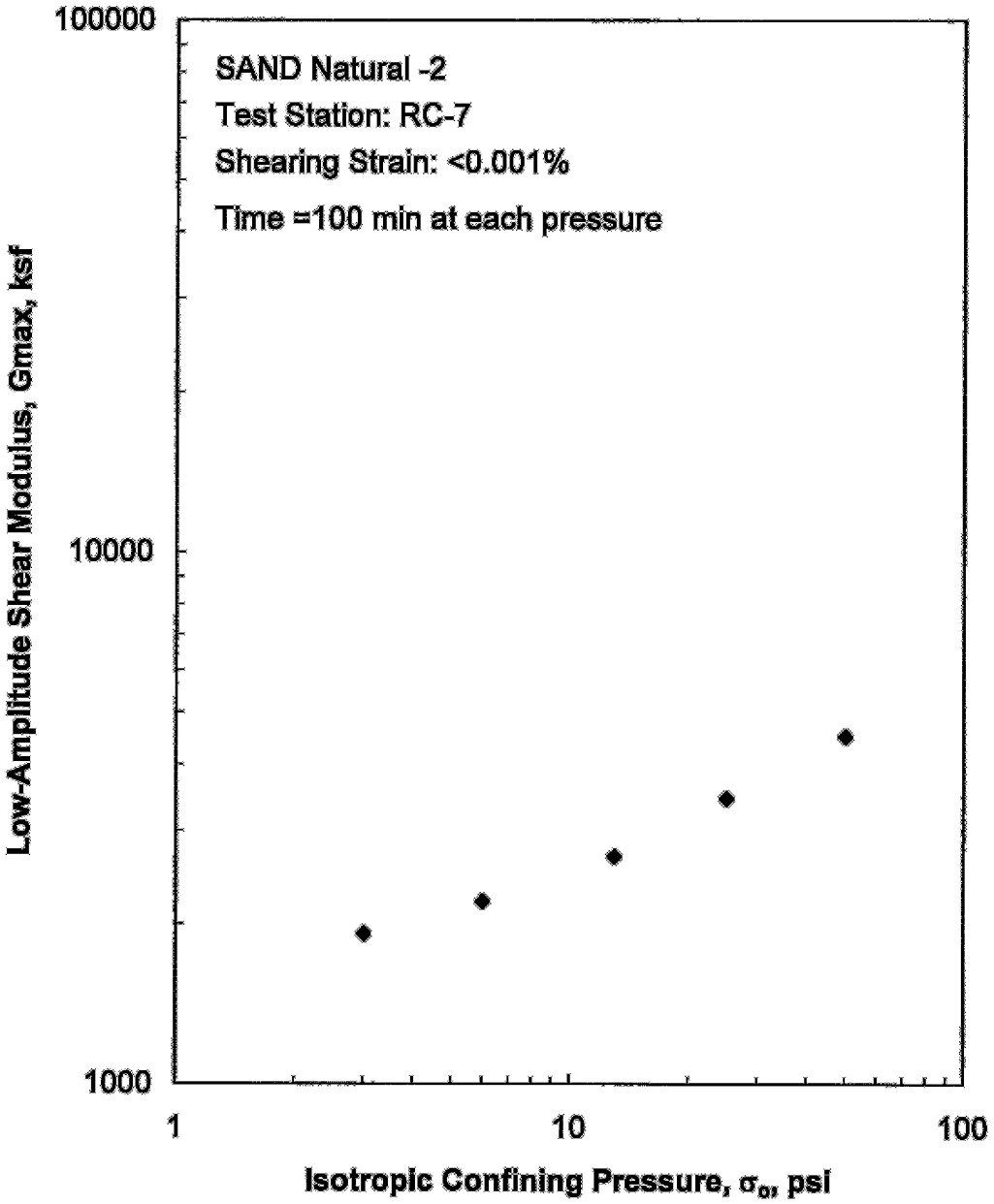

Figure D.5 Variation in Low-Amplitude Shear Modulus with Isotropic Confining Pressure from Resonant Column Tests

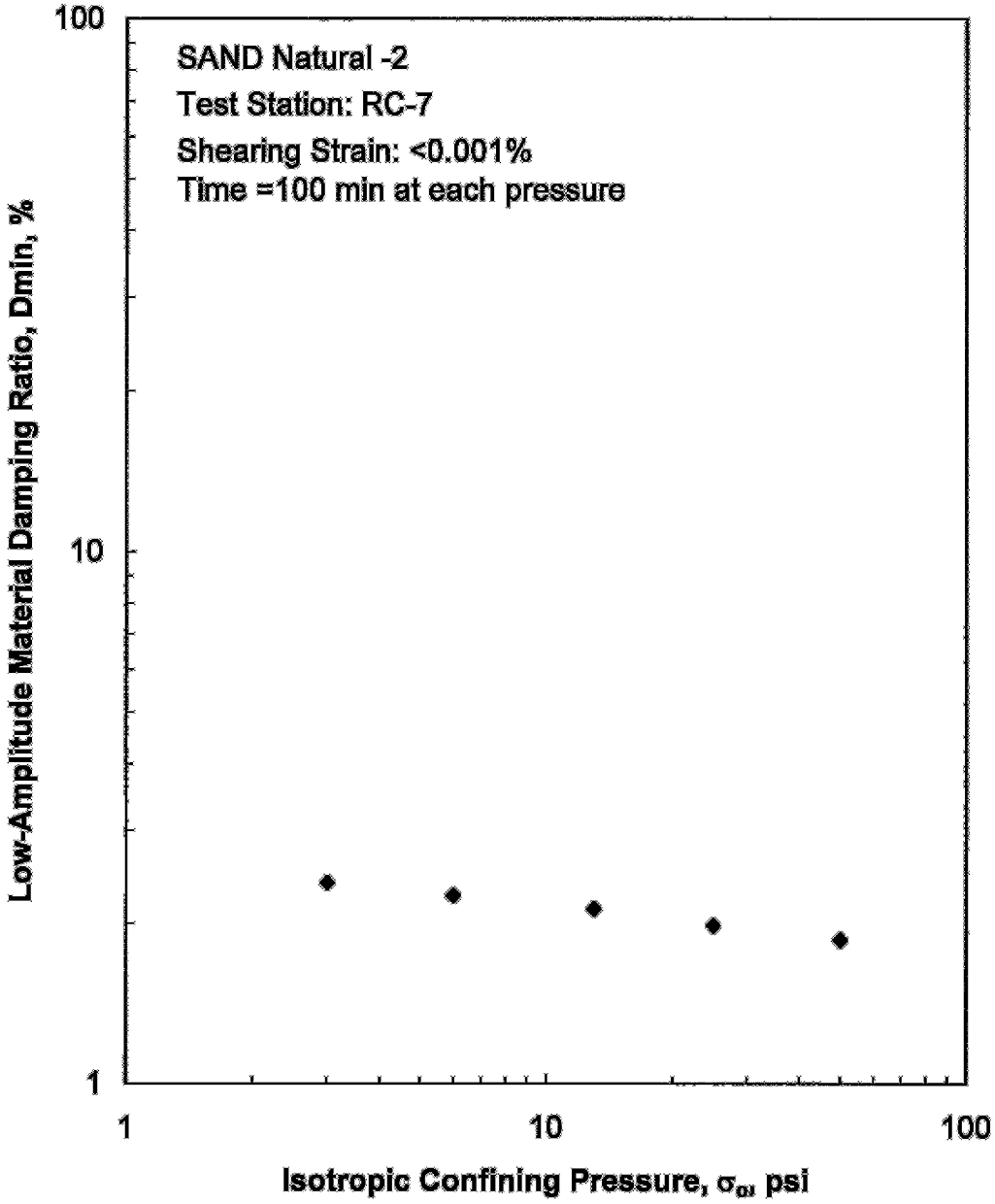

Figure D.6 Variation in Low-Amplitude Material Damping Ratio with Isotropic Confining Pressure from Resonant Column Tests

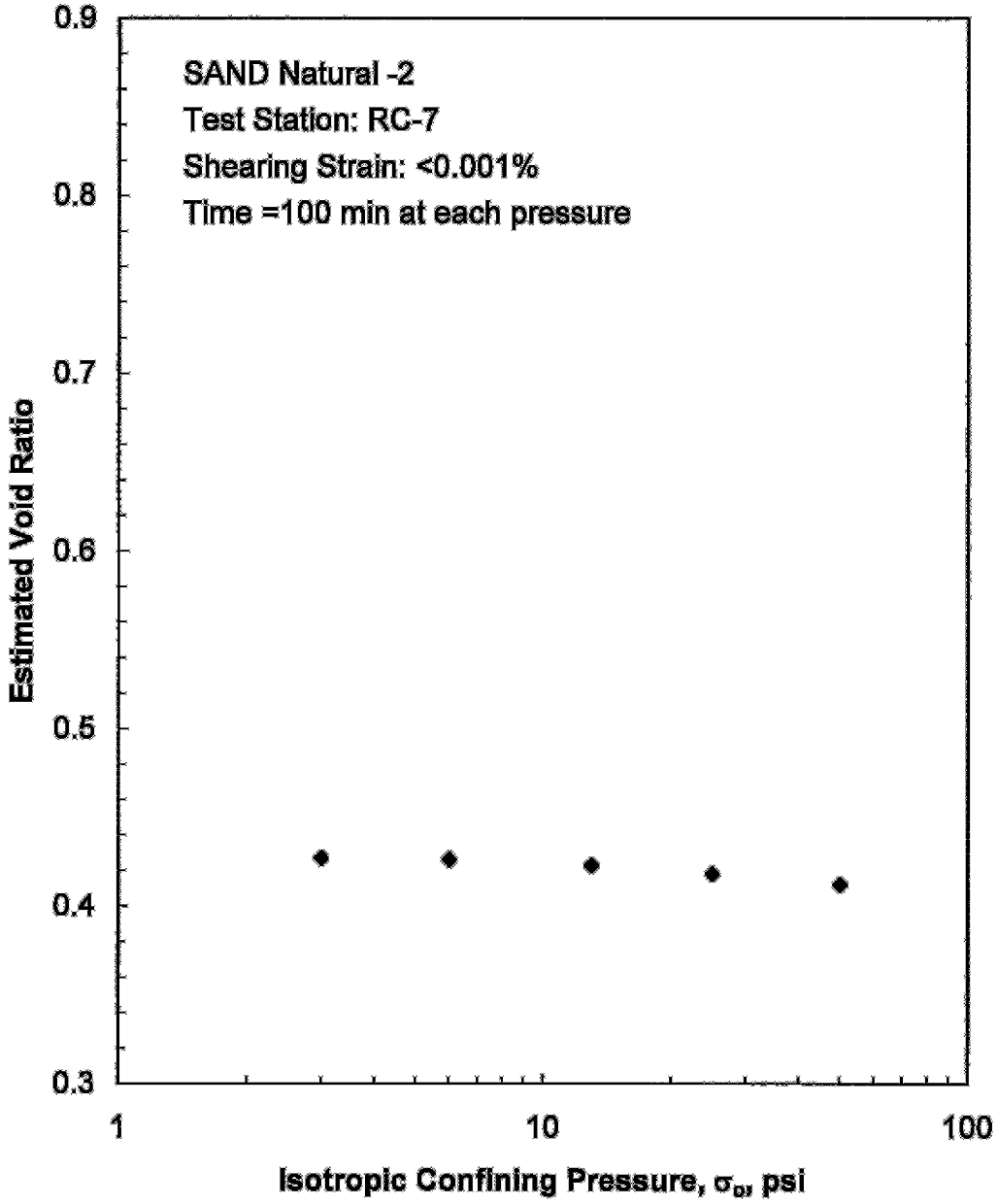

Figure D.7 Variation in Estimated Void Ratio with Isotropic Confining Pressure from Resonant Column Tests

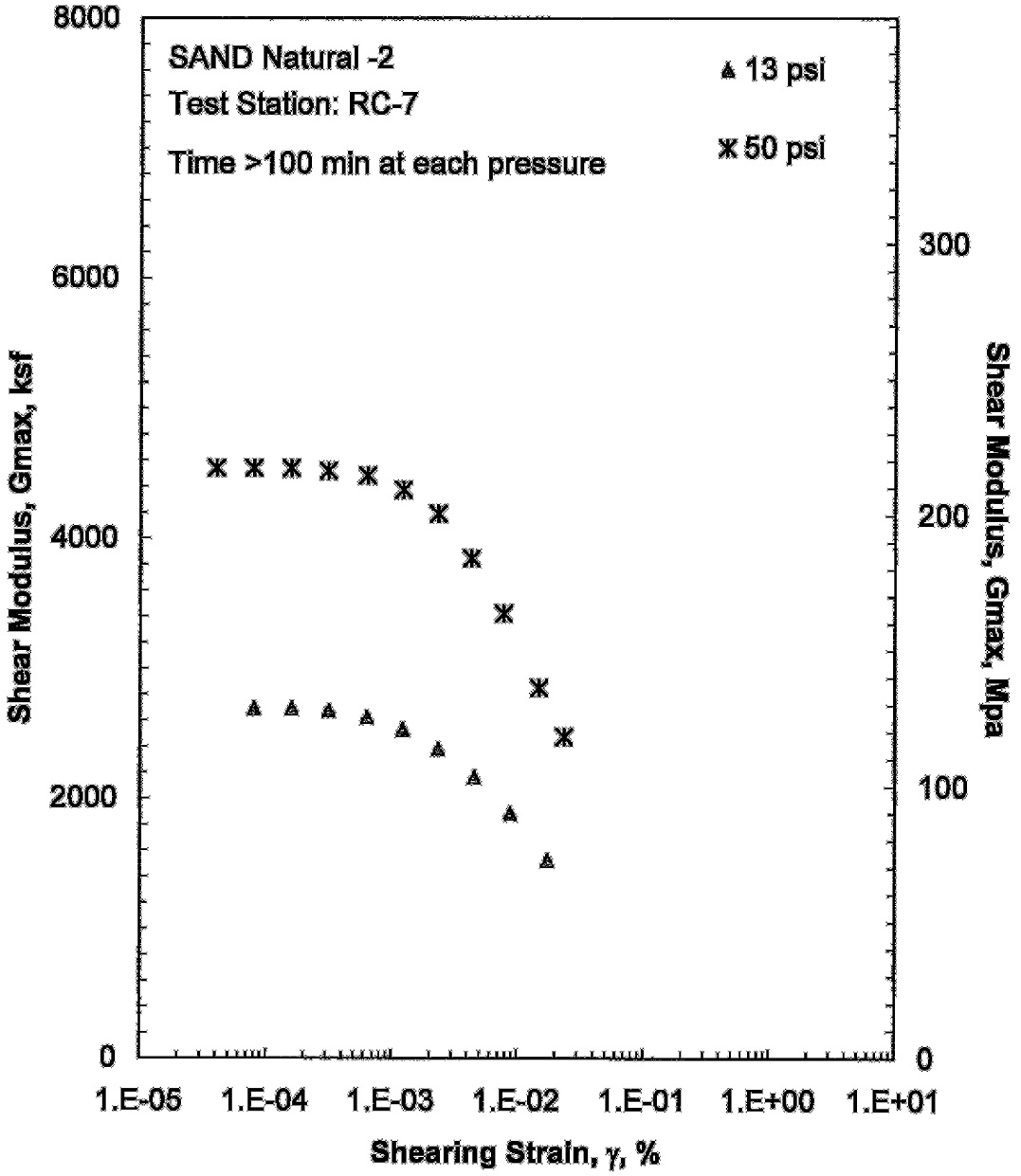

Figure D.8 Comparison of the Variation in Shear Modulus with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

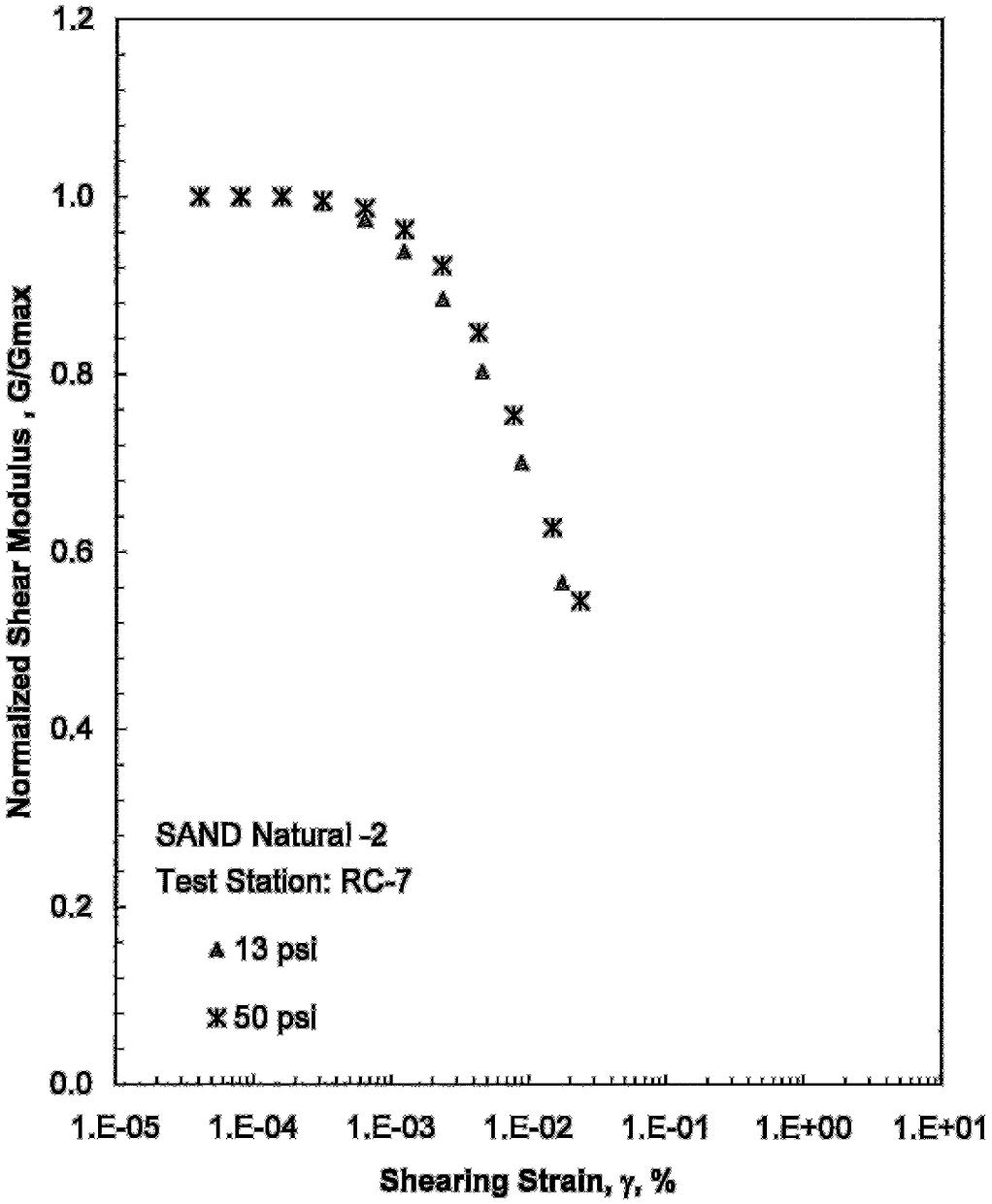

Figure D.9 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

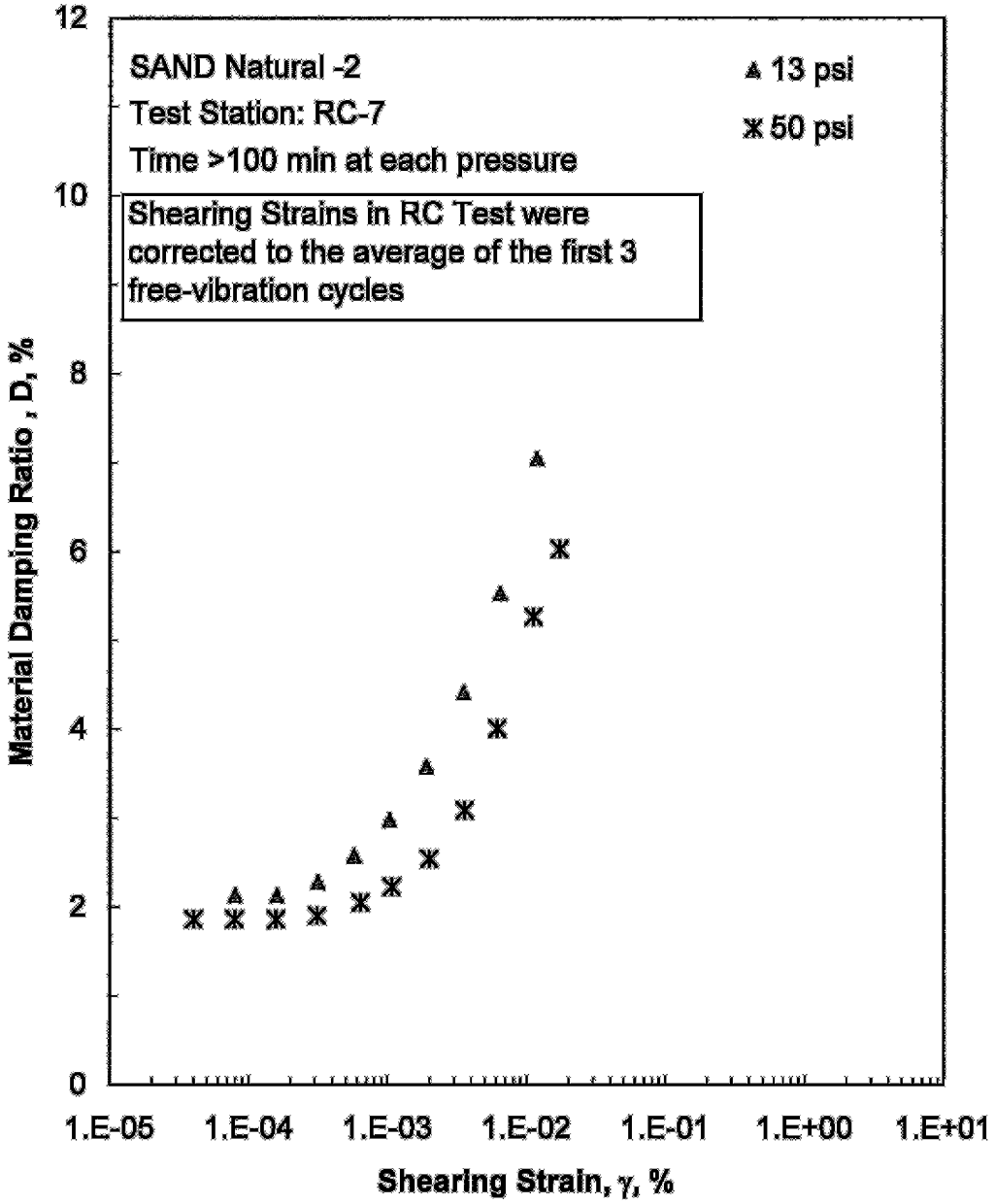

Figure D.10 Comparison of the Variation in Material Damping Ratio with Shearing Strain and Isotropic Confining Pressure from the Resonant Column Tests

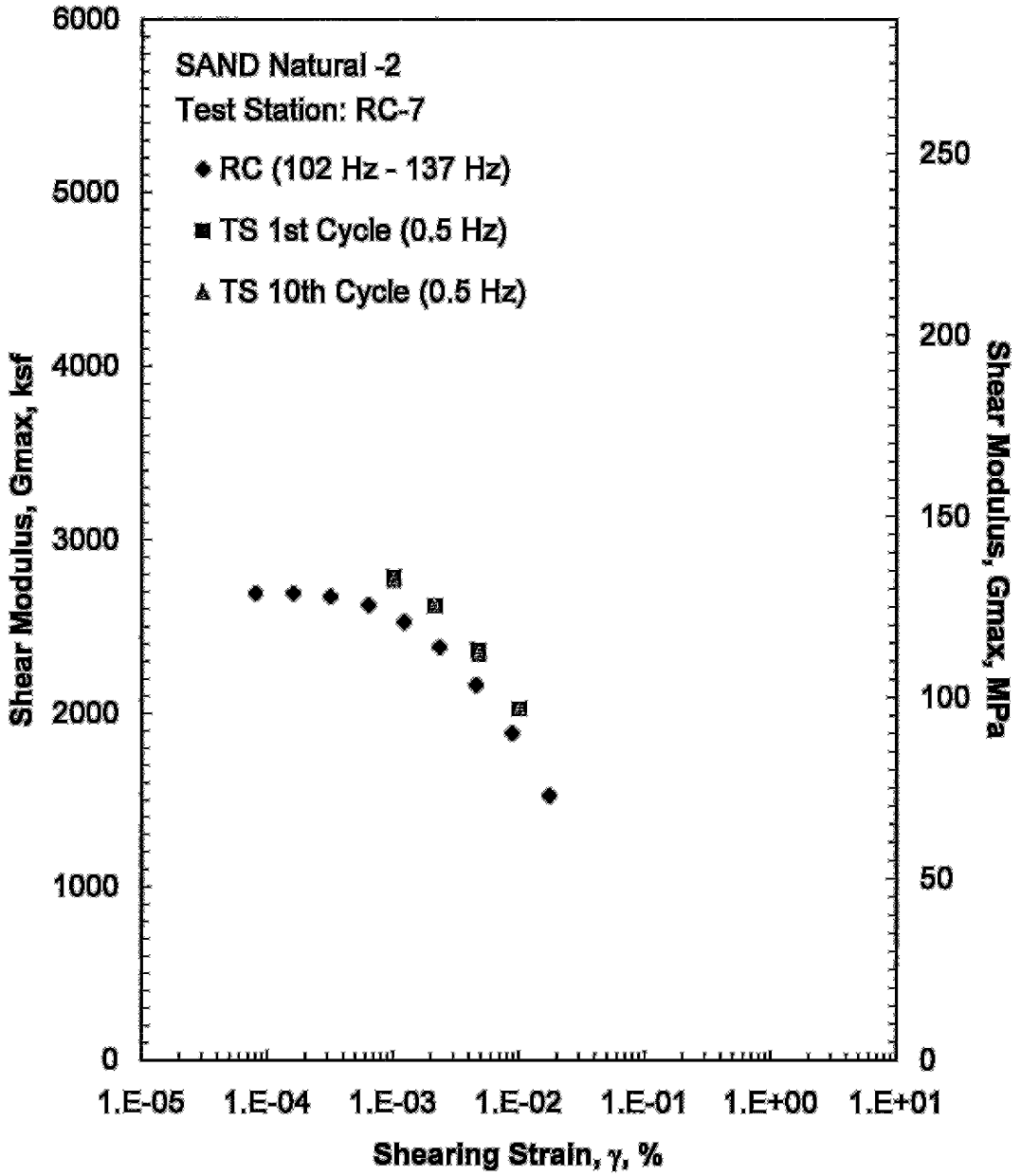

Figure D.11 Comparison of the Variation in Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 13 psi from the Combined RCTS Tests

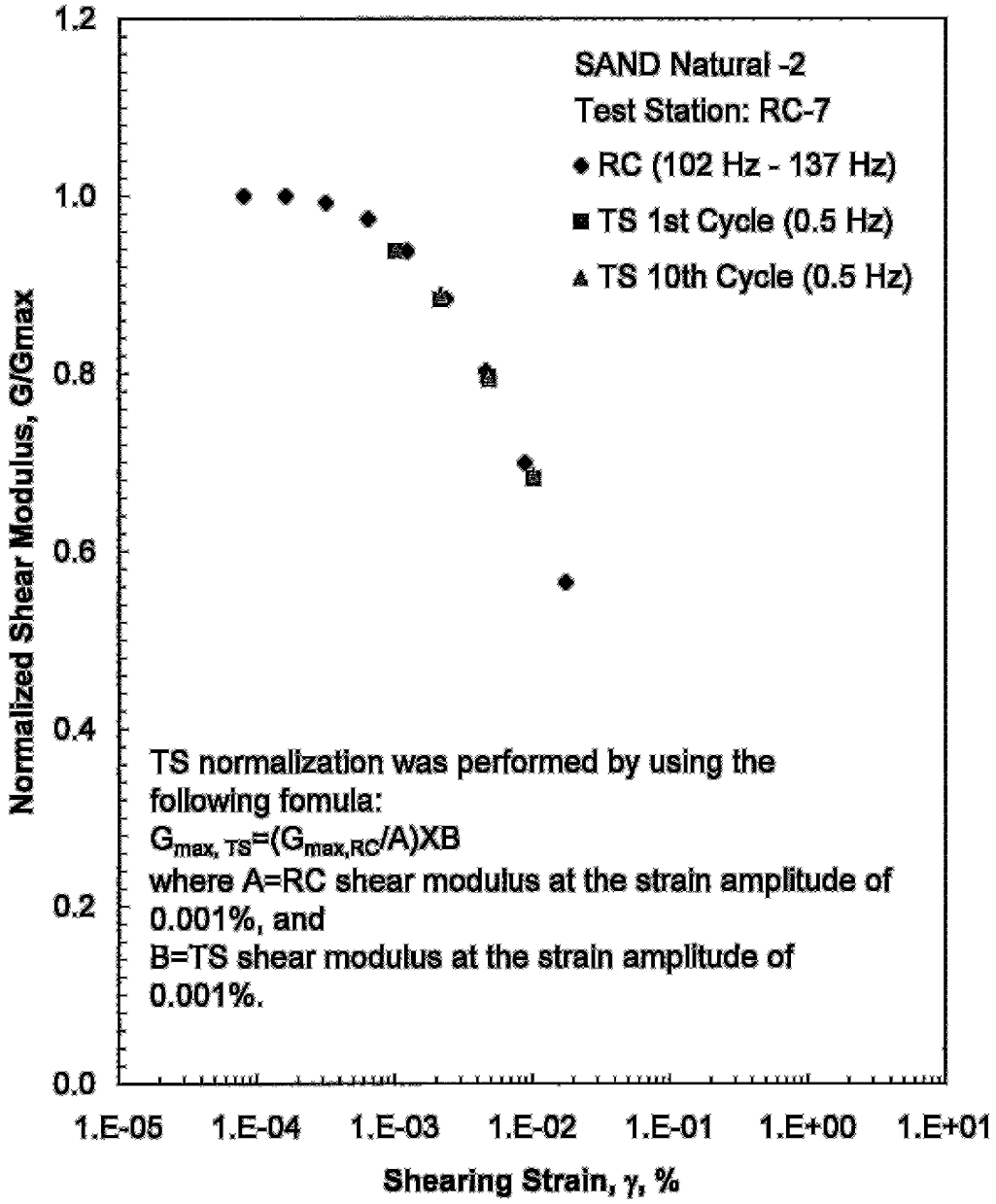

Figure D.12 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 13 psi from the Combined RCTS Tests

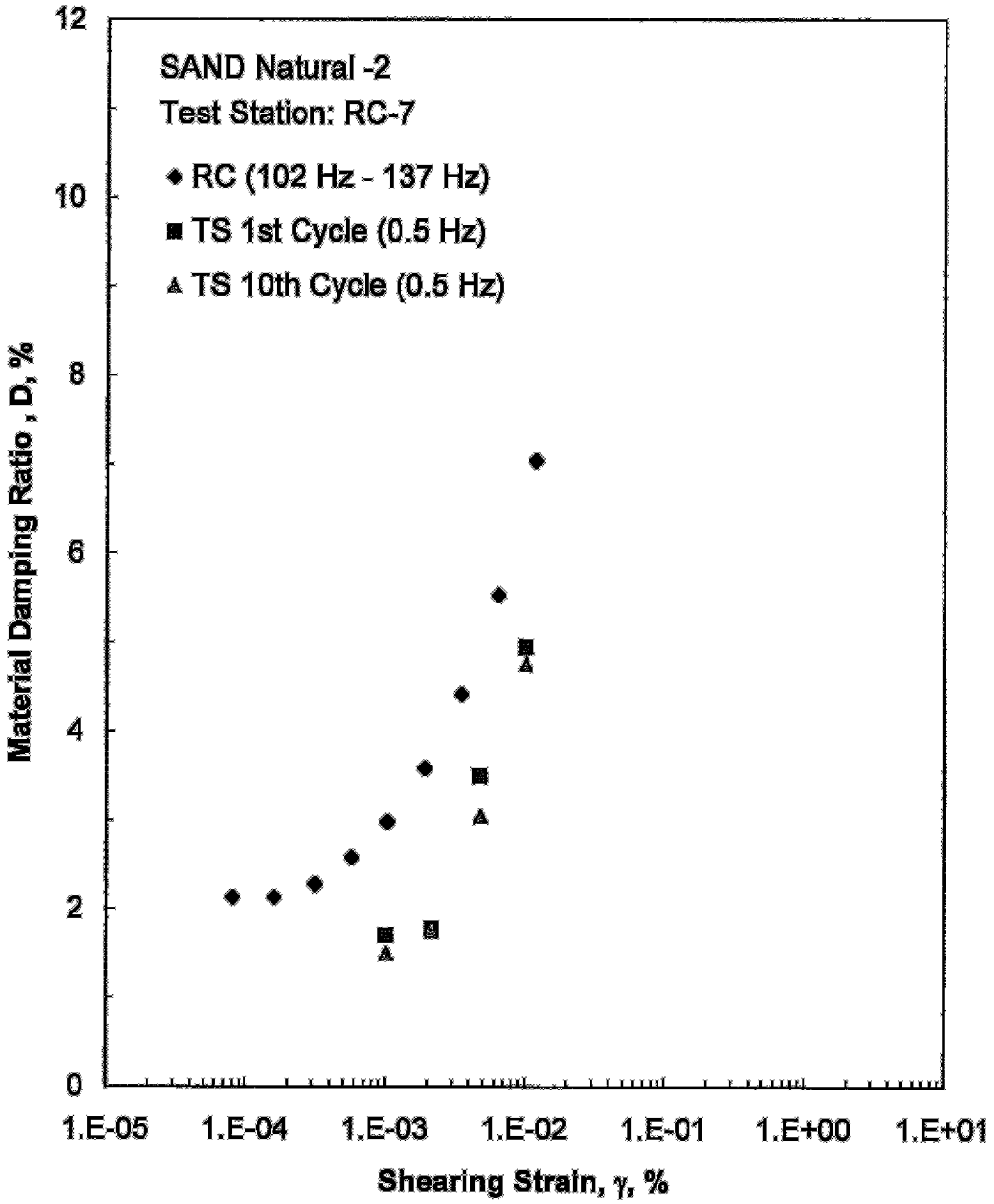

Figure D.13 Comparison of the Variation in Material Damping Ratio with Shearing Strain at an Isotropic Confining Pressure of 13 psi from the Combined RCTS Tests

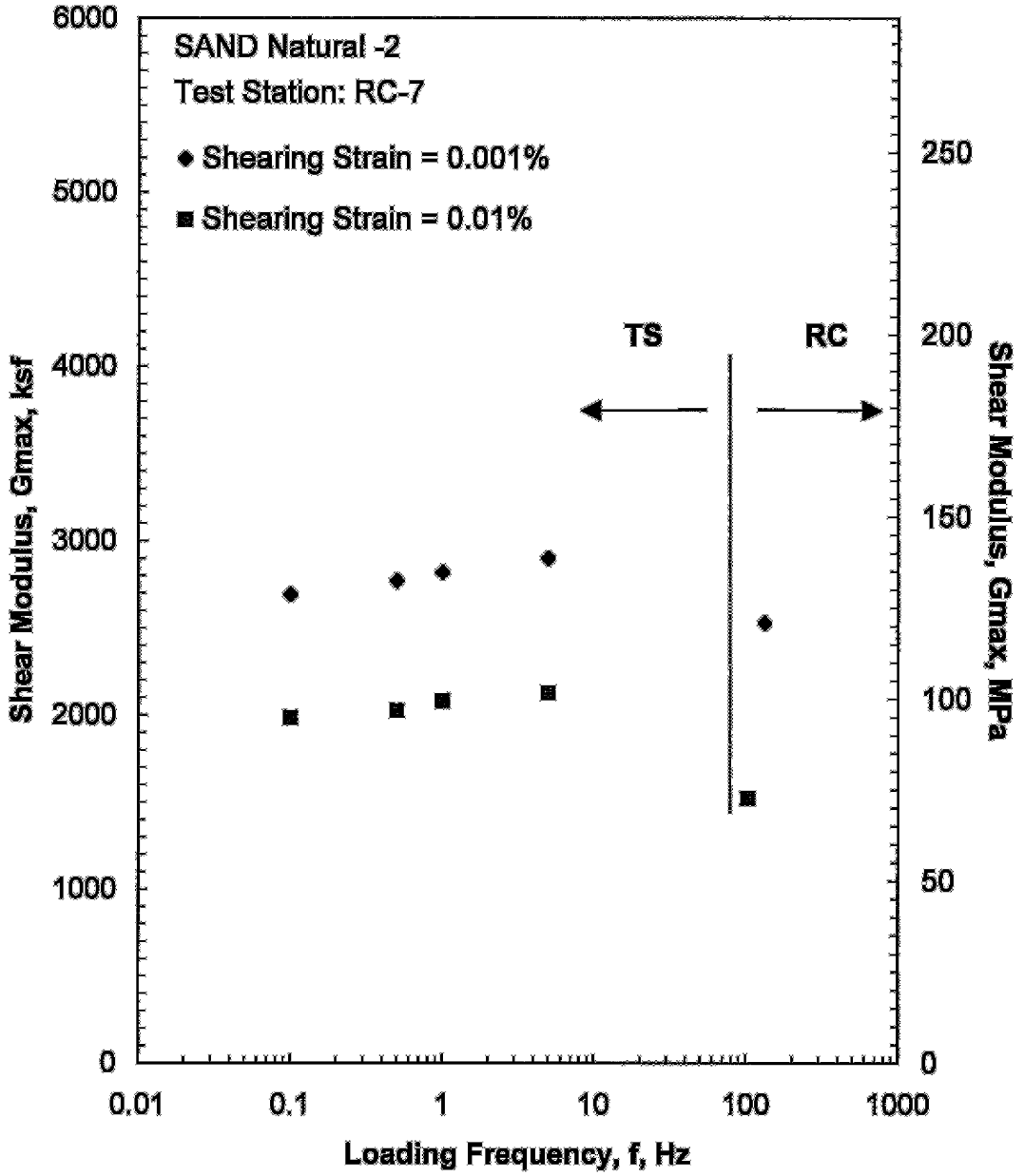

Figure D.14 Comparison of the Variation in Shear Modulus with Loading Frequency at an Isotropic Confining Pressure of 13 psi from the Combined RCTS Tests

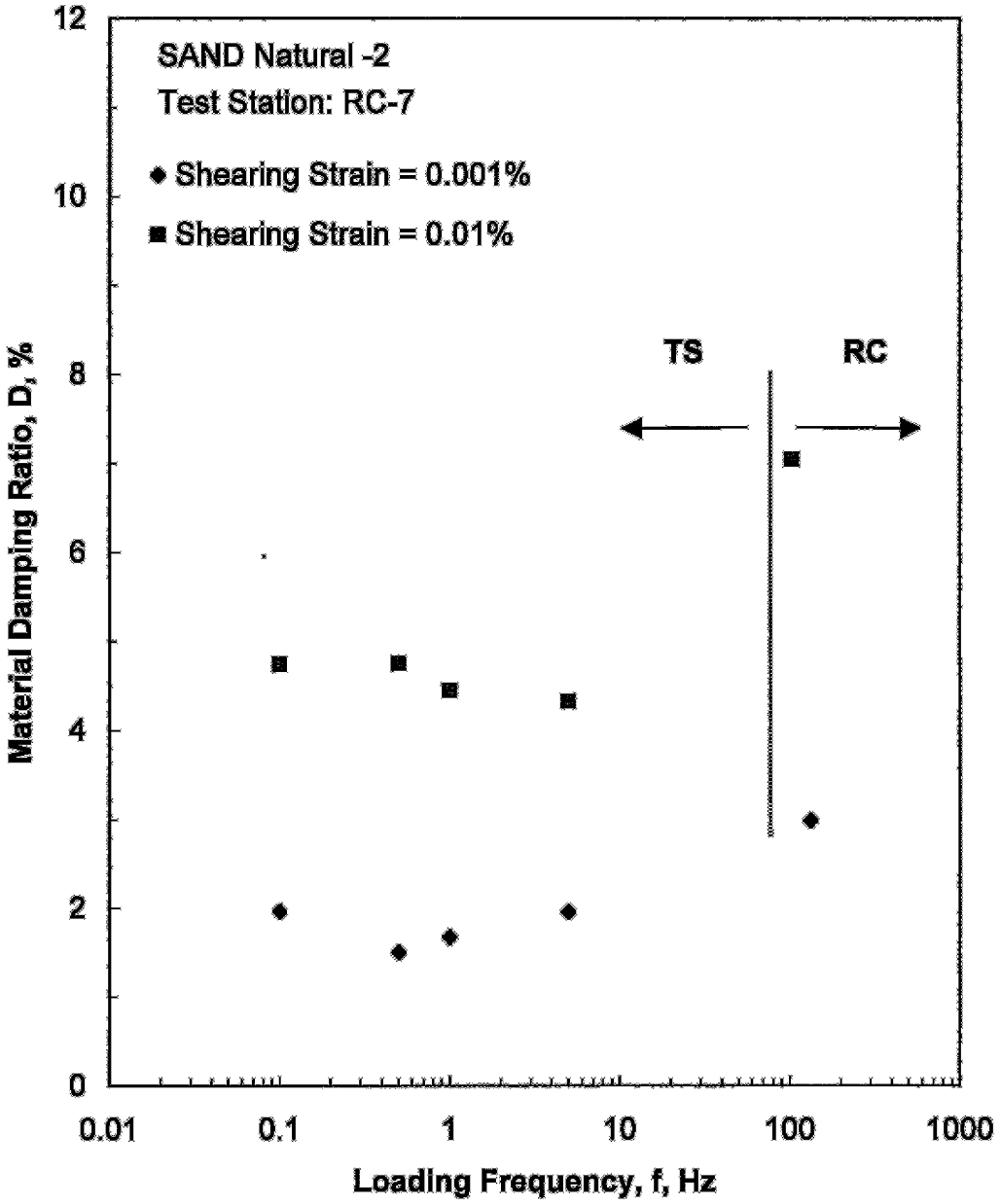

Figure D.15 Comparison of the Variation in Material Damping Ratio with Loading Frequency at an Isotropic Confining Pressure of 13 psi from the Combined RCTS Tests

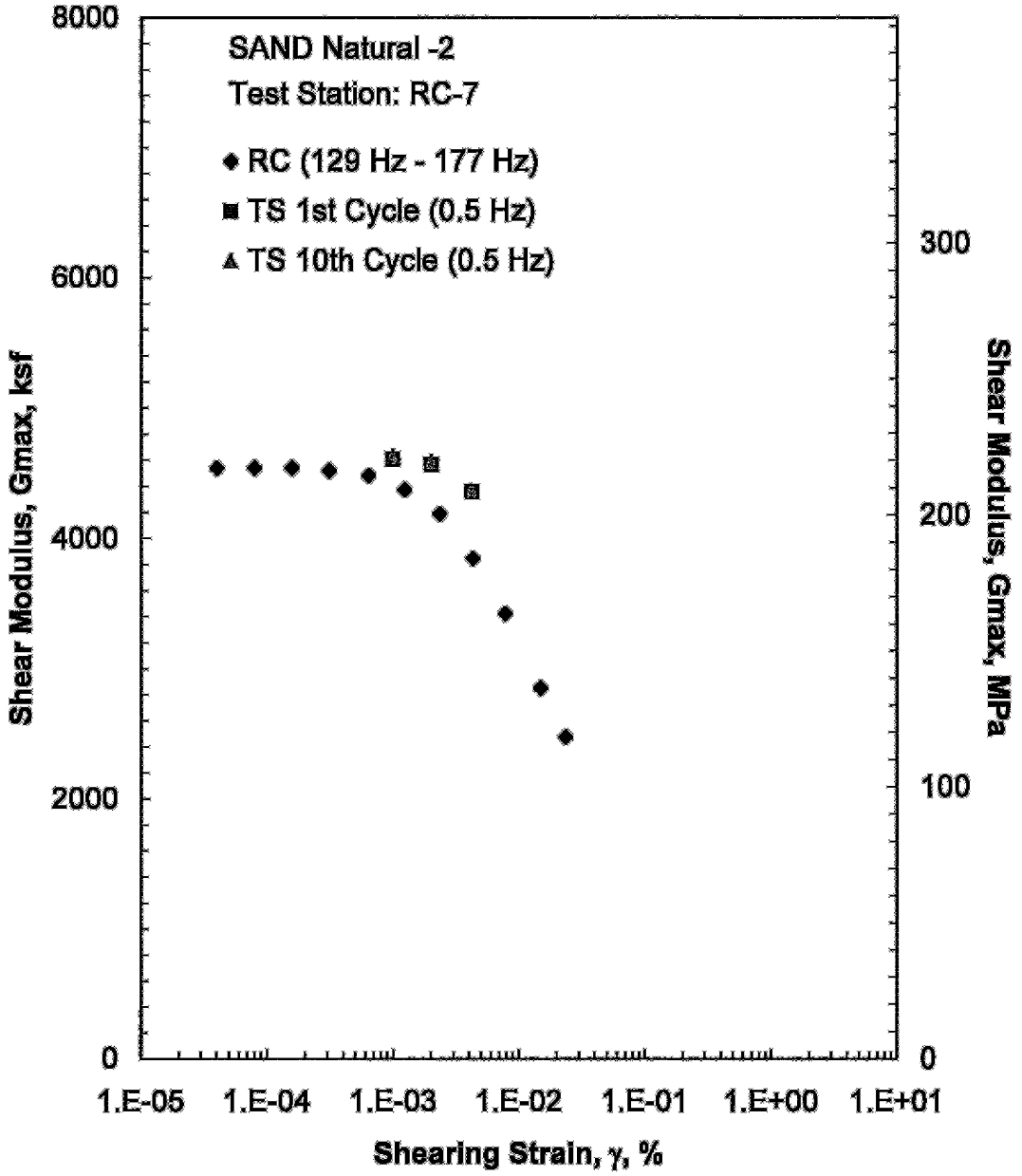

Figure D.16 Comparison of the Variation in Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 50 psi from the Combined RCTS Tests

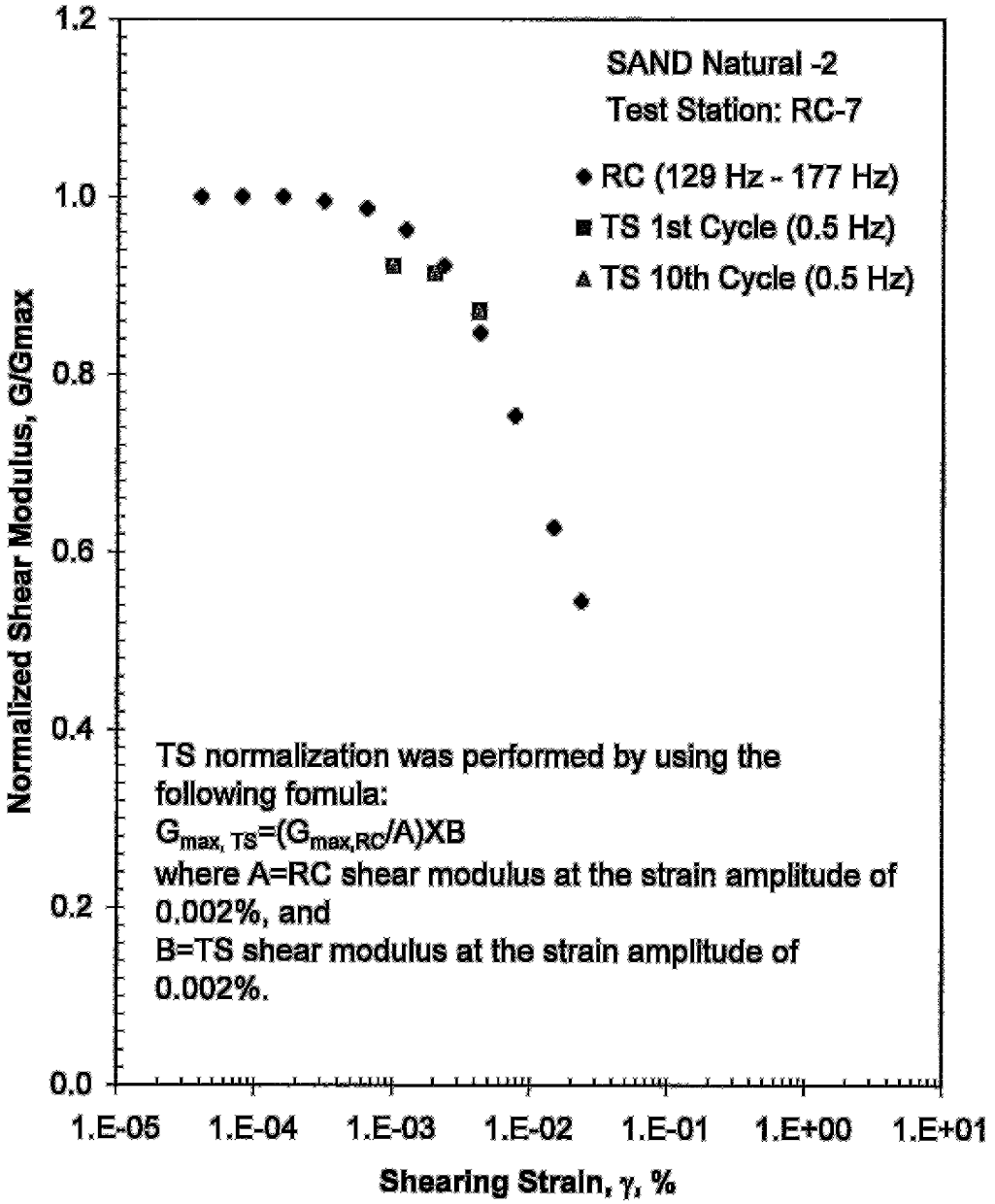

Figure D.17 Comparison of the Variation in Normalized Shear Modulus with Shearing Strain at an Isotropic Confining Pressure of 50 psi from the Combined RCTS Tests

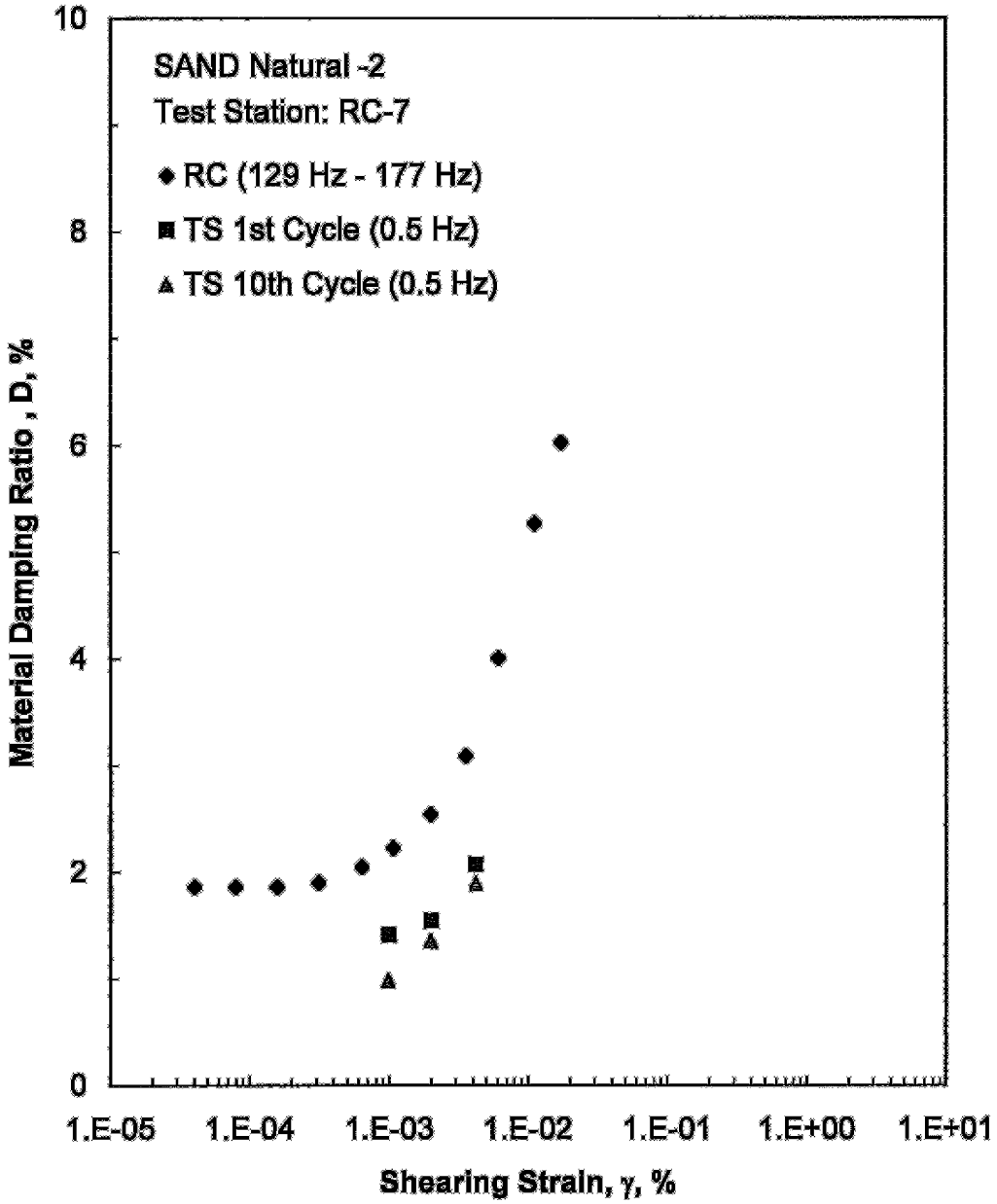

Figure D.18 Comparison of the Variation in Material Damping Ratio with Shearing Strain at an Isotropic Confining Pressure of 50 psi from the Combined RCTS Tests

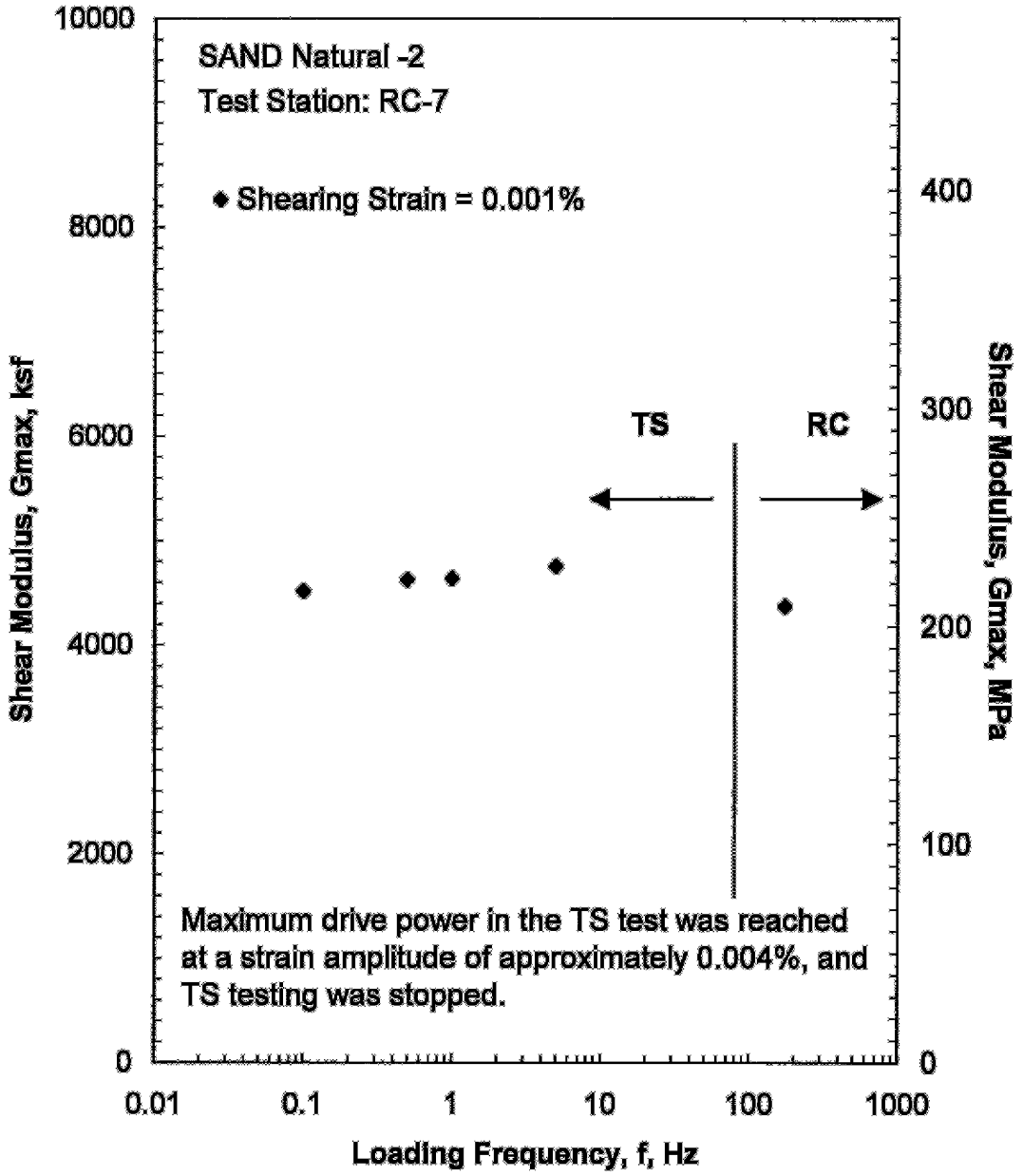

Figure D.19 Comparison of the Variation in Shear Modulus with Loading Frequency at an Isotropic Confining Pressure of 50 psi from the Combined RCTS Tests

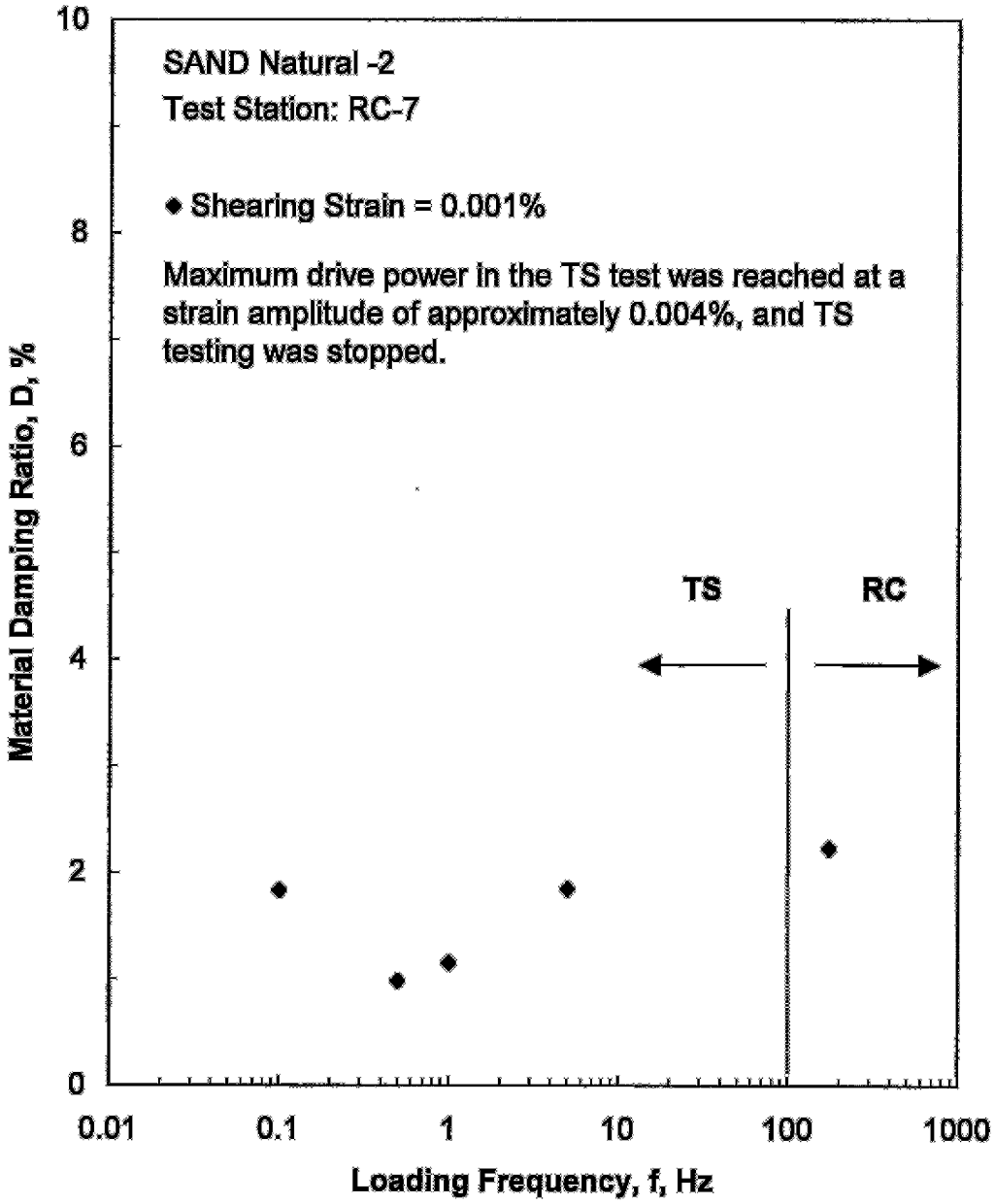

Figure D.20 Comparison of the Variation in Material Damping Ratio with Loading Frequency at an Isotropic Confining Pressure of 50 psi from the Combined RCTS Tests

Table D.1 Variation in Low-Amplitude Shear Wave Velocity, Low-Amplitude Shear Modulus, Low-Amplitude Material Damping Ratio and Estimated Void Ratio with Isotropic Confining Pressure from RC Tests of Specimen NATURAL

Isotropic Confining Pressure, σ_o			Low-Amplitude Shear Modulus, G_{max}		Low-Amplitude Shear Wave Velocity, Vs	Low-Amplitude Material Damping Ratio, Dmin	Estimated Void Ratio, e
(psi)	(psf)	(kPa)	(ksf)	(MPa)	(fps)	(%)	
3	432	21	1916	92	704	2.39	0.43
6	864	41	2203	106	754	2.25	0.43
13	1872	90	2681	129	831	2.13	0.42
25	3600	172	3443	165	940	1.98	0.42
50	7200	345	4504	216	1073	1.86	0.41

Table D.2 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen NATURAL; Isoptropic Confining Pressure, σ_o= 13 psi (1.9 ksf = 90 kPa)

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average+ Shearing Strain, %	Material Damping Ratio×, D, %
8.00E-05	2692	1.00	8.00E-05	2.13
1.60E-04	2692	1.00	1.60E-04	2.13
3.15E-04	2672	0.99	3.15E-04	2.28
6.36E-04	2623	0.97	5.72E-04	2.57
1.22E-03	2526	0.94	1.03E-03	2.98
2.34E-03	2380	0.88	1.90E-03	3.58
4.54E-03	2161	0.80	3.50E-03	4.41
8.82E-03	1884	0.70	6.44E-03	5.52
1.74E-02	1522	0.57	1.19E-02	7.04

+ Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

× Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table D.3 Variation in Shear Modulus, Normalized Shear Modulus and Material Damping Ratio with Shearing Strain from TS Tests of Specimen NATURAL; Isotropic Confining Pressure, σ_o= 13 psi (1.9 ksf =90 kPa)

First Cycle				Tenth Cycle			
Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %	Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %
1.01E-03	2782	0.94	1.70	1.01E-03	2769	0.94	1.50
2.15E-03	2618	0.88	1.78	2.14E-03	2622	0.89	1.75
4.76E-03	2363	0.80	3.49	4.80E-03	2340	0.79	3.04
1.01E-02	2022	0.68	4.94	1.01E-02	2023	0.69	4.75

Table D.4 Variation in Shear Modulus and Material Damping Ratio with Shearing Strain from RC Tests of Specimen NATURAL; Isoptropic Confining Pressure, σ_o= 50 psi (7.2 ksf = 345 kPa)

Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Average* Shearing Strain, %	Material Damping Ratio^x, D, %
4.00E-05	4540	1.00	4.00E-05	1.86
7.90E-05	4540	1.00	7.90E-05	1.86
1.57E-04	4540	1.00	1.57E-04	1.86
3.11E-04	4519	1.00	3.11E-04	1.90
6.34E-04	4480	0.99	6.34E-04	2.05
1.23E-03	4371	0.96	1.07E-03	2.22
2.32E-03	4187	0.92	1.97E-03	2.54
4.28E-03	3845	0.85	3.55E-03	3.09
7.73E-03	3420	0.75	6.10E-03	4.00
1.48E-02	2849	0.63	1.11E-02	5.26
2.34E-02	2473	0.54	1.71E-02	6.02

* Average Shearing Strain from the First Three Cycles of the Free Vibration Decay Curve

^{x} Average Damping Ratio from the First Three Cycles of the Free Vibration Decay Curve

Table D.5 Variation in Shear Modulus, Normalized Shear Modulus and Material Damping Ratio with Shearing Strain from TS Tests of Specimen NATURAL; Isotropic Confining Pressure, σ_o= 50 psi (7.2 ksf = 345 kPa)

First Cycle				Tenth Cycle			
Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %	Peak Shearing Strain, %	Shear Modulus, G, ksf	Normalized Shear Modulus, G/G_{max}	Material Damping Ratio, D, %
9.92E-04	4607	0.92	1.41	9.88E-04	4628	0.92	0.98
2.00E-03	4566	0.91	1.54	1.99E-03	4587	0.91	1.35
4.20E-03	4357	0.87	2.07	4.19E-03	4364	0.87	1.89

ATTACHMENT B

FUGRO #0411-08-1696

App. C.

RESONANT COLUMN CYCLIC TORSIONAL SHEAR (RCCyTS) TEST
Specimen Setup / Take Down

Project No: 0411-08-1696 Test Type: RCTS Cell No.: RC7 File Name: B-2-Mahuna L.
Project Name: GEI Test Stress(es), σ' = 3.1 , 6.2 , 12.5 , 25 & 50 psi (1)
Task No.: N/A Stokoe Resonant Column Device Gs = N/A ☐ Meas.; ☐ Assumed
Test No.: N/A Test Series No.: N/A Top Cap ID: 003

Assig. Remarks:

☐ Tube ☐ Field Extruded ☐ Liner ☐ N/A
Boring No.: 2 ☐ Reconstituted
Sample No.: Mahuna L Compostite No.: N/A
Depth (ft): N/A Specimen No.: 1
☐ Spec. Selection by X-ray; ☐ Geomarine Sample

Specimen Preparation (for reconstituted samples)
Target Dry Density 115.7 pcf Lift Thickness 28.64 cm² No. Lifts 5
Final Ht. 143.18 Final Area 39.80 cm² Final Vol. 574.54 cm³ 5/7/08
Final Total Mass 114.26 Water Cont. 7.8% 567.84 cm³

Type Consolidation: ☒ Isotropic ☐ Anisotropic ☐ Ko stress path ☐ 45o stress path

Water Content (WC);	Initial - Trimming Location: Top (Wo,1)	Bottom (Wo,2)	Sides (Wo,3)	Final (Wat) (see below)
Container No	799	DS	6	009
Mass Moist Soil + Cont. (g)	132.75		N/A	177.01
Mass Dry Soil + Cont. (g)	125.72			166.29
Mass Container (g)	32.12			17.10
Water Content, Wo,n (%)	7.51	N/A	N/A	7.19
Avg. Initial WC, Wo,avg (%)	7.51	Final (Wat);	Slice;	Whole Spec.

SOIL MASSES:	Initial	Final
Moist + Tare (etc.)(g):	1145.02	1141.26
Tare (etc.) (g):	0	0
Spec. Moist Mass (g):	1145.02	1141.26
EXCESS DRY SOIL (stuck to membrane, filters stones, etc.)		
Container No:		N/A
Mass Dry Soil + Container (g):		N/A
Mass Container (g):		N/A
Mass Excess Dry Soil (g):		N/A

Specimen Dimensions

	Height (mm) Initial (Ho)	Final (Haf)		Diameter (mm) Initial (Do)	Final (Daf)
GB	0	0	T	71.5	71.6
1	143.37	143.25	M	71.5	71.2
2	143.07	143.11	B	71.5	71.0
3	143.10	143.18	T'		
4	143.38	143.17	M'		
5	143.20	143.21	B'		
Avg	143.224	143.18	Avg	71.5	71.06

1 Measuring Devices:
5.638" Pi Tape: ☒ Dia. 2.81
Calipers: ☐ Ht. ☐ Dia.
Dial Comparator: ☒ Ht. ☐ Dia.

Ao (cm2) = N/A
Vo (cm3) = N/A
Aat (cm2)= N/A
Vat (cm3) = N/A

Estimated Initial Unit Weight:
Total, gt,o (lb/ft3) = N/A Dry, gd,o (lb/ft3)= N/A

Membrane / Filter Paper / Apparatus

Membrane (mm):	Top	Bottom
Number: = 1 Thickness: ☐ Single; ☒ Double	0.72	0.84
Circumference (Crm,o)	216	216
(1) Total thickness, if 2+ membranes Average:	Thickness (1) N/A	Dia.(Crm,o/p) N/A

Filter Paper: Top + Bottom: ☐ Yes ; ☒ No
Filter Strips: ☐ Yes ; ☐ No Number = N/A
If yes number = ___ Vertical: ¼" & Whatman #54 or N/A
" or = ___ or Sprial: ¼" & Whatman #1 or
Mass Drive Plate & Cap, Mdpc = N/A g, N/A lbf

NA - Not Applicable; UK - Unknown; GB - Gage Block

INTIAL → 2.31533

Note: (1) Each Test Stress is identified as a Test Stage or Sequence on other data sheets. LVDT READING

Final Specimen Description (USCS group name & symbol, color, layering, max. part. size, slickensided, fissured, blocky, honeycombed, etc.):
Cl Sa, Ol & w/few Gravels

☐ Photo taken (internal sliced surface & outside surface)
Other Remarks

Resonant Column Cyclic Torsional Shear (RCCyTS) Signature & Equipment Page		Boring: GS-1A-2 6/2/08
		Sample: NATURAL-1
		Depth (ft): N/A
		Test No. N/A
Project: Nine Mile Point Site Characterization Location: Oswego, New York		Fugro Project No.: 0411-08-1696
SIGNATURES		
Specimen Trimmed/Recompacted by: DBW		Date: 6/1/08
Specimen Setup by: Jupiter		Date: 6/1/08
Test Performed by: (per GEI Procedure 109 rev. ___) Jupiter		Date: 6/1/08
Specimen Takedown by: Jupiter		Date: 6/3/08
Preliminary Calculations by:		Date: 6/12/08
Calculated by:		Date: 6/12/08
Reviewed by:		Date: 6/24/08
EQUIPMENT USED		
RCCyTS Workstation No.: RC-7	Balance ID: BA-006	
Caliper ID: VH-10838	PI Tape ID: VH-10822	
Oven ID: #14	Scalping Sieve Size & ID: 3/8" B-31	
Other (specify) ID: —	Other (specify) ID: —	
Comments/Notes: —		

Water Content Measurement

Project Name: Nine Mile Point Site Characterization, Oswego, NY
Project No.: 07223
Performed by, per Proc 101, rev (NA): DANIEL B. NYARKO
Checked By: _____ Date: 6/16/08

DS 6/16/08

Determination No.	GEI # 07223					
Boring	TP-102					
Sample	1-A					
Oven ID	14					
Balance ID	BA006					
Date/Time in Oven	5/27/08					
Date/Time Out of Oven	5/28/08					
Tare No.	6057					
(a) Wet Wt. + Tare	150.29 g	g	g	g	g	g
(b) Dry Wt. + Tare	142.07 g	g	g	g	g	g
(c) Wt. Tare	31.61 g	g	g	g	g	g
(d) Wt. Water (a – b)	8.22 g	g	g	g	g	g
Wt. Wet Solids (a – c)	118.68 g	g	g	g	g	g
(e) Wt. Dry Solids (b – c)	110.46 g	g	g	g	g	g
Water Content (d/e) x 100, %	7.44					
Is Wet Wt. Enough for Method B? (yes/no)	YES					

DS 6/16/08

Remarks:

Test Notes:
1. Oven dry at 110°C (±5°C) for 12 hours minimum.
2. Cool in desiccator for a minimum of 30 minutes before weighing.

GEI Consultants

Form 101.1, rev. 1

RCTS Testing Record (Page 1 of 10)

NATURAL-1

Project #: 0411-08-1696 Project: Nine Mile Point Unit 3, Oswego, New York

BS 2/9/08

Specimen ~~#: NATURAL-2~~ Specimen Description: SC, SA, OL G w/ FEW GRAVELS

Tested By, per GEI Procedure 109 rev (0): JWC Date: 6.1.08

Checked By: Date: 6/16/08

Test Station: RC7

Confining Pressure: 3.1 psi **Testing Stage: X0.25**

RC Time Effect Tests

	Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
PM	3:17	B-2-NATURAL-1.P3-T0	4	1	109.3	
PM	4:57	B-2-NATURAL-1.P3-T7	4	1	116.1	
END						

RC Strain Amplitude Effect Tests

BS 6/6/08

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

RCTS Testing Record (Page 2 of 10)

Station:_____ Date:_____ Tested by:_____

Project #:_____ Project Name:_____

Boring #:_____ Specimen #:_____

Confining Pressure:_____ **Testing Stage: X0.25**

TS Tests (prior to tests, fr= Hz)

Frequency (Hz)	File Name	Pre-Amp Input (mV)	Post-Amp Input (mV)	Strain Amplitude	Notes
0.5					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

RCTS Testing Record (Page 3 of 10)

Station: RC 7 Date: 6.2.08 Tested by: ft Surad Jupic

Project #: 0411-08-1696 Project Name: GEI

Boring #: B-2 Specimen #: natural

Confining Pressure: 6.2 psi **Testing Stage: X0.5**

RC Time Effect Tests

	Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
AM	7:35	B-2-natural-1-PG-76	10	1	123.3	
AM	9:15	B-2-Natural-1-PG-77	10	1	127.8	
END	~~END~~					

6/19/08

RC Strain Amplitude Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

RCTS Testing Record (Page 4 of 10)

Station:_____ Date:_____ Tested by:_____ DS 1/4/08

Project #:_____ Project Name:_____

Boring #:_____ Specimen #:_____

Confining Pressure:_____ **Testing Stage: X0.5**

TS Tests (prior to tests, fr= Hz)

Frequency (Hz)	File Name	Pre-Amp Input (mV)	Post-Amp Input (mV)	Strain Amplitude	Notes
0.5					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

RCTS Testing Record (Page 5 of 10)

S1
6.24.08

Station: RC7 Date: 6.2.08 Tested by: SI Suvad Jupic
Project #: 0411-08-1696 Project Name: QE1
Boring #: B-2 Specimen #: Natural-1
Confining Pressure: 12.5 PSI **Testing Stage: X1**

RC Time Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
9:27	B-2-Natural-1-P12-To 10	1	1	173.5	
11:06	B-2-Natural-1-P12-T7	10	1	139.8	
End					

P3 6/18/08

108.74
≈ 60%

RC Strain Amplitude Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
12:36	B-2-Natural-1-P12-S_0	5	1	139.6	
12:36	B-2-Natural-1-P12-S_1	10	1	139.8	
12:37	B-2-Natural-1-P12-S-2	20	1	139.1	
12:37	B-2-Natural-1-P12-S_3	40	1	137.8	
12:38	B-2-Natural-1-P12_S_4	80	1	135.2	
12:39	B-2-Natural-1-P12-SP-0	160	10	121.8	
12:39	B-2-Natural-1-P12-SP-1	320	10	125.5	
12:40	B-2-Natural-1-P12-SP_0	640	10	117.0	
12:41	B-2-Natural-1-P12-SC_0	1280	10	104.9	
	End	2.5 6/24			

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
12:43	B-2-Natural-1-P12-SC_10	10	1	136.4	

RCTS Testing Record (Page 6 of 10)

11
6.24.08

Station: RC 7 Date: 6.2.08 Tested by: AJ Suvad Jupic
Project #: 0411-08-1696 Project Name: GE1
Boring #: B-2 Specimen #: Natural
Confining Pressure: 12.5 psi **Testing Stage: X1**

TS Tests (prior to tests, fr= 137.8 Hz)

Frequency (Hz)	File Name	Pre-Amp Input (mV)	Post-Amp Input (mV)	Strain Amplitude	Notes
0.5	B-2-Natural-P12-TS01	0.1	1.98	1.53-6	
0.5	B-2-Natural-P12-TS02	0.2	3.96	2.9-6	
0.5	B-2-Natural-P12-TS03	0.4	7.93	0.6-5	
0.5	B-2-Natural-P12-TS04	0.64	12.70	1.02-5	
0.1	B-2-Natural-P12-TS05	0.64	12.70	1.03-5	
0.5	B-2-Natural-P12-TS06	↓	↓	1.02-5	
1	B-2-Natural-P12-TS07			1.01-5	
5	B-2-Natural-P12-TS08			0.98-5	
10	B-2-Natural-P12-TS09	0.64	12.70	0.95-5	
0.5	B-2-Natural-P12-TS10	1.28	25.40	2.1-5	
0.5	B-2-Natural-P12-TS11	2.56	50.81	0.47-5	
0.5	B-2-Natural-P12-TS12	4.7	93.35	1.07-4	
0.1	B-2-Natural-P12-TS13	↓	↓	1.05-4	
0.5	B-2-Natural-P12-TS14			1-4	
1	B-2-Natural-P12-TS15			0.98-4	
5	B-2-Natural-P12-TS16			0.96-4	
10	B-2-Natural-P12-TS17	4.7	93.71	0.95-4	
0.5	END				
0.5					

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
11:35	B-2-Natural-P12-TSCK	10	1	136.3	
12:34	NA	10	1	139.6	
END					

ll
6.24.08

RCTS Testing Record (Page 7 of 10)

Station: RC 7 Date: 6.2.08 Tested by: CT Suvad Jupic
Project #: 0411-08.1696 Project Name: GE1
Boring #: B.2 Specimen #: Natural -1
Confining Pressure: 25 psi **Testing Stage: X2**

RC Time Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
pm 12:47	B-2-natural-1-P25-T0	10	1	149.6	
pm 1:26	B-2-natural-1-P25-T1	10	1	147.1	
(2nd)					

RC Strain Amplitude Effect Tests

BS 6/6/08

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

RCTS Testing Record (Page 8 of 10)

Station:_____ Date:_____ Tested by:_____ DS 6/6/06

Project #:_____ Project Name:_____

Boring #:_____ Specimen #:_____

Confining Pressure:_____ **Testing Stage: X2**

TS Tests (prior to tests, fr= Hz)

Frequency (Hz)	File Name	Pre-Amp Input (mV)	Post-Amp Input (mV)	Strain Amplitude	Notes
0.5					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

RCTS Testing Record (Page 9 of 10)

C1
6.24.08

Station: RC7 Date: 6.2.08 Tested by: A + Sunal Jupic
Project #: 04/1-08-1692 Project Name: GEI
Boring #: B-2 Specimen #: Natural -1
Confining Pressure: 50 psi **Testing Stage: X4**

RC Time Effect Tests

	Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
PM	2:18	B-2-Natural-1-P50-T0	10	1	169.2	
PM	4:13	B-2-Natural-1-P50-T7	10	1	177.9	
147 min PM	5:01	~~1447 11 624 PM - SLFA~~	10	1	178.6	
	END	B-2-Natural-1-P50-TA				

RC Strain Amplitude Effect Tests

	Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
PM	6:02	B-2-Natural-1-P50-S_0	5	1	179.1	
	6:03	B-2-Natural-1-P50-S_1	10	1	178.8	
	6:03	B-2-Natural-1-P50-S_2	20	1	178.8	
	6:03	B-2-Natural-1-P50-S_3	40	1	178.4	
	6:03	B-2-Natural-1-P50-S_4	80	1	177.6	
	6:05	B-2-Natural-1-P50-SA-0	160	10	175.5	
	6:05	B-2-Natural-1-P50-SA-1	320	10	171.6	
	6:05	B-2-Natural-1-P50-SB-0	640	10	165	
	6:06	B-2-Natural-1-P50-SC-0	1280	10	154	
	6:07	B-2-Natural-1-P50-SD-0	2560	10	140.1	
PM	6:08	B-2-Natural-1-P50-SE-0	4000	10	131.4	
		END				

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
6:09	B-2-Natural-1-P50-SCL	10	1	172.8	

S1
6.24.08

RCTS Testing Record (Page 10 of 10)

Station: RC 7 Date: 6.2.08 Tested by: Lt Suvad Jupic
Project #: 0911-08-169C Project Name: GE1
Boring #: B-2 Specimen #: Natural-1
Confining Pressure: 50 psi **Testing Stage: X4**

TS Tests (prior to tests, fr=178.6 Hz)

Frequency (Hz)	File Name	Pre-Amp Input (mV)	Post-Amp Input (mV)	Strain Amplitude	Notes
0.5	B-2-Natural-P50-TS01	0.15	2.975	1.5-5	
0.5	B-2-Natural-P50-TS02	0.3	5.95	3-5	
0.5	B-2-Natural-P50-TS03	0.6	11.9	0.58-5	
0.5	B-2-Natural-P50-TS04	1.05	20.83	1.01-5	
0.1	B-2-Natural-P50-TS05	1.05	20.83	1.03-5	
0.5	B-2-Natural-P50-TS06	↓	↓	1-5	
1	B-2-Natural-P50-TS07	↓	↓	0.99-5	
5	B-2-Natural-P50-TS08	↓	↓	0.96-5	
10	B-2-Natural-P50-TS09	1.05	20.83	0.94	
0.5	B-2-Natural-P50-TS10	2.1	41.67	2.03-5	
0.5	B-2-Natural-P50-TS11	4.2	83.40	4.2-5	
0.5	B-2-Natural-P50-TS12	4.7	93.75	4.85-5	max input
0.1	B-2-Natural-P50-TS13	4.7	93.75	4.75-5	
0.5	B-2-Natural-P50-TS14	↓	↓	4.6-5	
1	B-2-Natural-P50-TS15	↓	↓	4.5-5	
5	B-2-Natural-P50-TS16	↓	↓	4.4-5	
10	B-2-Natural-P50-TS17	4.7	93.75	4.3-5	
0.5	END				
0.5					

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
15:28	B-2-Natural-1-P50-RC4	10	1	177.4	
15:59	N/A	10	1	178.6	
END					

PS 6/10/08

App. D

RESONANT COLUMN CYCLIC TORSIONAL SHEAR (RCCyTS) TEST
Specimen Setup / Take Down

Project No: 0411-08-1696 Test Type: RCTS Cell No.: RC7 File Name: N/A
Project Name: GCI Test Stress(es), σ' = 3.1 , 6.2 , 12.5 , 25 & 50 psi (1)
Task No.: N/A Stokoe Resonant Column Device Gs = N/A ☐ Meas.; ☐ Assumed
Test No.: N/A Test Series No.: N/A Top Cap ID: 003

Assig. Remarks: 39.38cm²

☐ Tube ☐ Field Extruded ☐ Liner ☐ N/A
Boring No.: 2 ☐ Reconstituted
Sample No.: NATURAL Composite No.: N/A
Depth (ft): — N/A Specimen No.: 2
☐ Spec. Selection by X-ray; ☐ Geomarine Sample

Specimen Preparation (for reconstituted samples)
Target Dry Density 115.7 pcf Lift Thickness 28.612 AS 7/9/08 No. Lifts 5
Final Ht. 143.06 Final Area ~~39.38cm²~~ Final Vol. 563.40 m³
Final Total Mass 1141.08 Water Cont. 7.8%

Type: ☒ Isotropic ☐ Ko stress path
Consolidation: ☐ Anisotropic ☐ 45o stress path

Water Content (WC);	Initial - Trimming Location: Top (Wo,1)	Bottom (Wo,2)	Sides (Wo,3)	Final (Wat) (see below)
Container No	C-15			ST-5
Mass Moist Soil + Cont. (g)	138.67		N/A	192.82
Mass Dry Soil + Cont. (g)	131.15			181.00
Mass Container (g)	30.07			17.14
Water Content, Wo,n (%)	7.44	N/A	N/A	7.21
Avg. Initial WC, Wo,avg (%)	7.44	Final (Wat): ☐ Slice; ☐		Whole Spec.

SOIL MASSES:	Initial	Final
Moist + Tare (etc.)(g):	1144.1	1141.08
Tare (etc.) (g):	0	0
Spec. Moist Mass (g):	1144.1	1141.08
EXCESS DRY SOIL (stuck to membrane, filters stones, etc.)		
Container No:		N/A
Mass Dry Soil + Container (g):		N/A
Mass Container (g):		N/A
Mass Excess Dry Soil (g):		N/A

Specimen Dimensions

	Height (mm) Initial (Ho)	Final (Hat)		Diameter (mm) Initial (Do)	Final (Dat)
GB	0	0	T	71.5	70.7
1	143.08	143.14	M	71.5	71.0
2	143.04	143.01	B	71.5	70.8
3	143.05	143.01	T'		AS 4/17/08
4	143.20	143.04	M'		
5	142.12	143.10	B'		
Avg	142.098	143.06	Avg	71.5	70.83

1 Measuring Devices:
5.633" Pi Tape: ☒ Dia. 2.814" Ao (cm2) = N/A
Calipers: ☐ Ht. ☐ Dia. Vo (cm3) = N/A
Dial Comparator: ☒ Ht. ☐ Dia. Aat (cm2)= N/A
Vat (cm3) = N/A

Estimated Initial Unit Weight:
Total, gt,o (lb/ft3) = N/A Dry, gd,o (lb/ft3)= N/A

Membrane / Filter Paper / Apparatus

Membrane (mm):	Top	Bottom
Number: = 1 ☐ Single; ☒ Double	0.72	0.84
Circumference (Crm,o)	216	216
(1) Total thickness, if 2+ membranes Average:	Thickness (1) N/A	Dia.(Crm,o/p) N/A

Filter Paper: Top + Bottom: ☐ Yes ; ☑ No
Filter Strips: ☐ Yes ; ☑ No Number = N/A
If yes number = 6 Vertical: ¼" & Whatman #54 or N/A
" or = ~~5~~ N/A or Sprial: ¼" & Whatman #1 or
Mass Drive Plate & Cap, Mdpc = N/K g, N/A lbf

NA - Not Applicable; UK - Unknown; GB - Gage Block

AS 4/19/08 −2.24326 INITIAL LVDT READING

Note: (1) Each Test Stress is identified as a Test Stage or Sequence on other data sheets.

Final Specimen Description (USCS group name & symbol, color, layering, max. part. size, slickensided, fissured, blocky, honeycombed, etc.):
CLSa, OCG w/ few Gravels

☐ Photo taken (internal sliced surface & outside surface)
Other Remarks

Resonant Column Cyclic Torsional Shear (RCCyTS) Signature & Equipment Page	Boring: 2
	Sample: NATURAL-2
	Depth (ft): —
	Test No. —

Project: Nine Mile Point Site Characterization Location: Oswego, New York	Fugro Project No.: 0411-08-1696

SIGNATURES

Specimen Trimmed/Recompacted by: DBN	Date: 6/3/08
Specimen Setup by: Jupiter	Date: 6/3/08
Test Performed by: (per GEI Procedure 109 rev. ___) Jupiter	Date: 6/3/08
Specimen Takedown by: Jupiter	Date: 6/5/08
Preliminary Calculations by:	Date: 6/16/08
Calculated by:	Date: 6/16/08
Reviewed by:	Date: 6/24/08

EQUIPMENT USED

RCCyTS Workstation No.: RC-7	Balance ID: BA-006
Caliper ID: VH-10838	PI Tape ID: VH-10822
Oven ID: #14	Scalping Sieve Size & ID: 3/8" B-31
Other (specify) ID: —	Other (specify) ID: —

Comments/Notes: —

Water Content Measurement

Project Name: Nine Mile Point Site Characterization, Oswego, NY
Project No.: 07223
Performed by, per Proc 101, rev (N/A): DANIEL B. NYARKO
Checked By: _____ Date: 6/16/08
6/16/08

Determination No.	GEI # 07223					
Boring	TP-102					
Sample	1-2					
Oven ID	14					
Balance ID	BA006					
Date/Time in Oven	5/27/08					
Date/Time Out of Oven	5/28/08					
Tare No.	6057					
(a) Wet Wt. + Tare	150.29 g	g	g	g	g	g
(b) Dry Wt. + Tare	142.07 g	g	g	g	g	g
(c) Wt. Tare	31.61 g	g	g	g	g	g
(d) Wt. Water (a – b)	8.22 g	g	g	g	g	g
Wt. Wet Solids (a – c)	118.68 g	g	g	g	g	g
(e) Wt. Dry Solids (b – c)	110.46 g	g	g	g	g	g
Water Content (d/e) x 100, %	7.44					
Is Wet Wt. Enough for Method B? (yes/no)	YES					

BS 6/19/08

BS 6/19/08

Remarks:

Test Notes:
1. Oven dry at 110°C (±5°C) for 12 hours minimum.
2. Cool in desiccator for a minimum of 30 minutes before weighing.

GEI

Form 101.1, rev. 1

RCTS Testing Record (Page 1 of 10)

NATURAL 2

Project #: 0411-08-1695 Project: Nine Mile Point Unit 3, Oswego, New York

Specimen ~~#: Natural 2~~ Specimen Description: CLS UC6 w/ few gravel

Tested By, per GEI Procedure 109 rev (0): Jupiter Date: 6.4.08

Checked By: [signature] Date: 6/16/08

AS 7/9/08

Test Station: RC7

Confining Pressure: 3.1 psi **Testing Stage: X0.25**

RC Time Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
AM 8:05	B-2-Natural-2-P3-T0	4	1	111.1	
AM 9:45	B2-Nat-nl-2-P3.T-1	4	1	115.4	
End ~~End~~					

AS 6/16/08

RC Strain Amplitude Effect Tests

AS 6/16/08

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

RCTS Testing Record (Page 2 of 10)

Station: RC7 Date: 6.4.08 Tested by: [illegible]

Project #: 0411-08-1696 Project Name: GE1

Boring #: [illegible] Specimen #: [illegible]

Confining Pressure: [illegible] **Testing Stage: X0.25**

TS Tests (prior to tests, fr= Hz)

Frequency (Hz)	File Name	Pre-Amp Input (mV)	Post-Amp Input (mV)	Strain Amplitude	Notes
0.5					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

RCTS Testing Record (Page 3 of 10)

Station: RC 7 Date: 6.4.08 Tested by: Ed Suvol Jupic

Project #: 0411-08-1696 Project Name: GE1

Boring #: B-2 Specimen #: Natural-2

Confining Pressure: 6.2 psi **Testing Stage: X0.5**

RC Time Effect Tests

	Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
AM	9:54	B-2-Natural-2-PC-T.0	10	1	119	
AM	11:37	B-2-Natural-2-PC-T.7	10	1	123.6	
END	END					

6/18/08

RC Strain Amplitude Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

RCTS Testing Record (Page 4 of 10)

Station:_____ Date:_____ Tested by:_____

Project #:_____ Project Name:_____

Boring #:_____ Specimen #:_____

Confining Pressure:_____ **Testing Stage: X0.5**

TS Tests (prior to tests, fr= Hz)

Frequency (Hz)	File Name	Pre-Amp Input (mV)	Post-Amp Input (mV)	Strain Amplitude	Notes
0.5					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

6.24.08

RCTS Testing Record (Page 5 of 10)

Station: RC7 Date: 6.4.08 Tested by: ft Suvad Jupic
Project #: 04II-08-1692 Project Name: GE 1
Boring #: B-2 Specimen #: Natural
Confining Pressure: 12.5 psi **Testing Stage: X1**

RC Time Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
AM 11:49	B-2-Natural-2-P12-T0	10	1	129.3	
PM 1:27	B-2-Natural-2-P12-T7	10	1	136.1	
(end)					

S 6/19/08

RC Strain Amplitude Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
PM 3:18	B-2-Natural-2-P12-S_0	5	1	136.6	
3:18	B-2-Natural-2-P12-S_1	10	1	136.1	
3:19	B-2-Natural-2-P12-S_2	20	1	135.9	
3:19	B-2-Natural-2-P12-S_3	40	1	134.6	
3:19	B-2-Natural-2-P12-S_4	80	1	132.1	
3:20	B-2-Natural-2-P12-SA_0	160	10	128.1	
3:21	B-2-Natural-2-P12-SA_1	320	10	122	
3:22	B-2-Natural-2-P12-SB_0	640	10	113.8	
PM 3:23	B-2-Natural-2-P12-SC_0	1280	10	102.3	
	B (end)				

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
PM 3:24	B-2-Natural-2-P12-SCk	10	1	132.8	

S1
6.24.08

RCTS Testing Record (Page 6 of 10)

Station: RC7 Date: 6.4.08 Tested by: [illegible]
Project #: 0411-08-1696 Project Name: GE1
Boring #: B-2 Specimen #: Natural-2
Confining Pressure: 12.5 psi **Testing Stage: X1**

TS Tests (prior to tests, fr=136.1 Hz)

Frequency (Hz)	File Name	Pre-Amp Input (mV)	Post-Amp Input (mV)	Strain Amplitude	Notes
0.5	B-2-Natural-2-P12-TS01	0.10	1.98	1.3-6	
0.5	B-2-Natural-2-P12-TS02	0.20	3.96	2.8-6	
0.5	B-2-Natural-2-P12-TS03	0.4	7.92	0.6-5	
0.5	B-2-Natural-2-P12-TS04	0.64 (0.62)	12.28 (12.28)	1.0-5 (1.05-5)	1.02-5 S1 6/24
0.1	B-2-Natural-2-P12-TS05	0.62	12.28	1.05-5	
0.5	B-2-Natural-2-P12-TS06	↓	↓	1.01-5	
1	B2-Natural-2-P12-TS07			1-5	
5	B2-Natural-2-P12-TS08	↓	↓	0.97-5	
10	B2-Natural-2-P12-TS09	0.62	12.28	0.95-5	
0.5	B2-Natural-2-P12-TS10	1.24	24.56	2.1-5	
0.5	B2-Natural-2-P12-TS11	2.48	49.13	4.8-5	
0.5	B2-Natural-2-P12-TS12	4.5	89.35	1.01-4	
0.1	B2-Natural-2-P12-TS13	4.5	89.35	1.04-4	
0.5	B2-Natural-2-P12-TS14	↓	↓	1-4	
1	B2-Natural-2-P12-TS15			0.99-4	
5	B2-Natural-2-P12-TS16	↓	↓	0.96-4	
10	B2-Natural-2-P12-TS17	4.5	89.35	0.94-4	
0.5	end				
0.5					

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
2:12	B2-Natural-2-P12-TS18	10	1	131.8	
0:12	NK	10	1	136.1	
end					

RCTS Testing Record (Page 7 of 10)

SI 6.24.08

Station: RC 7 Date: 6.4.08 Tested by: A Suvad Jupic

Project #: 0411-08-1696 Project Name: GE1

Boring #: B-2 Specimen #: nch1-L-2

Confining Pressure: 25 psi **Testing Stage: X2**

RC Time Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
PM 3:29	B-2-natural-2-P25-T5	10	1	1462	
PM 5:07	B-2-natural-2-P25-T7	10	1	1541	
END 6:08					

DS 6/18/08

RC Strain Amplitude Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

DS 6/18/08

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

RCTS Testing Record (Page 8 of 10)

PS 6/16/08

Station:_____ Date:_____ Tested by:_____

Project #:_____ Project Name:_____

Boring #:_____ Specimen #:_____

Confining Pressure:_____ **Testing Stage: X2**

TS Tests (prior to tests, fr= Hz)

Frequency (Hz)	File Name	Pre-Amp Input (mV)	Post-Amp Input (mV)	Strain Amplitude	Notes
0.5					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					
0.5					
0.1					
0.5					
1					
5					
10					
0.5					
0.5					

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes

RCTS Testing Record (Page 9 of 10)

SI 6.24.08

Station: RC1 Date: 6.4.08 Tested by: Suyad Jupic

Project #: 0411-08-1696 Project Name: GE1

Boring #: B-2 Specimen #: Natural-2

Confining Pressure: 50 psi **Testing Stage: X4**

RC Time Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
PM 5:12	B-2-Natural-2-P50-T.0	10	1	166.3	
PM 6:49	B-2-Natural-2-P50-T.1	10	1	175.9	
147mth 7:38	~~147 SI 6.24.08 mgtn~~ -TA	10	1	176.6	
END	B-2-Natural-2-P50				

RC Strain Amplitude Effect Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
PM 8:47	B-2-Natural-2-P50-S.0	5	1	176.6	
8:47	B-2-Natural-2-P50-S.1	10	1	176.6	
8:48	B-2-Natural-2-P50-S.2	20	1	176.3	
8:48	B-2-Natural-2-P50-S.3	40	1	176.1	
8:48	B-2-Natural-2-P50-S.4	80	1	175.3	
8:50	B-2-Natural-2-P50-SA.0	160	10	173.1	
8:50	B-2-Natural-2-P50-SA.1	320	10	169.4	
8:51	B-2-Natural-2-P50-SB.0	640	10	162.4	
8:52	B-2-Natural-2-P50-SC.0	1280	10	152.7	
8:53	B-2-Natural-2-P50-SD.0	2560	10	138.9	
PM 8:54	B-2-Natural-2-P50-SE.0	4000	10	129.4	
	END				

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
PM 8:56	B-2-Natural-2-P50-SCk	10	1	171.6	

RCTS Testing Record (Page 10 of 10)

SJ 6.24.08

Station: RC7 Date: 6.4.08 Tested by: SJ Suvad Jupic

Project #: 0411-08-1696 Project Name: GEI

Boring #: B-2 Specimen #: Natural 2

Confining Pressure: 50 psi **Testing Stage: X4**

TS Tests (prior to tests, fr=176.6 Hz)

Frequency (Hz)	File Name	Pre-Amp Input (mV)	Post-Amp Input (mV)	Strain Amplitude	Notes
0.5	B-2-Natural-2-PS0-TS01	0.15	2.97	1.5E-6	
0.5	B-2-Natural-2-PS0-TS02	0.3	5.94	3.1-6	
0.5	B-2-Natural-2-PS0-TS03	0.6	11.89	0.6-5	
0.5	B-2-Natural-2-PS0-TS04	1	19.83	1-5	
0.1	B-2-Natural-2-PS0-TS05	1	19.83	1.07-5	
0.5	B-2-Natural-2-PS0-TS06	↓	↓	1-5	
1	B2-Natural-2-PS0-TS07			0.98-5	
5	B2-Natural-2-PS0-TS08	↓	↓	0.96-5	
10	B2-Natural-2-PS0-TS09	1	19.83	0.93-5	
0.5	B-2-Natural-2-PS0-TS10	2	39.66	2-5	
0.5	B-2-Natural-2-PS0-TS11	4	73.36	4.2-5	
0.5	B2-Natural-2-PS0-TS12	4.7	93.27	4.8-5	
0.1	B-2-Natural-2-PS0-TS13	4.7	93.27	4.9-5	
0.5	B2-Natural-2-PS0-TS14	↓	↓	4.75-5	
1	B-2-Natural-2-PS0-TS15			4.7-5	
5	B2-Natural-2-PS0-TS16	↓	↓	4.55-5	
10	B2-Natural-2-PS0-TS17	4.7	93.27	4.4-5	
0.5	END				
0.5					

Resonant Frequency Check after Higher Strain Amplitude Tests

Time (min)	File Name	Input (mV)	Gain @ Charge Amplifier	fr (Hz)	Notes
8:17	B2-Natural-2-PS0-TS18	10	1	174.8	
8:45	N/A	10	1	176.6	
END					