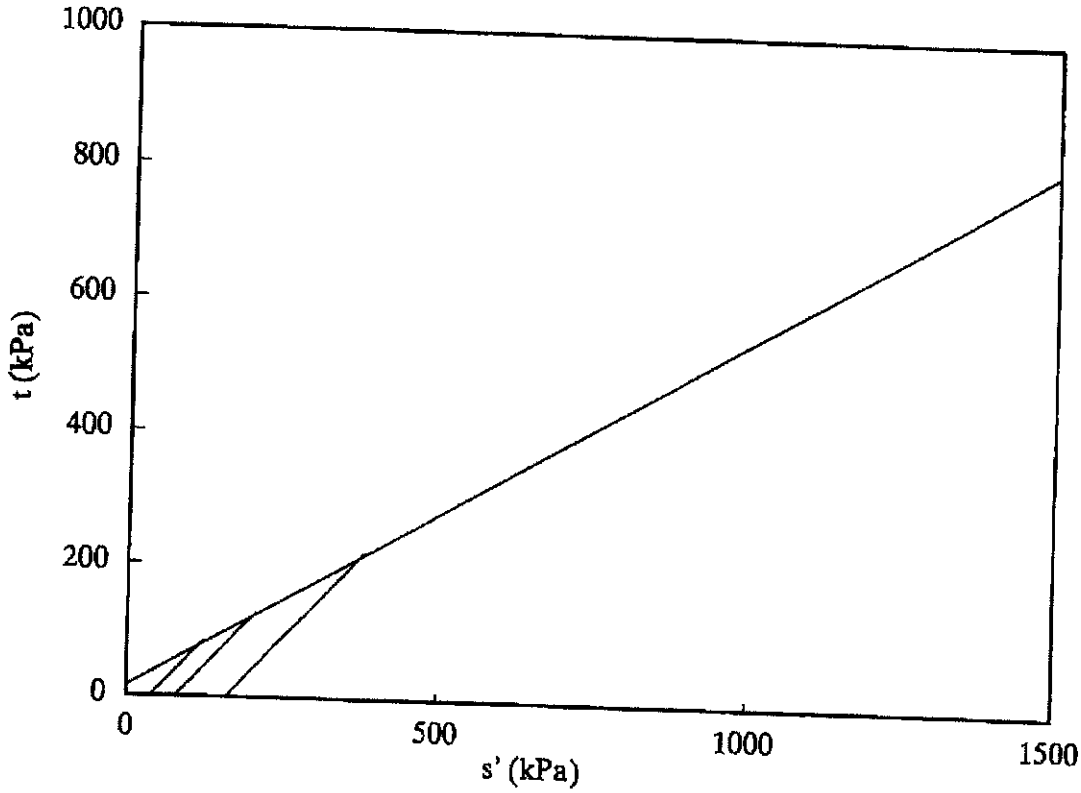
Job Name: 41 HIGHGATE
BH Number: 2

Sample No.: U1
Depth (m): 4.00



NOTES ON STRESS PATH PLOTS

1. No membrane or filter drain corrections made to stress path plots

2. Effective stress paths assume full pore water pressure equalization at all times after the start of shear. This assumption is incorrect. The rate of shearing has been estimated to give 95% equalization only at failure.

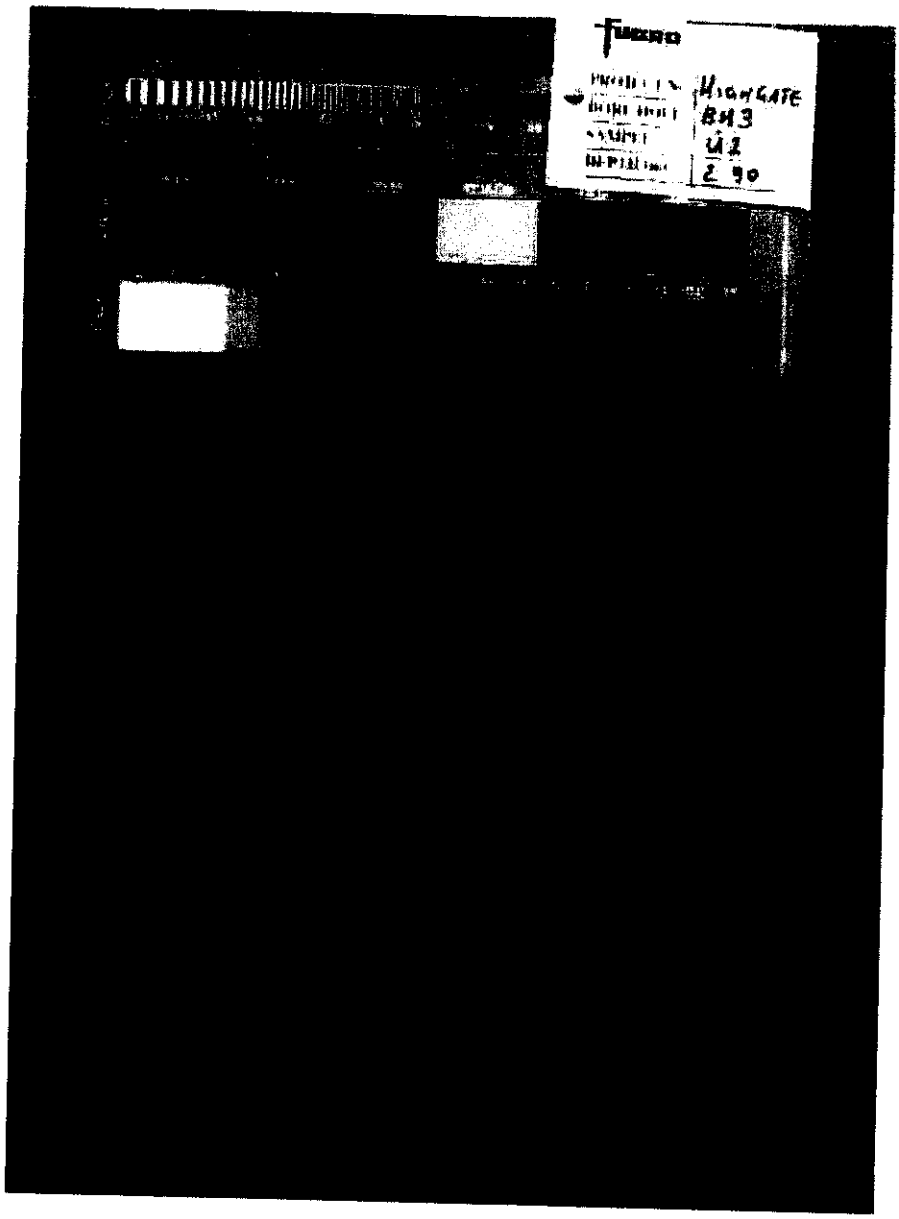
CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C
Surrey Geotechnical Consultants Limited

GROUND ENGINEERING
HIGHGATE

VISUAL DESCRIPTION
Compact thinly bedded brown and light brown fine silty SAND with clay

SPECIMEN PHOTOGRAPHS



Borehole	BH3
Sample	U1
Depth (m)	2.90

Report No: 20921005

S·G·C
Surrey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE
BH Number: 3

Sample No:U1
Depth (m):2.90

SPECIMEN DETAILS (TEST #1)
description: Firm brown sand with clay (visual)
preparation: Undisturbed
orientation within original sample: Vertical
test started: 24/03/2009

INITIAL STAGE		TEST 1
type of side drains:		Vertical
membrane thickness (mm):		0.3
particle density (Mg/m³):	assumed	2.69
voids ratio:		0.61
degree of saturation (%):		107.0

SATURATION STAGE
method: increments of cell pressure only

final pore water pressure (kPa):	293
final degree of saturation (%):	99.0

CONSOLIDATION STAGE

effective stress (kPa):	30
initial pore water pressure (kPa):	326
final pore water pressure (kPa):	300
pore pressure dissipation (%):	100.0

SHEAR STAGE
failure criterion: maximum deviator stress (kPa)

cell pressure (kPa):	330
initial pore water pressure (kPa):	300
rate of strain (mm/min):	0.006
strain at failure (%):	7.04
volumetric strain (%):	0.12
eff. major principal stress (kPa):	136
eff. minor principal stress (kPa):	30
time to peak dev. stress (min):	885

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C
Stuart Geotechnical Consultants Limited

Job name: 41 HIGHGATE
BH Number: 3

Sample No.:U1
Depth : 2.90 (m)

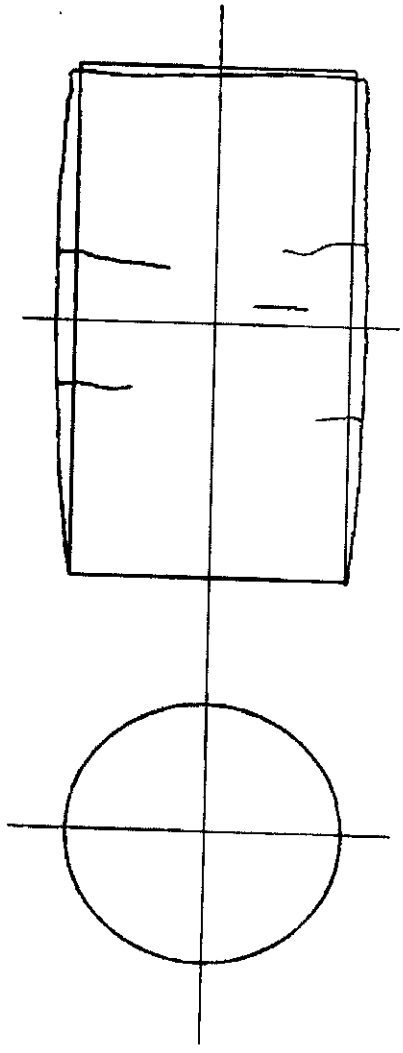
SPECIMEN DETAILS

Description : Firm brown sand with clay (visual)
Specimen size: 76 mm high
38 mm diameter

Test No:

Elevation

Plan



FAILURE SKETCH

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C
Surrey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE
BH Number: 3

Sample No.: U1
Depth (m): 2.90

SPECIMEN DETAILS (TEST #1)

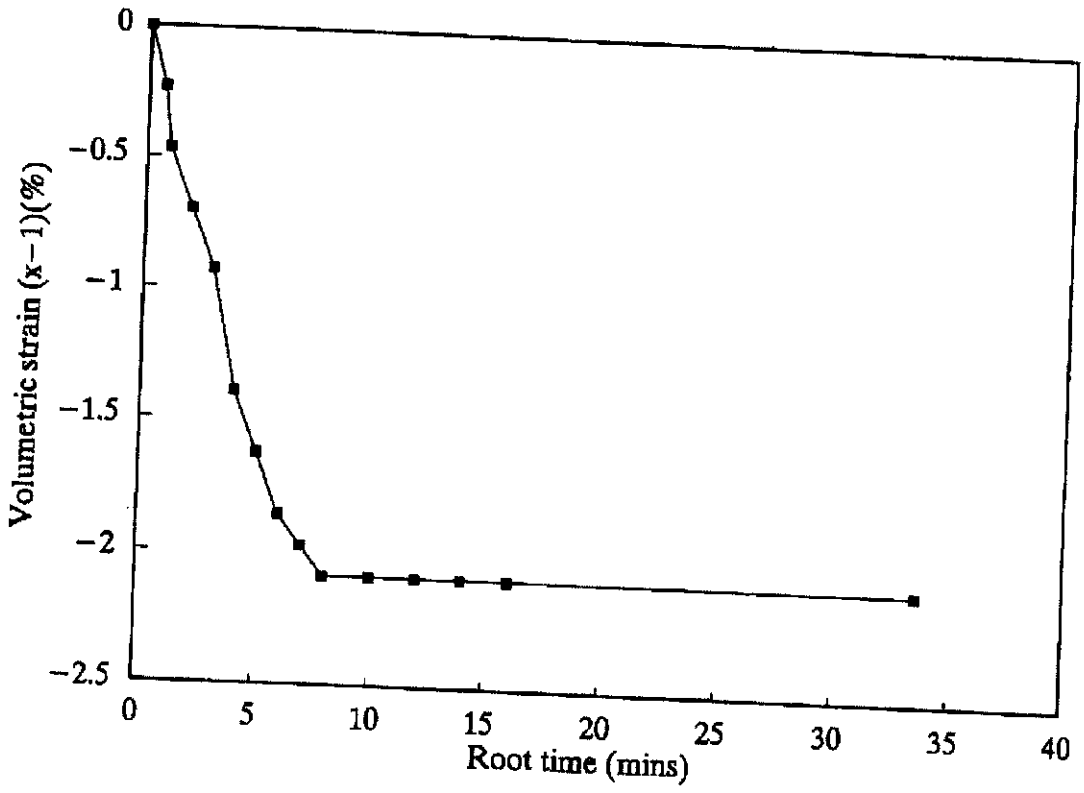
description: Firm brown sand with clay (visual)		
initial and final m/c (%):	24	24
initial bulk density (Mg/cu.m):	2.08	
initial dry density (Mg/cu.m):	1.67	
height and diameter (mm):	76	38

SATURATION STAGE

cell and back pressure (kPa):		
B value:	0.99	

CONSOLIDATION STAGE

cell and back pressure (kPa):	330	300
effective consolidation pressure (kPa):		30
base, side, top drainage	y y y	



CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

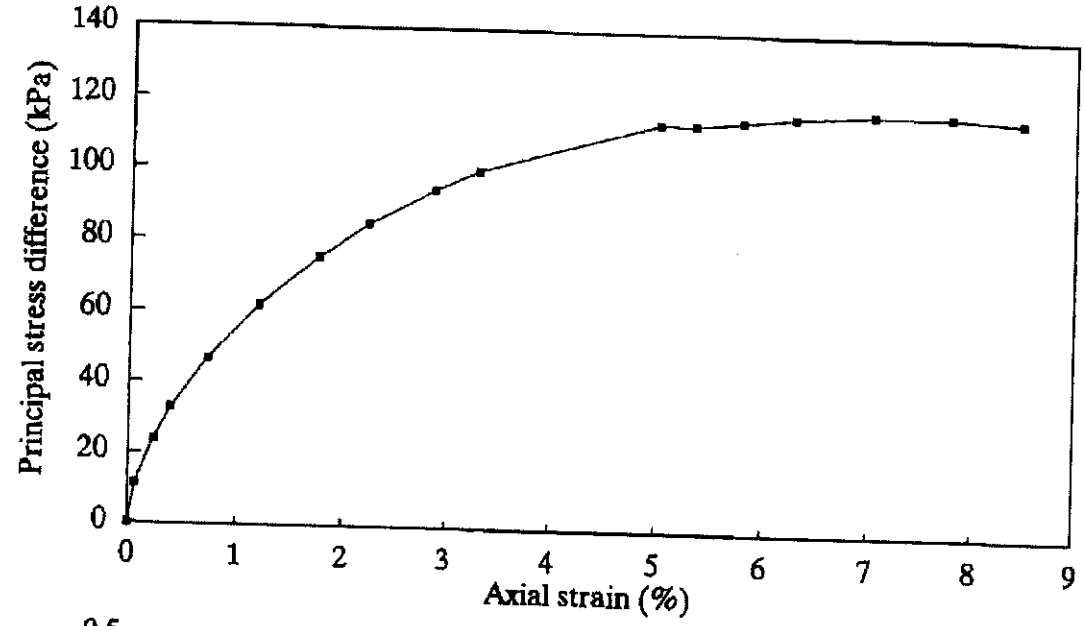
S·G·C
Surrey Geotechnical Consultants Limited

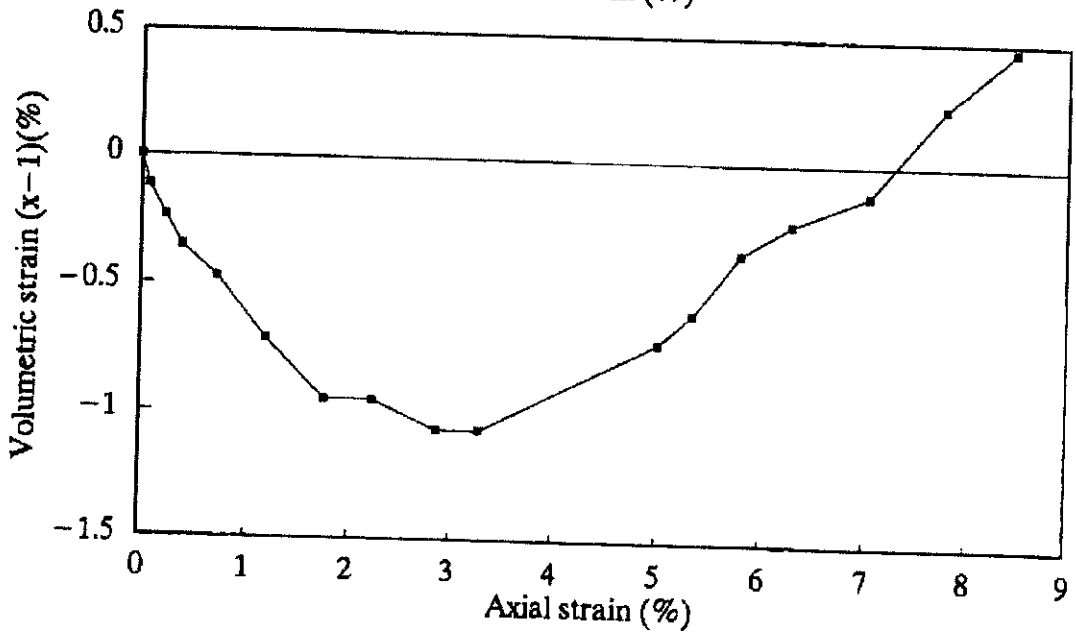
Job Name: 41 HIGHGATE
BH Number: 3

Sample No.: U1
Depth (m): 2.90

SHEAR STAGE (TEST #1)

machine rate of strain (%/hr):	0.47
cell pressure (kPa):	330
measured max. deviator stress (kPa):	118
membrane + filter drain correction (kPa):	11.8
corrected max. deviator stress (kPa):	106
pore pressure at failure (kPa):	300





CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C
Surrey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE Sample No:U1
BH Number: 3 Depth (m):2.90

SPECIMEN DETAILS (TEST #2)
description: Firm brown sand with clay (visual)
preparation: Undisturbed
orientation within original sample: Vertical
test started: 24/03/2009

		TEST 2
INITIAL STAGE		
type of side drains:		Vertical
membrane thickness (mm):		0.3
particle density (Mg/m³):	assumed	2.69
voids ratio:		0.64
degree of saturation (%):		104.8
SATURATION STAGE		
method:	increments of cell pressure only	
final pore water pressure (kPa):		296
final degree of saturation (%):		100.0
CONSOLIDATION STAGE		
effective stress (kPa):		60
initial pore water pressure (kPa):		360
final pore water pressure (kPa):		300
pore pressure dissipation (%):		100.0
SHEAR STAGE		
failure criterion:	maximum deviator stress (kPa)	
cell pressure (kPa):		360
initial pore water pressure (kPa):		300
rate of strain (mm/min):		0.006
strain at failure (%):		10.50
volumetric strain at failure (%):		0.25
eff. major principal stress (kPa):		291
eff. minor principal stress (kPa):		60
time to peak dev. stress (min):		1303

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C
Surrey Geotechnical Consultants Limited

Job name: 41 HIGHGATE Sample No.:U1
BH Number: 3 Depth : 2.90 (m)

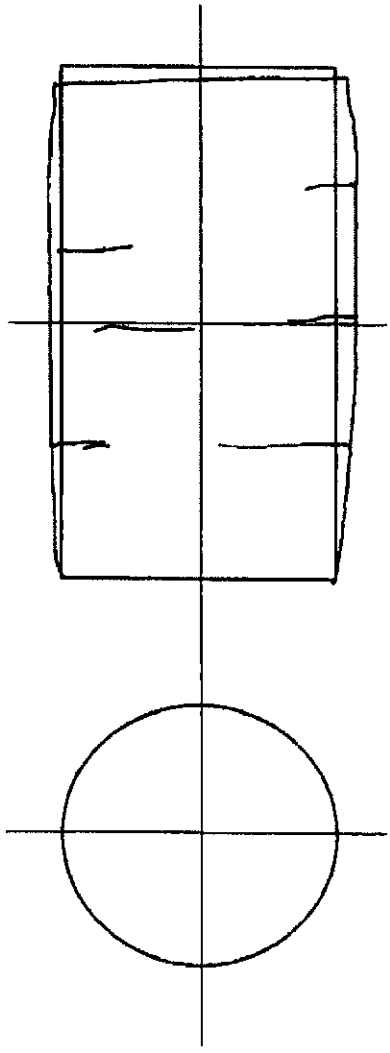
SPECIMEN DETAILS

Description : Firm brown sand with clay
(visual)
Specimen size: 76 mm high
38 mm diameter

Test No:

Elevation

Plan



FAILURE SKETCH

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C
Surrey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE Sample No.: U1
BH Number: 3 Depth (m): 2.90

SPECIMEN DETAILS (TEST #2)
description: Firm brown sand with clay
(visual)

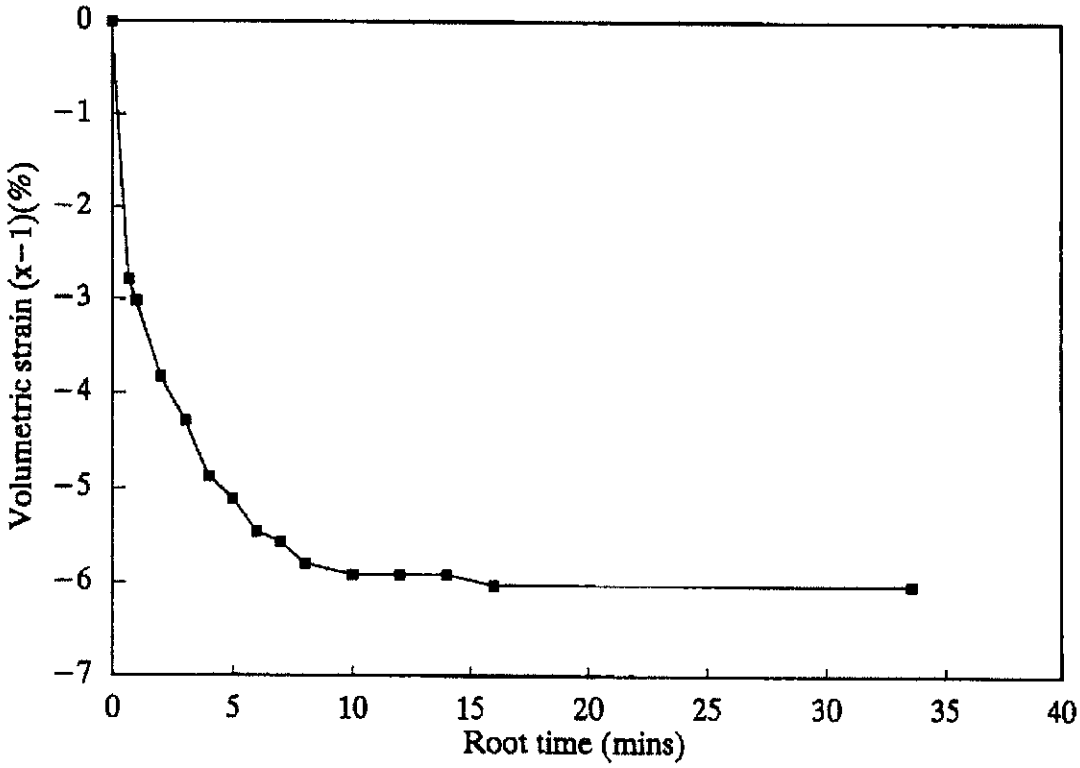
initial and final m/c (%):	25	23
initial bulk density (Mg/cu.m):	2.05	
initial dry density (Mg/cu.m):	1.64	
height and diameter (mm):	76	38

SATURATION STAGE

cell and back pressure (kPa):		
B value:	1	

CONSOLIDATION STAGE

cell and back pressure (kPa):	360	300
effective consolidation pressure (kPa):		60
base, side, top drainage	y y	y



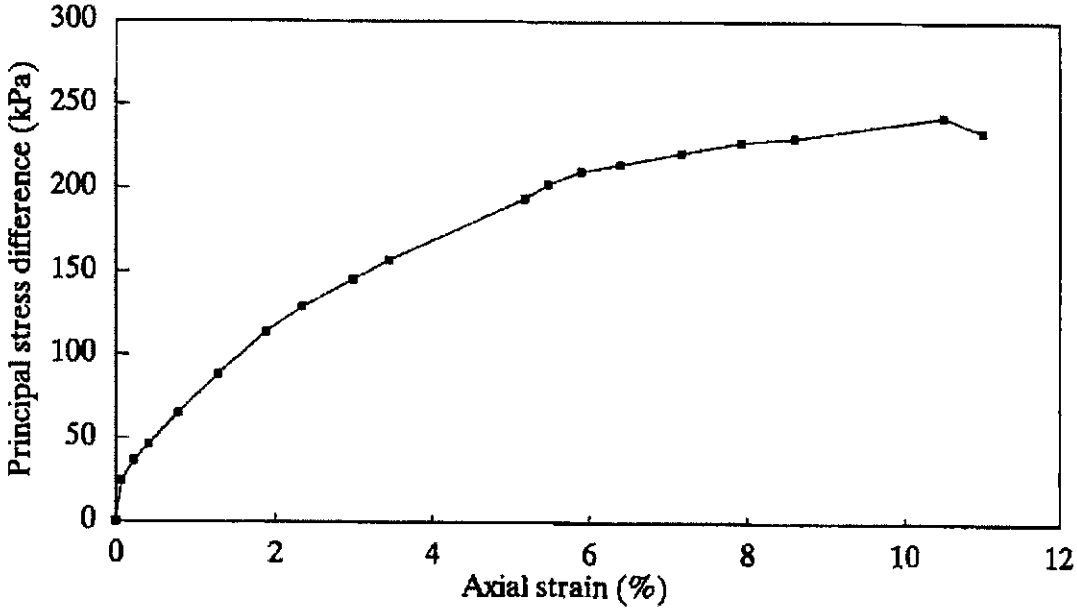
CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

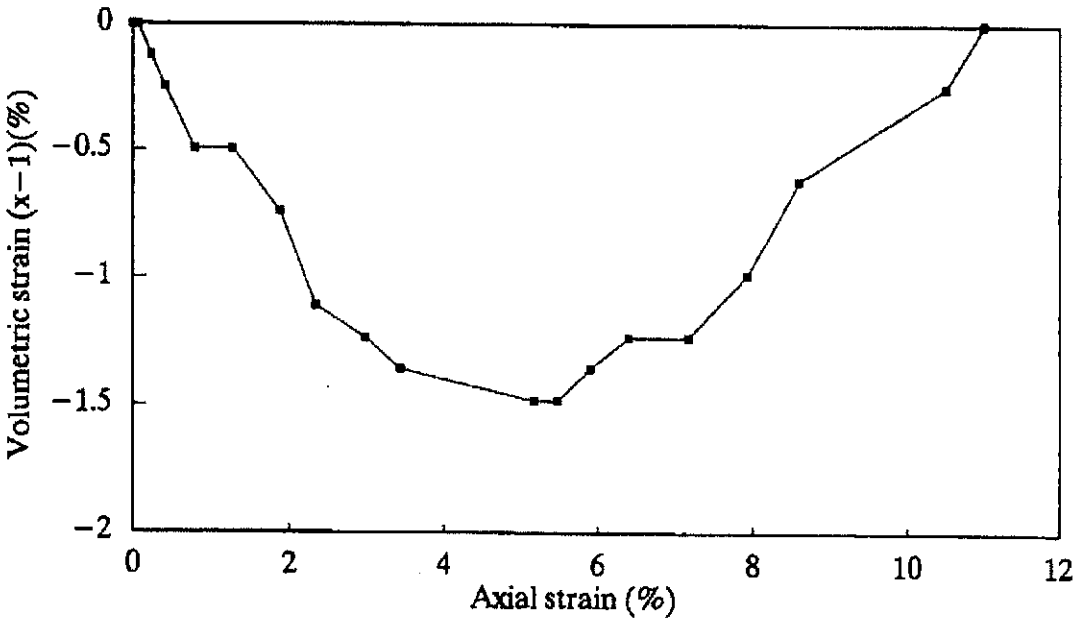
S·G·C
Surrey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE Sample No.: U1
BH Number: 3 Depth (m): 2.90

SHEAR STAGE (TEST #2)

machine rate of strain (%/hr):	0.47
cell pressure (kPa):	360
measured max. deviator stress (kPa):	243
membrane + filter drain correction (kPa)	12.4
corrected max. deviator stress (kPa):	231
pore pressure at failure (kPa):	300





CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C

Job Name:	41 HIGHGATE	Sample No:	U1
BH Number:	3	Depth (m):	2.90

SPECIMEN DETAILS (TEST #3)

description: (visual)	Firm brown sand with clay	
preparation:	Undisturbed	
orientation within original sample:		Vertical
test started:	24/03/2009	

		TEST 3
INITIAL STAGE		
type of side drains:		Vertical
membrane thickness (mm):		0.3
particle density (Mg/m^3):	assumed	2.69
voids ratio:		0.65
degree of saturation (%):		104.1

SATURATION STAGE	
method:	increments of cell pressure only
final pore water pressure (kPa):	419
final degree of saturation (%):	99.0

CONSOLIDATION STAGE	
effective stress (kPa):	120
initial pore water pressure (kPa):	419
final pore water pressure (kPa):	300
pore pressure dissipation (%):	100.0

SHEAR STAGE	
failure criterion:	maximum deviator stress (kPa)
cell pressure (kPa):	420
initial pore water pressure (kPa):	300
rate of strain (mm/min):	0.006
strain at failure (%):	10.07
volumetric strain at failure (%):	1.23
eff. major principal stress (kPa):	490
eff. minor principal stress (kPa):	120
time to peak dev. stress (min):	1253

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C

Surrey Geotechnical Consultants Limited

Job name: 41 HIGHGATE Sample No.:U1
BH Number: 3 Depth : 2.90 (m)

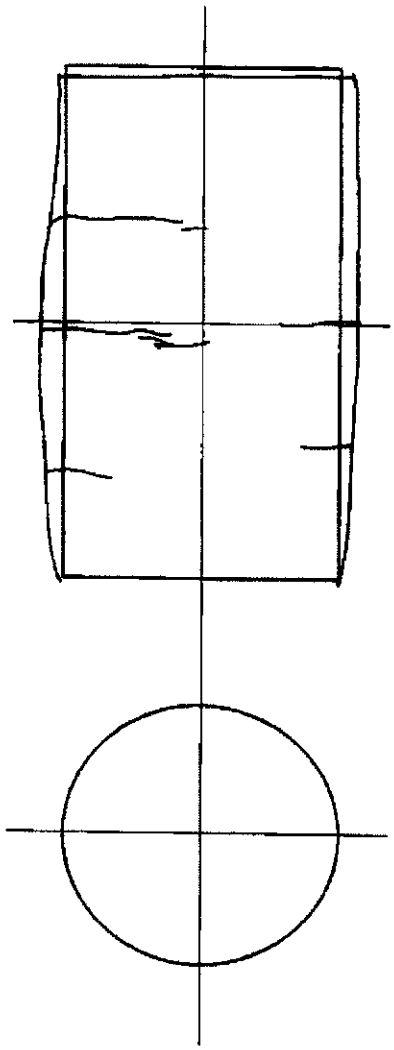
SPECIMEN DETAILS

Description : Firm brown sand with clay (visual)
Specimen size: 76 mm high
38 mm diameter

Test No:

Elevation

Plan



FAILURE SKETCH

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C

Job Name: 41 HIGHGATE Sample No.: U1
BH Number: 3 Depth (m): 2.90

SPECIMEN DETAILS (TEST #3)
description: Firm brown sand with clay (visual)

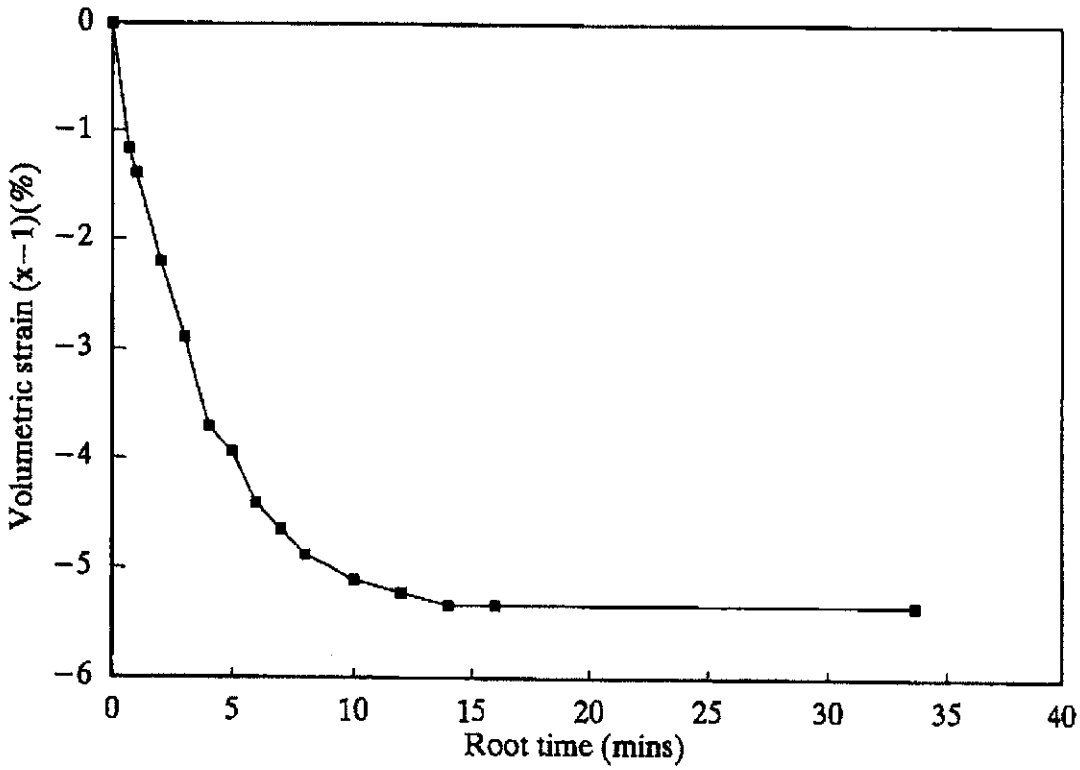
initial and final m/c (%):	25	22
initial bulk density (Mg/cu.m):	2.04	
initial dry density (Mg/cu.m):	1.63	
height and diameter (mm):	76	38

SATURATION STAGE

cell and back pressure (kPa):		
B value:	0.99	

CONSOLIDATION STAGE

cell and back pressure (kPa):	420	300
effective consolidation pressure (kPa):		120
base, side, top drainage	y y	y



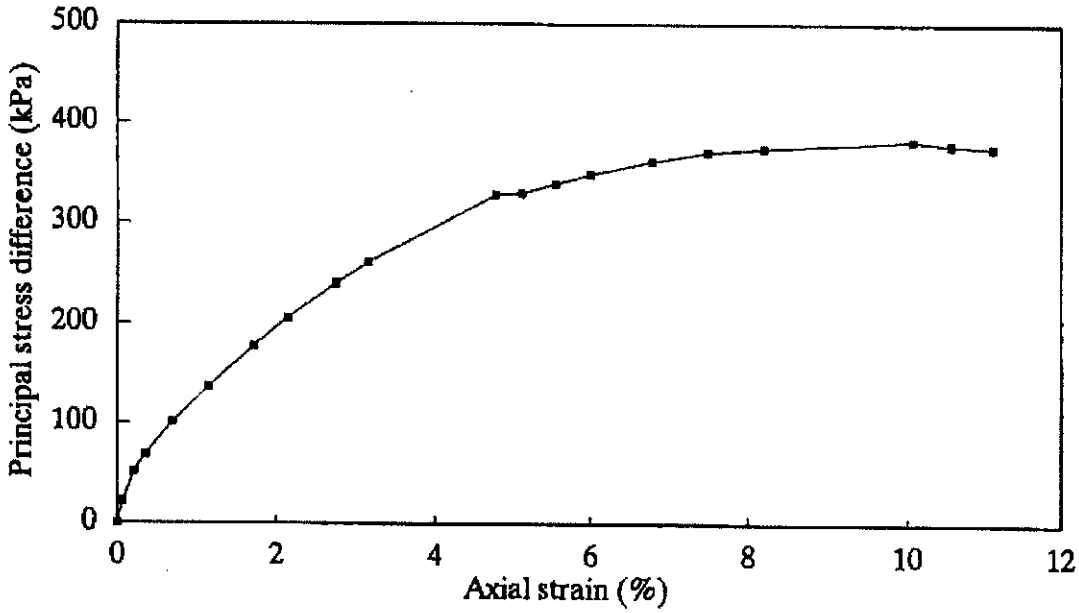
CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

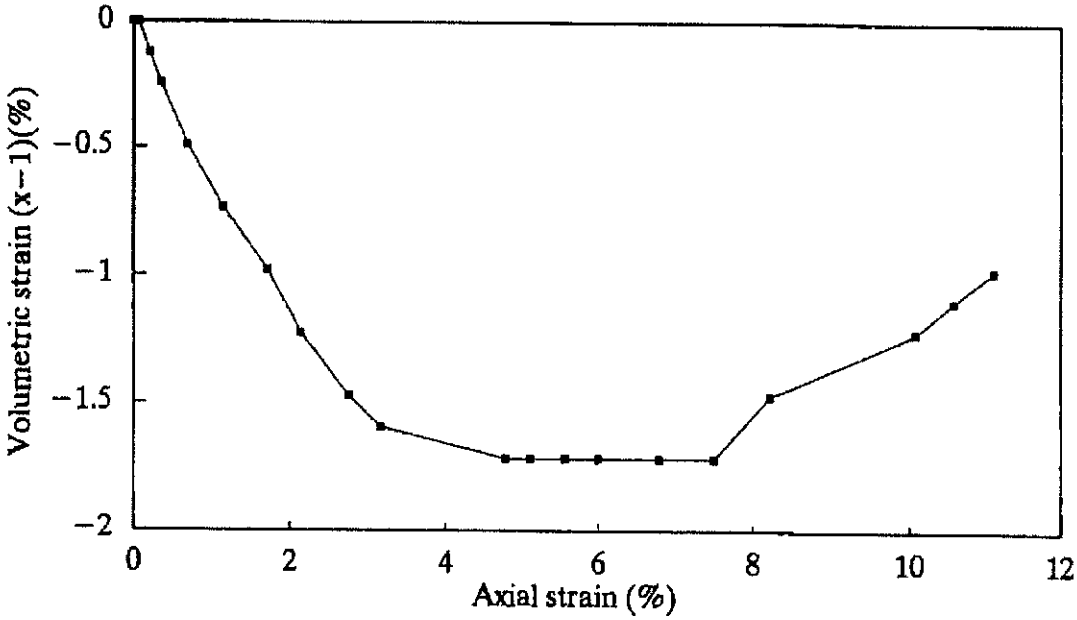
S·G·C
Soil Geotechnical Consultants Limited

Job Name: 41 HIGHGATE Sample No.: U1
BH Number: 3 Depth (m): 2.90

SHEAR STAGE (TEST #3)

machine rate of strain (%/hr):	0.47
cell pressure (kPa):	420
measured max. deviator stress (kPa):	382
membrane + filter drain correction (kPa)	12.4
corrected max. deviator stress (kPa):	370
pore pressure at failure (kPa):	300



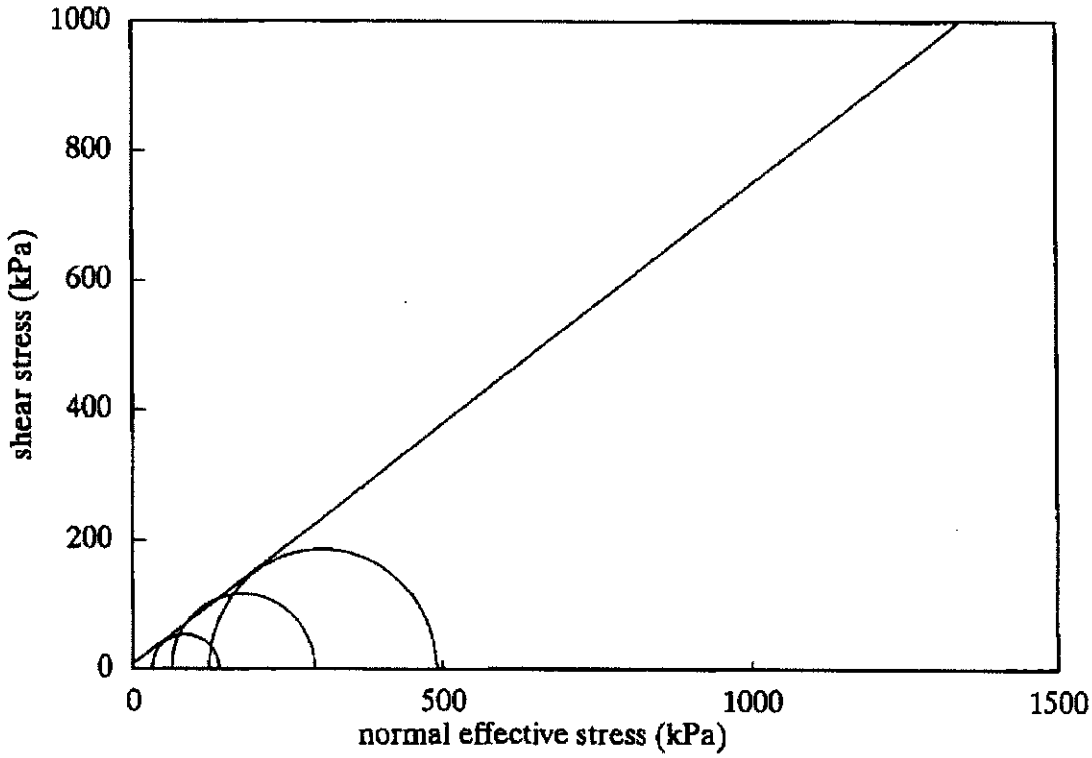


CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C
Surrey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE
BH Number: 3

Sample No.: U1
Depth (m): 2.90



SUMMARY
At maximum principal stress difference:

	#1	#2	#3
cell pressure (kPa)	330	360	420
deviator stress (kPa)	106	231	370
pore pressure (kPa)	300	300	300

Effective strength parameters:

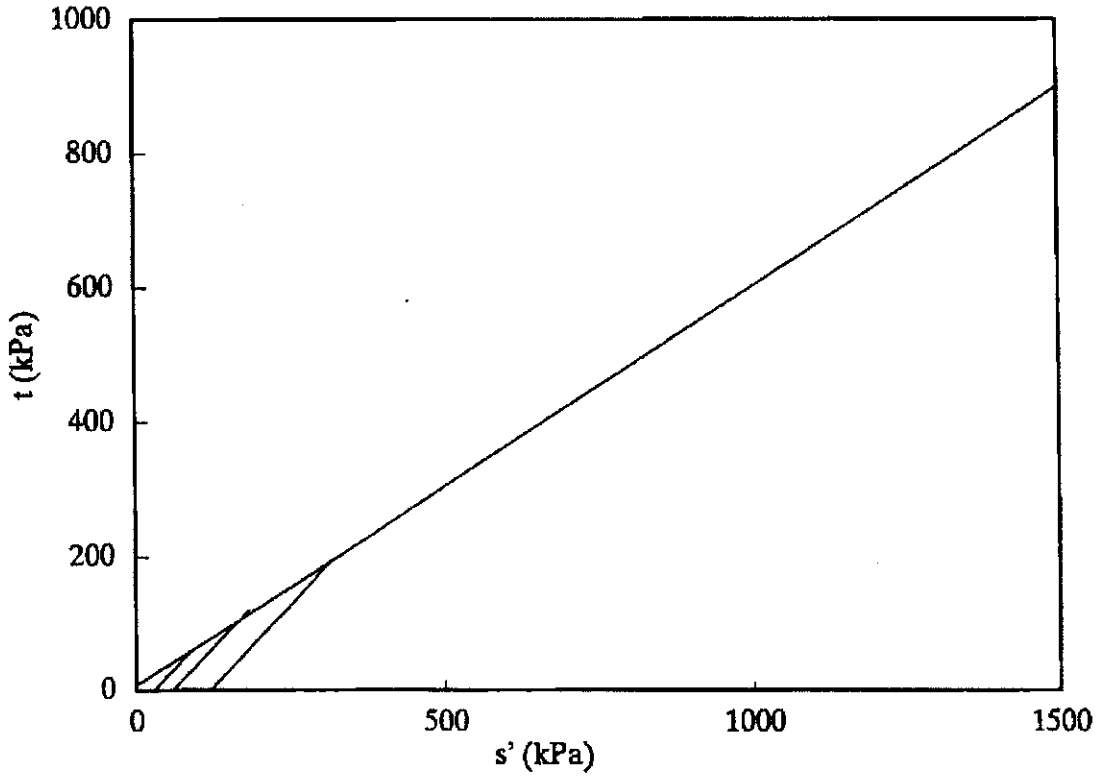
effective cohesion intercept (kPa)	8.0
effective angle of friction (degrees)	36.5

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C
Surrey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE
BH Number: 3

Sample No.: U1
Depth (m): 2.90



NOTES ON STRESS PATH PLOTS

1. No membrane or filter drain corrections made to stress path plots

2. Effective stress paths assume full pore water pressure equalization at all times after the start of shear. This assumption is incorrect. The rate of shearing has been estimated to give 95% equalization only at failure.

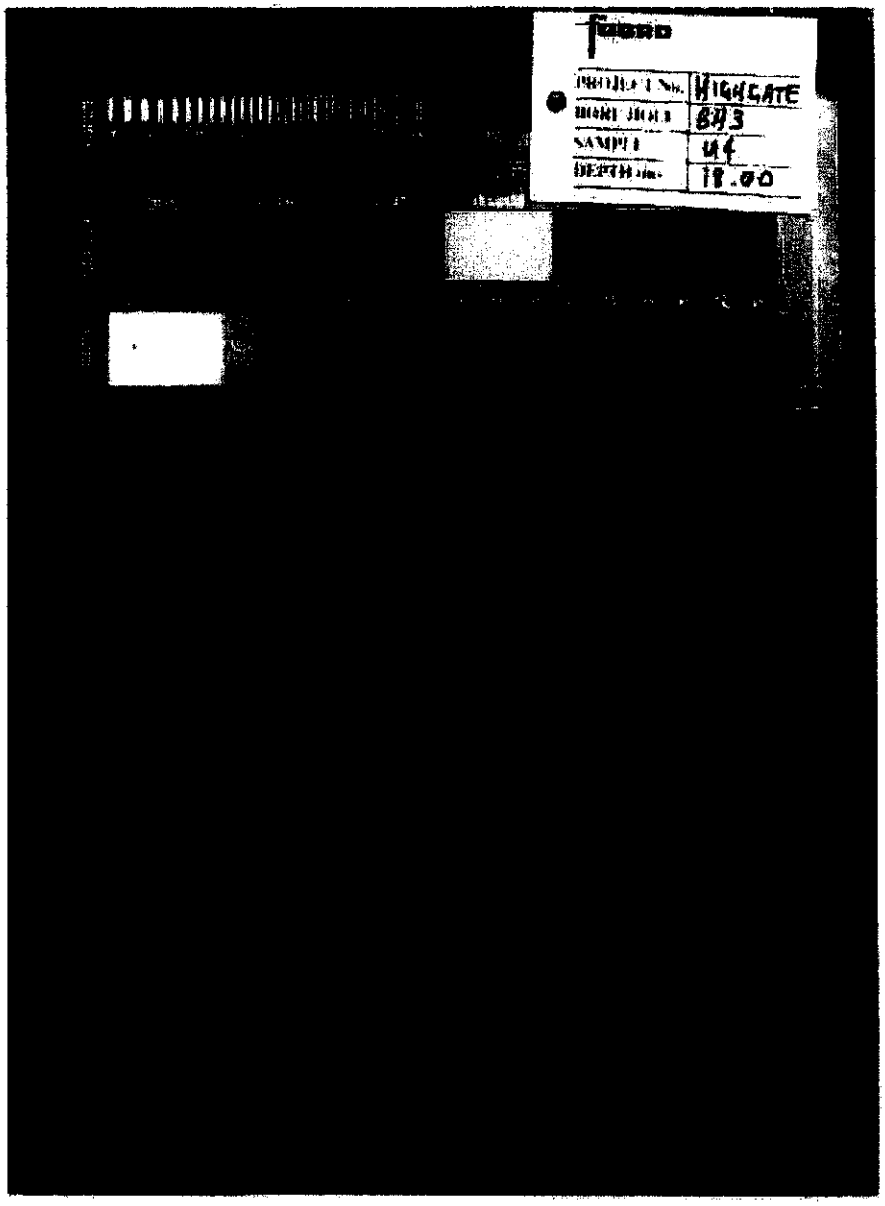
CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C
Surrey Geotechnical Consultants Limited

GROUND ENGINEERING
HIGHGATE

VISUAL DESCRIPTION
Firm closely fissured grey brown CLAY with thin laminae of grey brown silty sand and occasional pockets of sand

SPECIMEN PHOTOGRAPHS



Borehole	BH3
Sample	U4
Depth (m)	18.00

Report No: 20921005

S·G·C
Surrey Geotechnical Consultants Limited

Job Name:	41 HIGHGATE	Sample No:	U4
BH Number:	3	Depth (m):	18.0

SPECIMEN DETAILS (TEST #1)

description:	Firm grey brown clay	
(visual)	with pockets of brown sand	
preparation:	Undisturbed	
orientation within original sample:		Vertical
test started:	27/03/2009	

		TEST 1
INITIAL STAGE		
type of side drains:		Vertical
membrane thickness (mm):		0.3
particle density (Mg/m³):	assumed	2.7
voids ratio:		0.82
degree of saturation (%):		97.3

SATURATION STAGE

method:	increments of cell and back pressure
final pore water pressure (kPa):	393
final degree of saturation (%):	96.0

CONSOLIDATION STAGE

effective stress (kPa):	150
initial pore water pressure (kPa):	438
final pore water pressure (kPa):	300
pore pressure dissipation (%):	100.0

SHEAR STAGE

failure criterion:	maximum deviator stress (kPa)
cell pressure (kPa):	450
initial pore water pressure (kPa):	300
rate of strain (mm/min):	0.006
strain at failure (%):	10.11
volumetric strain (%):	3.57
eff. major principal stress (kPa):	428
eff. minor principal stress (kPa):	151
time to peak dev. stress (min):	1257

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C

Surrey Geotechnical Consultants Limited

Job name: 41 HIGHGATE Sample No.:U4
BH Number: 3 Depth : 18.0 (m)

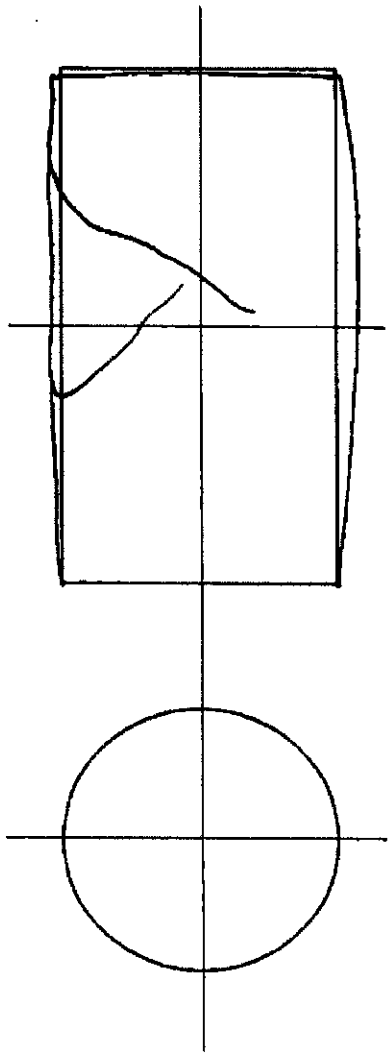
SPECIMEN DETAILS

Description : Firm grey brown clay
(visual) with pockets of brown sand
Specimen size: 76 mm high
38 mm diameter

Test No:

Elevation

Plan



FAILURE SKETCH

CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C
Soil Geotechnical Consultants Limited

Job Name: 41 HIGHGATE Sample No.: U4
BH Number: 3 Depth (m): 18.0

SPECIMEN DETAILS (TEST #1)

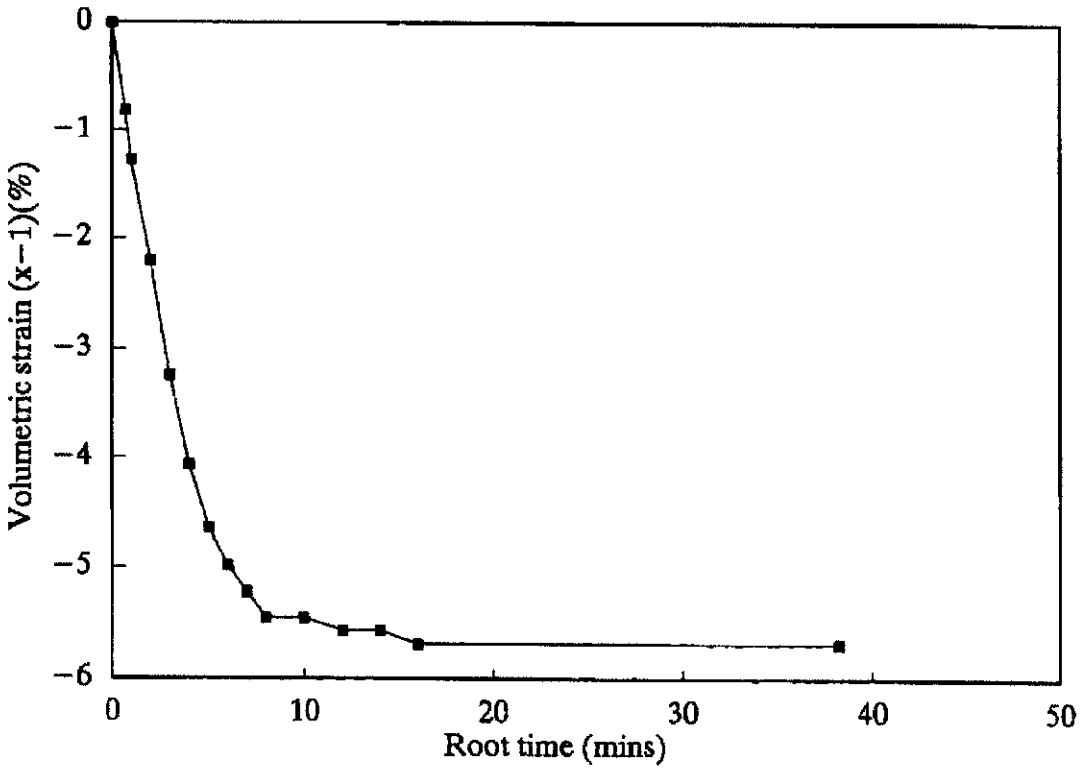
description: (visual)	Firm grey brown clay with pockets of brown sand	
initial and final m/c (%):	29	27
initial bulk density (Mg/cu.m):	1.92	
initial dry density (Mg/cu.m):	1.48	
height and diameter (mm):	76	38

SATURATION STAGE

cell and back pressure (kPa):	310	300
B value:	0.96	

CONSOLIDATION STAGE

cell and back pressure (kPa):	450	300
effective consolidation pressure (kPa):		150
base, side, top drainage	y y y	



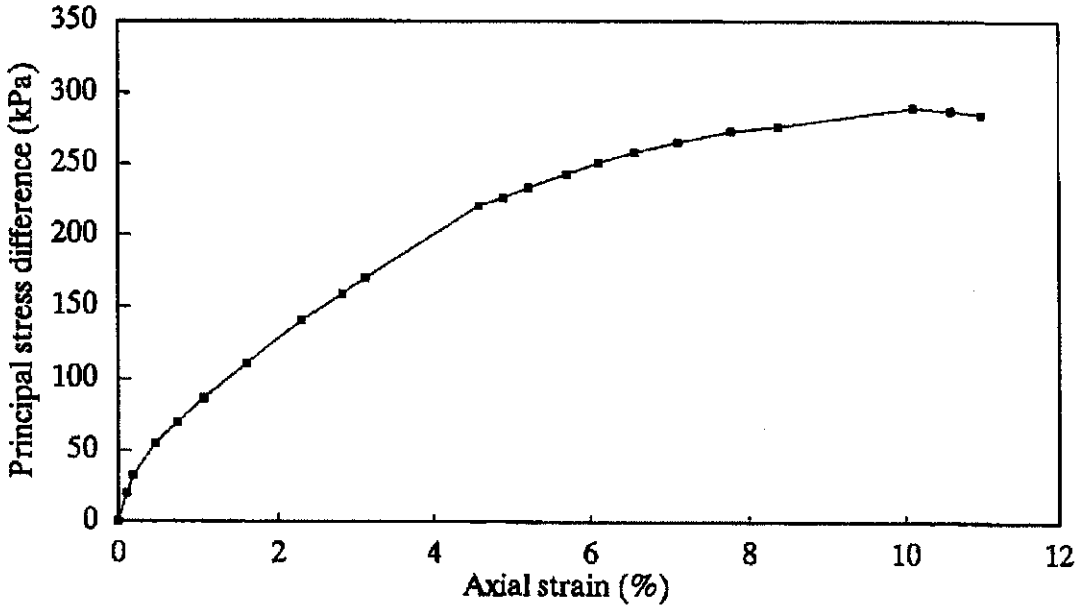
CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

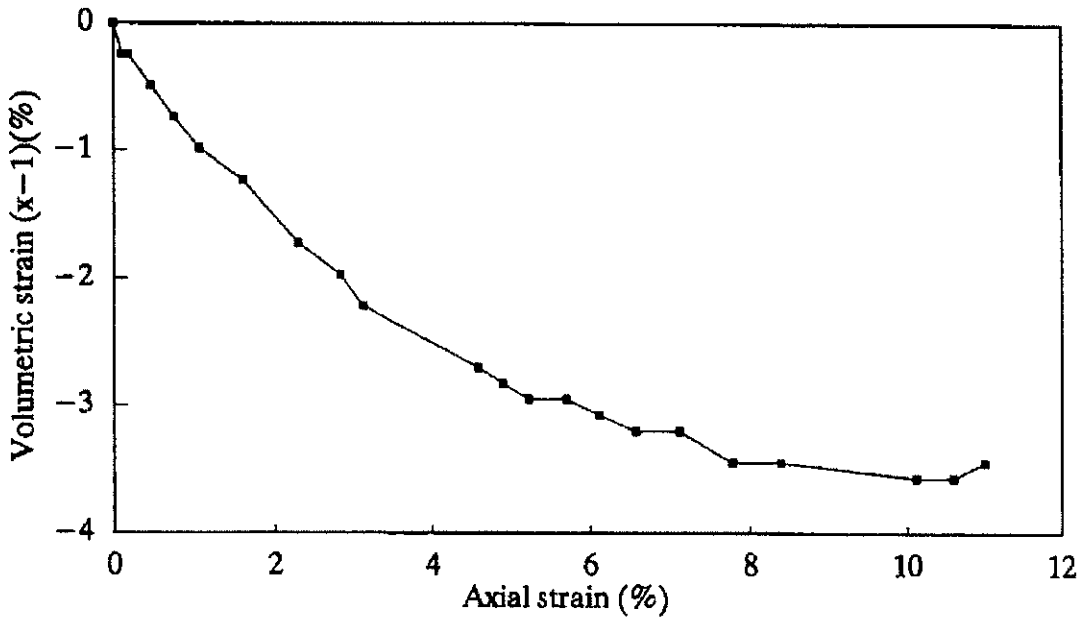
S·G·C
Surrey Geotechnical Consultants Limited

Job Name: 41 HIGHGATE Sample No.: U4
BH Number: 3 Depth (m): 18.0

SHEAR STAGE (TEST #1)

machine rate of strain (%/hr):	0.47
cell pressure (kPa):	450
measured max. deviator stress (kPa):	289
membrane + filter drain correction (kPa):	12.4
corrected max. deviator stress (kPa):	277
pore pressure at failure (kPa):	299





CONSOLIDATED DRAINED TRIAXIAL TEST
WITH VOLUME CHANGE MEASUREMENT

S·G·C
Stuart Geotechnical Consultants Limited