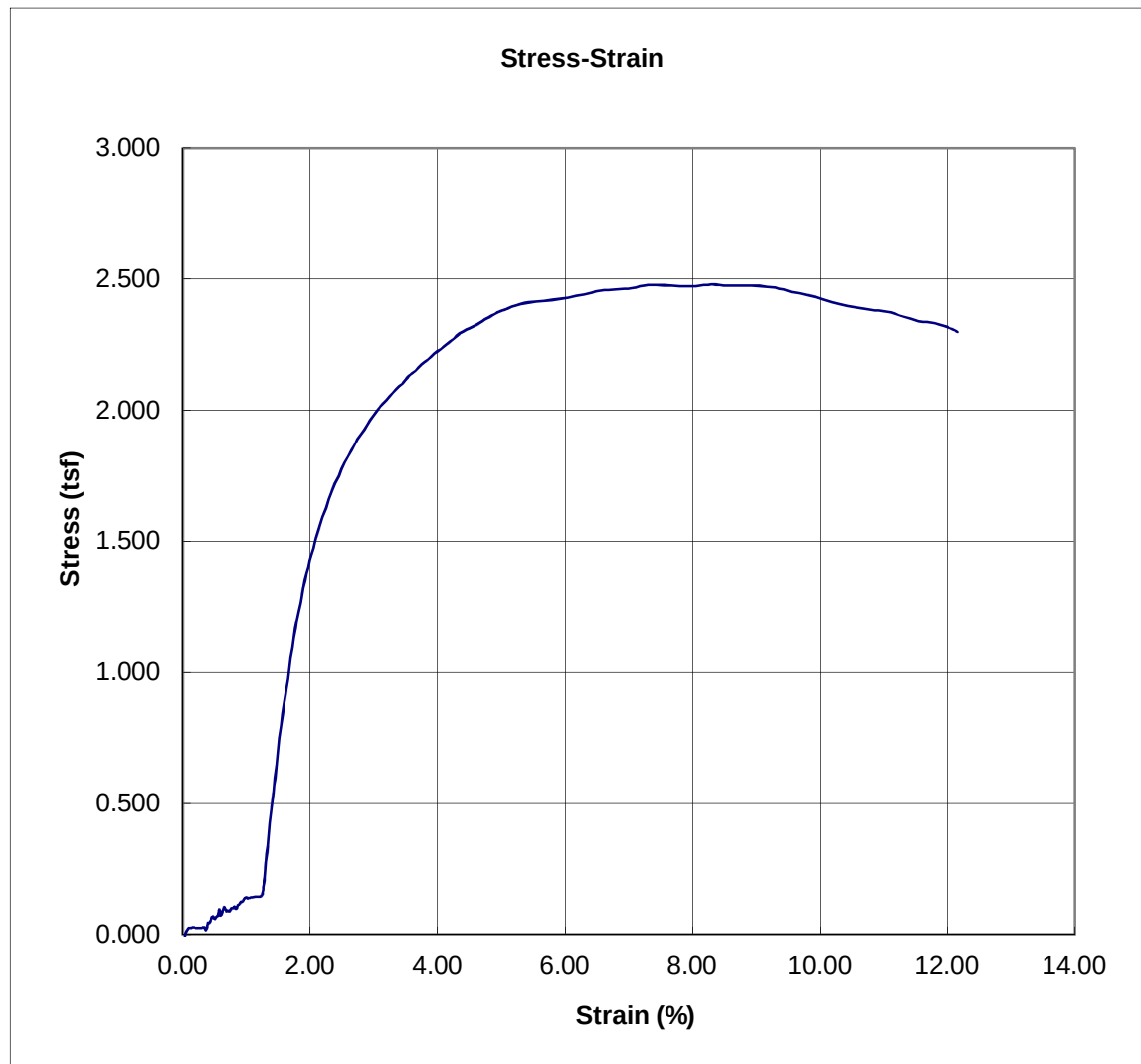
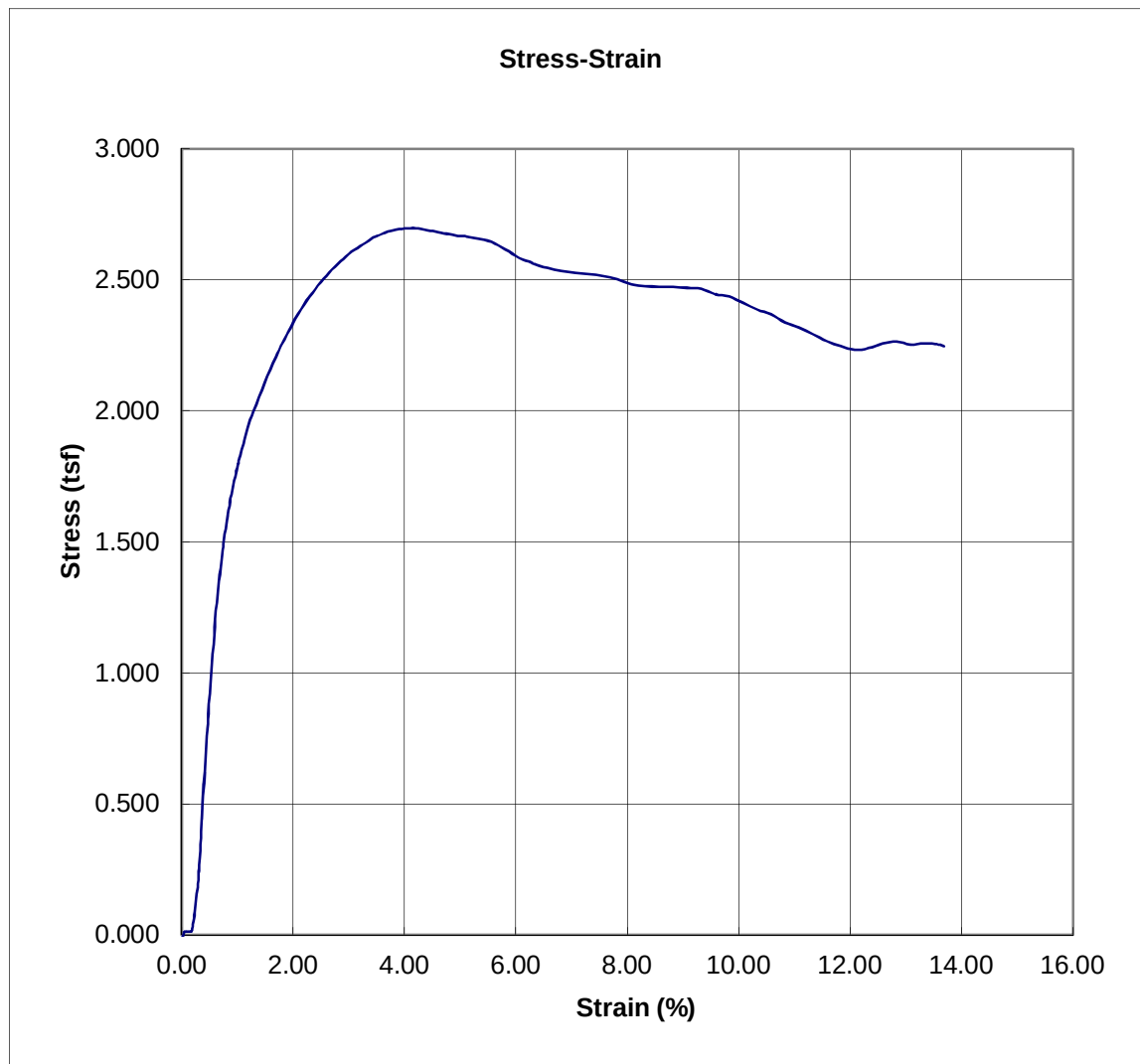


Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-217
Depth: 33'-35'



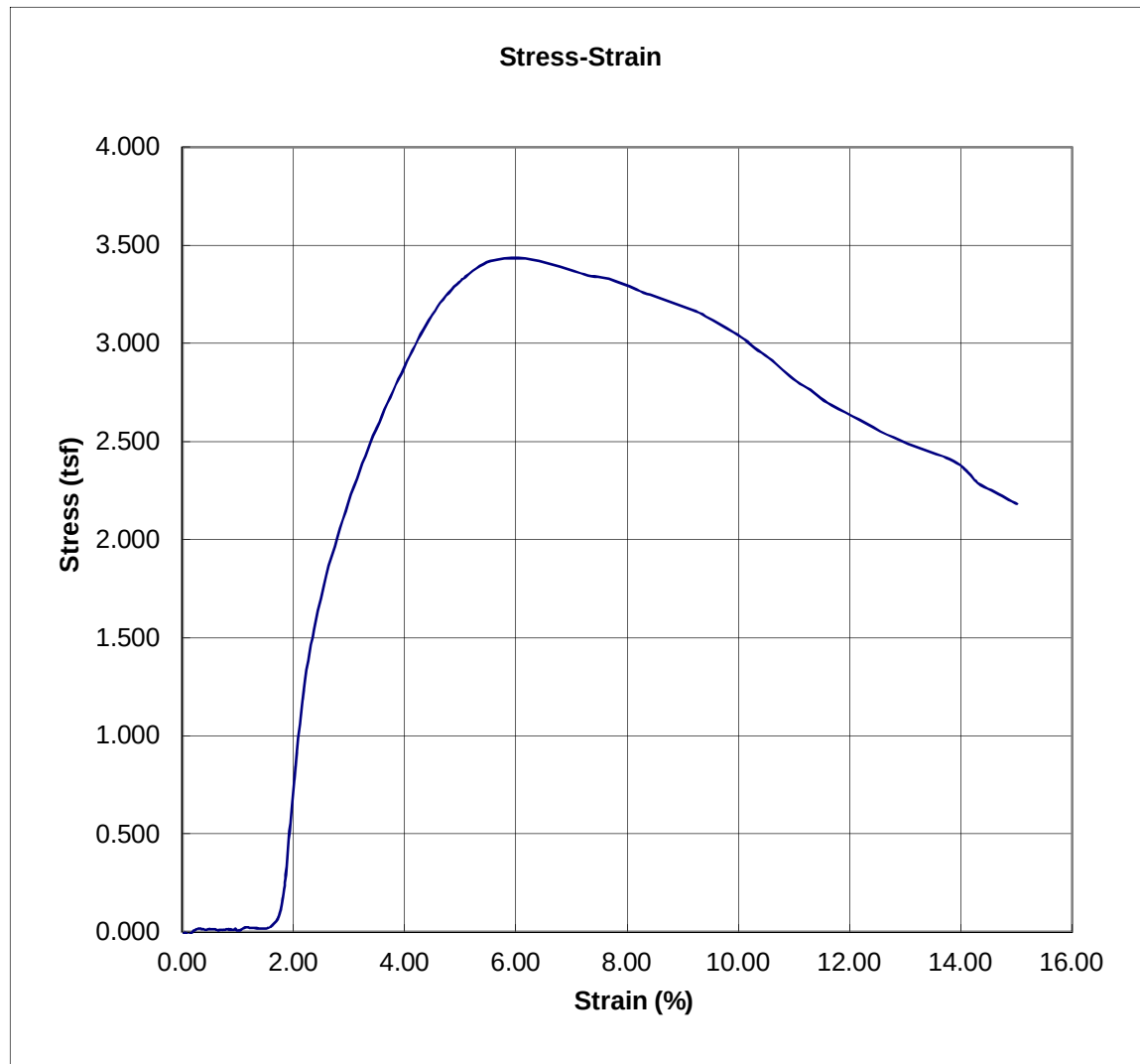
Peak Point	8.30	2.479
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-217
Depth: 48'-50'



Peak Point	4.16	2.698
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-217
Depth: 53'-55'



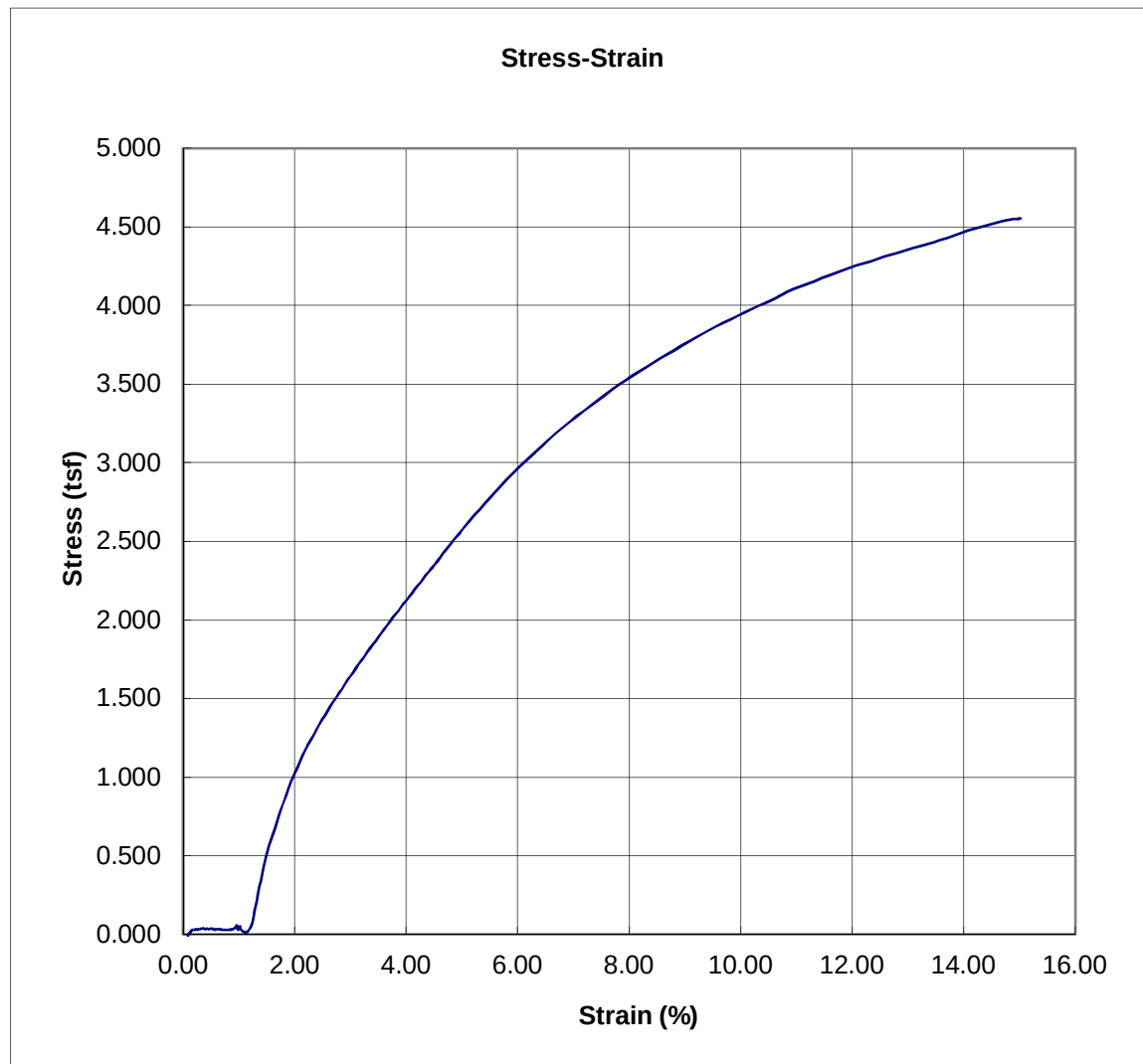
Peak Point	6.04	3.434
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-217
Depth: 78'-80'



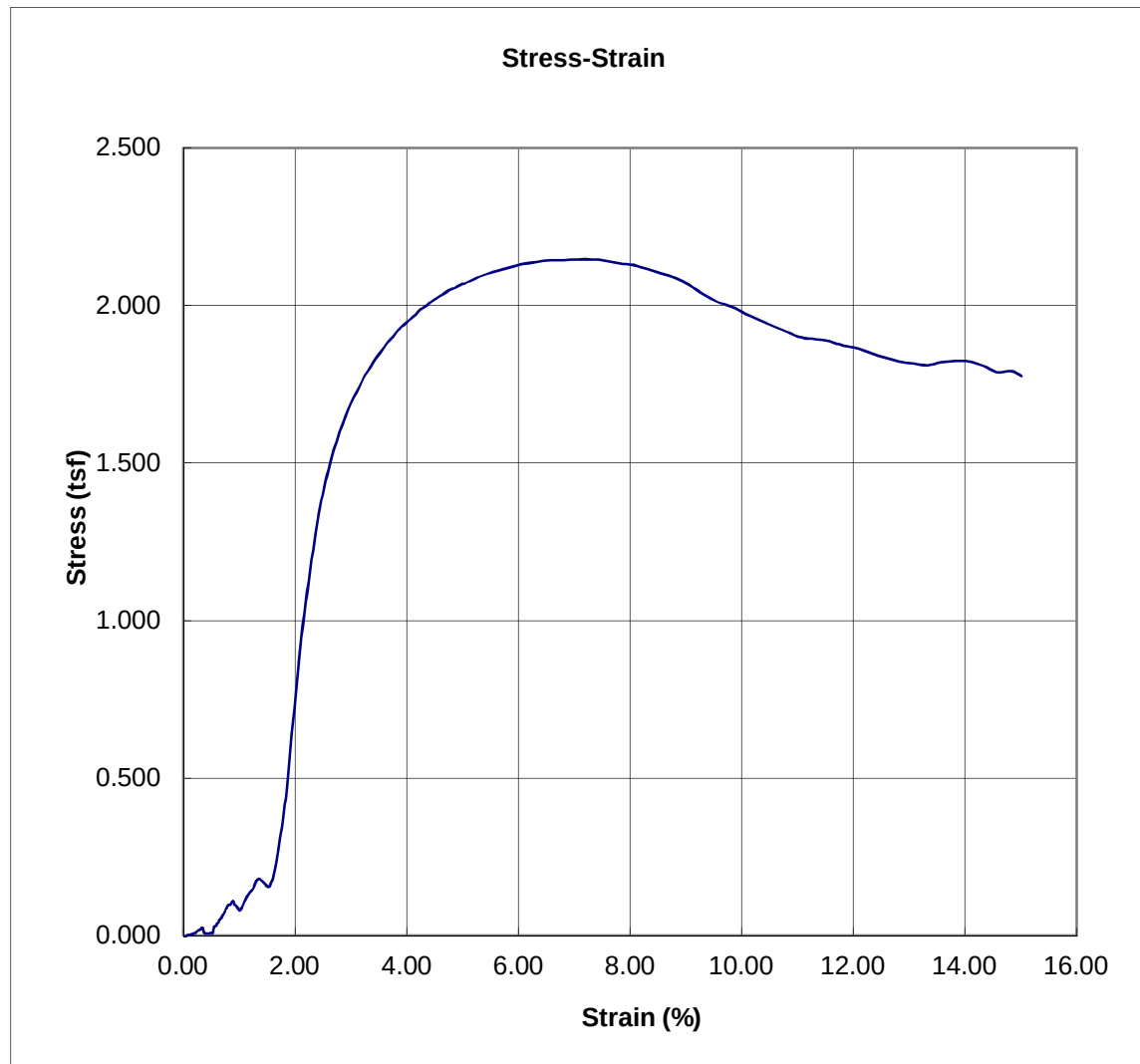
Peak Point	8.56	5.319
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-217
Depth: 88'-90'



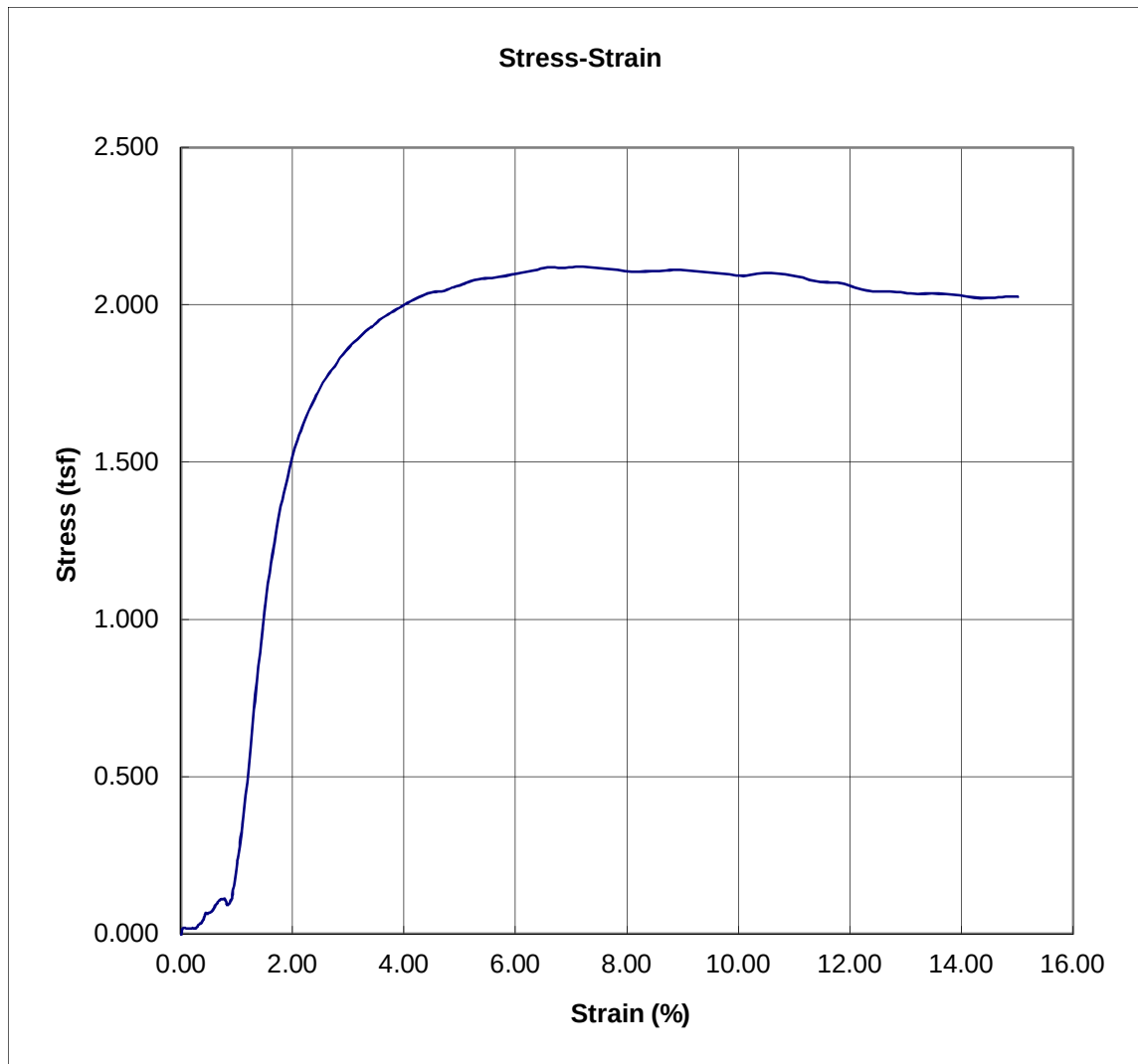
Peak Point	15.02	4.552
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-218
Depth: 33'-35'



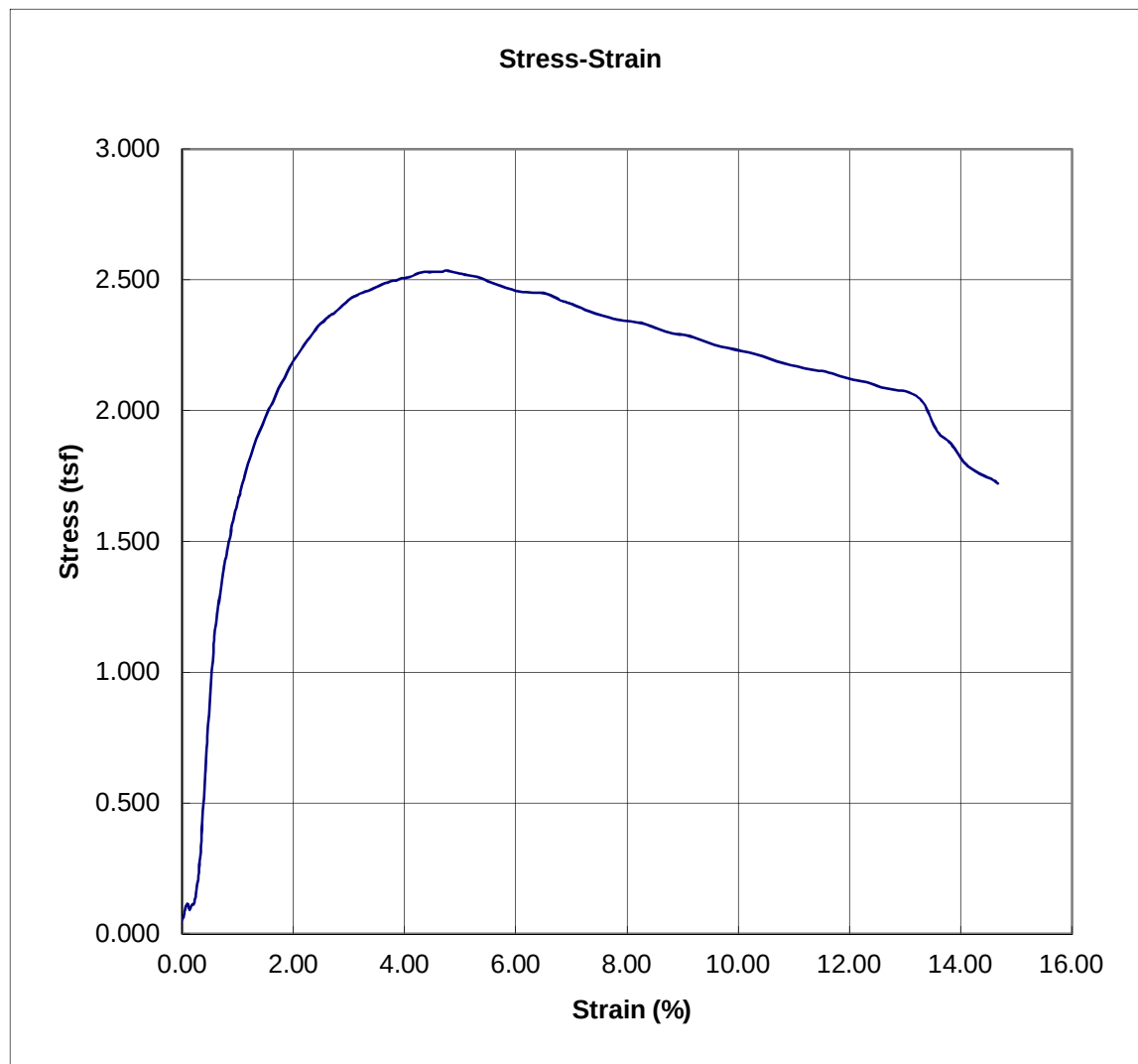
Peak Point	7.31	2.146
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-218
Depth: 43'-45'



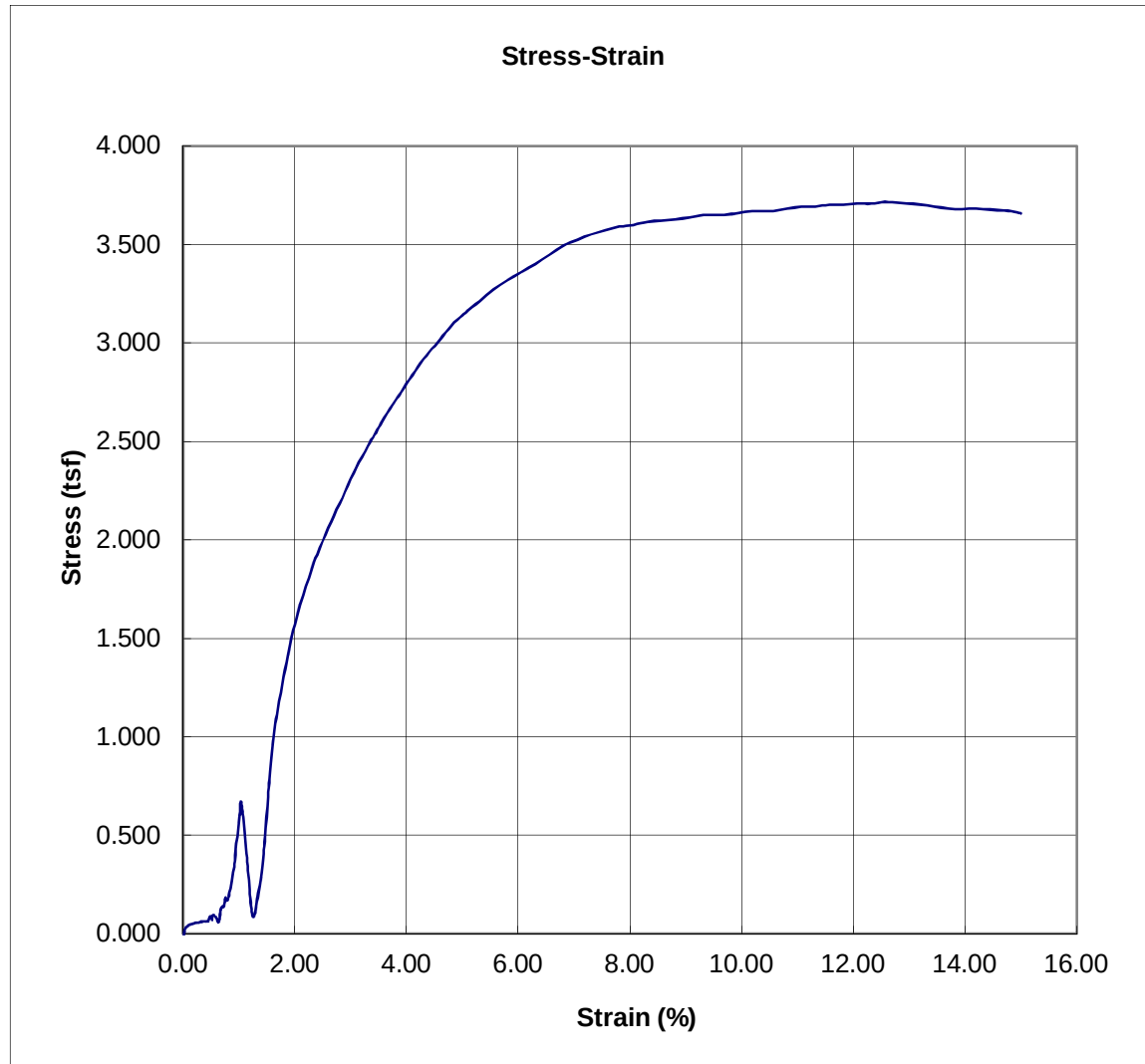
Peak Point	7.08	2.120
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-218
Depth: 53'-55'



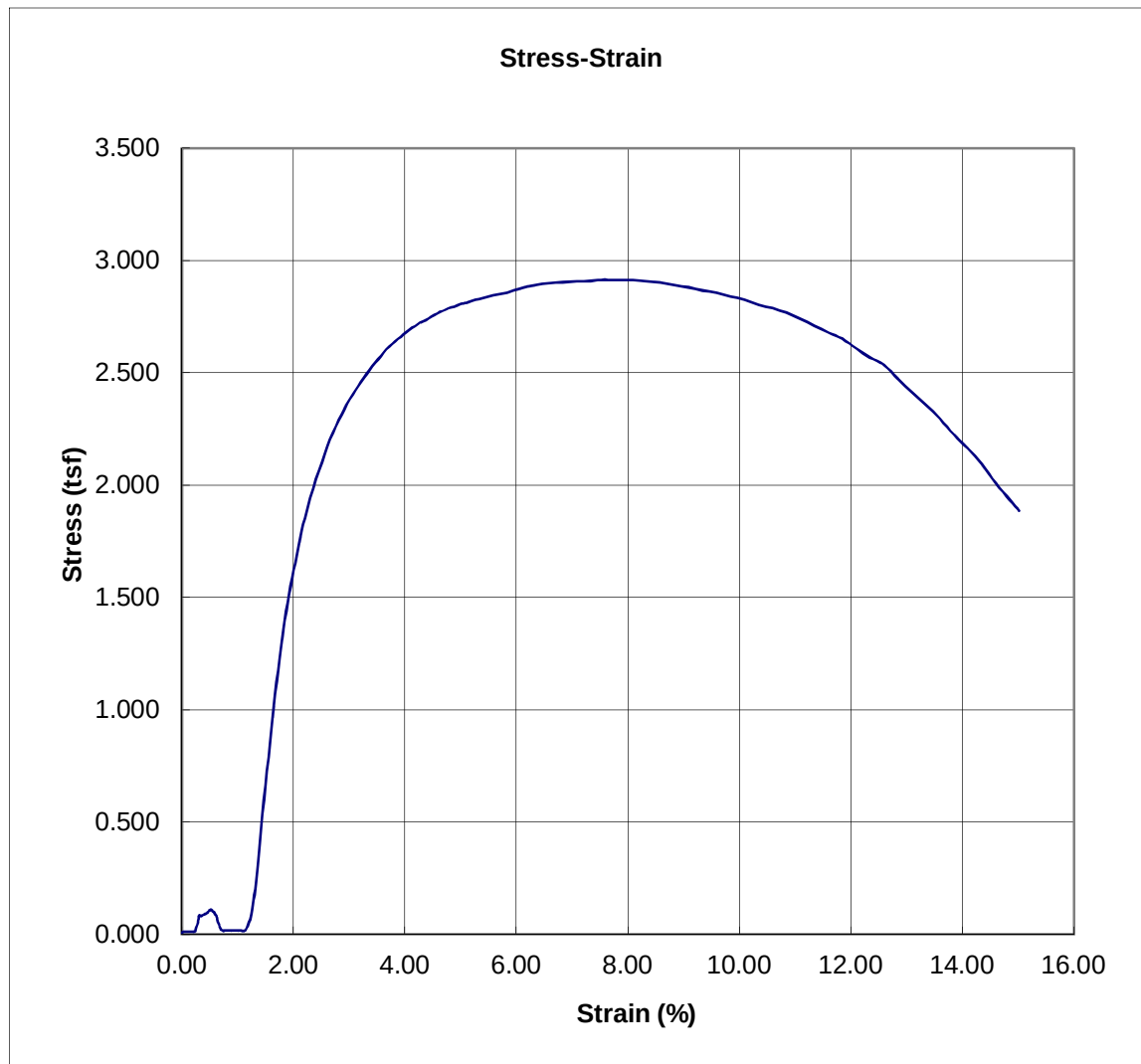
Peak Point	4.76	2.535
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-218
Depth: 88'-90'



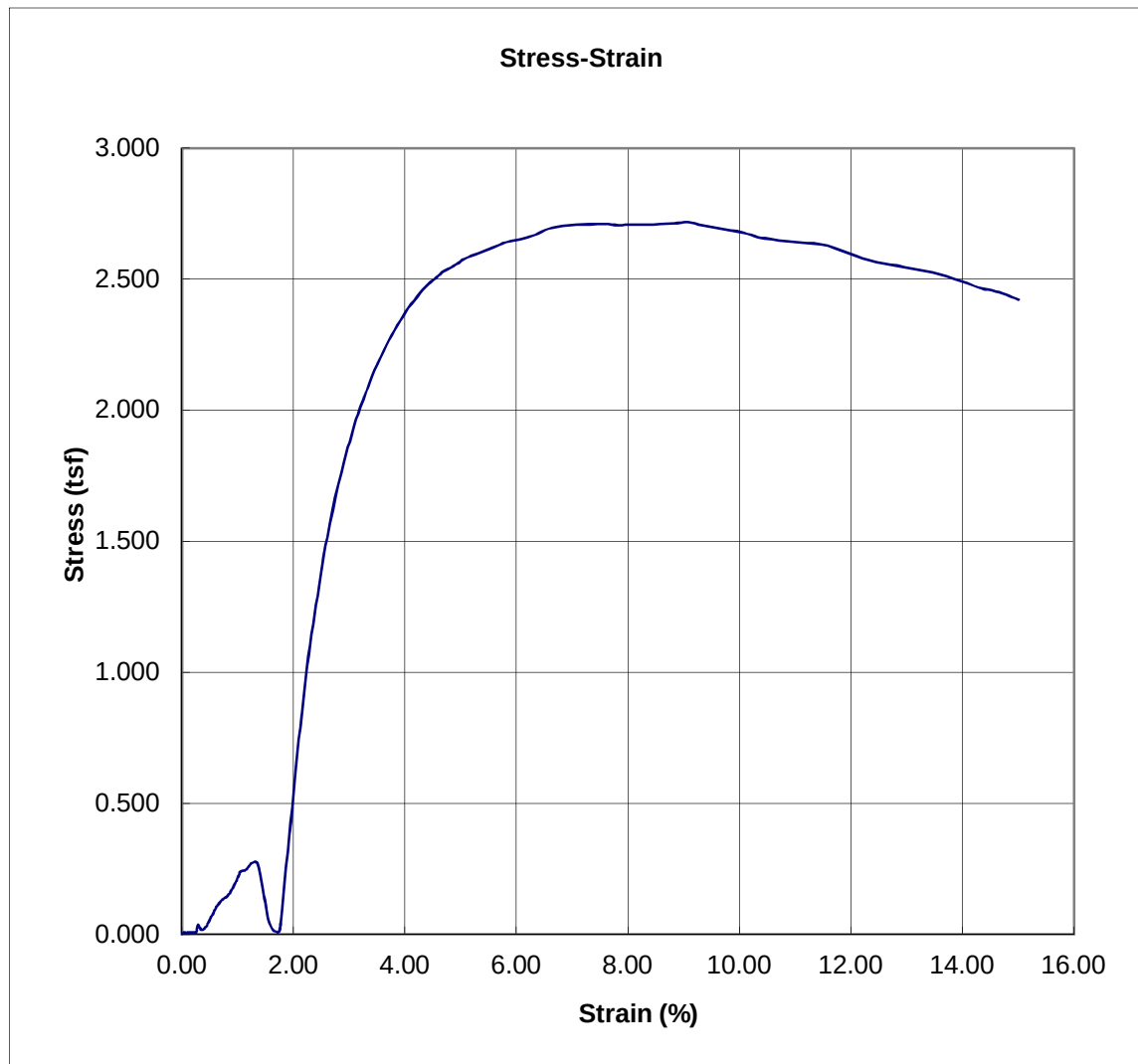
Peak Point	12.57	3.716
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-219
Depth: 33'-35'



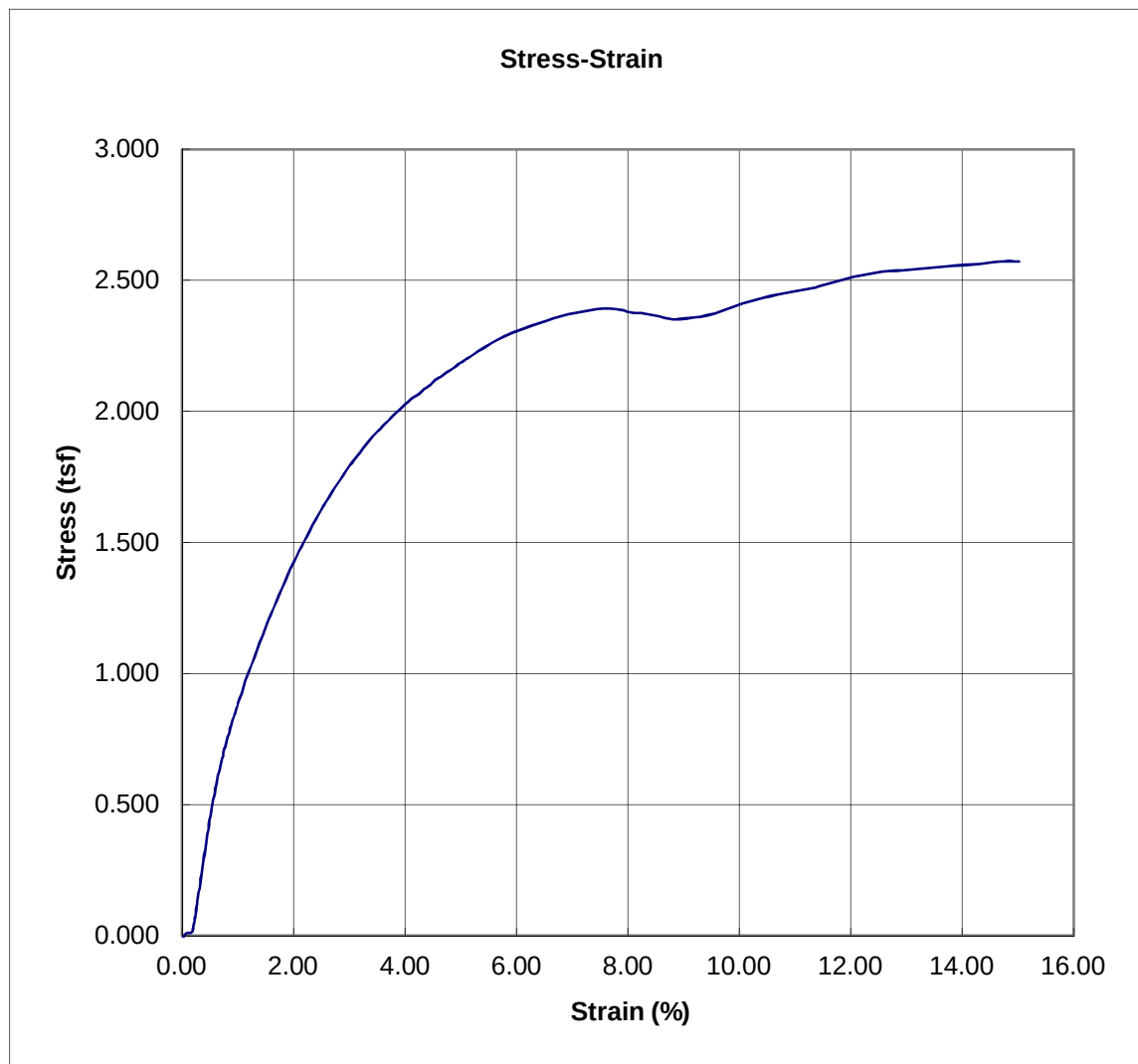
Peak Point	7.59	2.914
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-219
Depth: 43'-45'



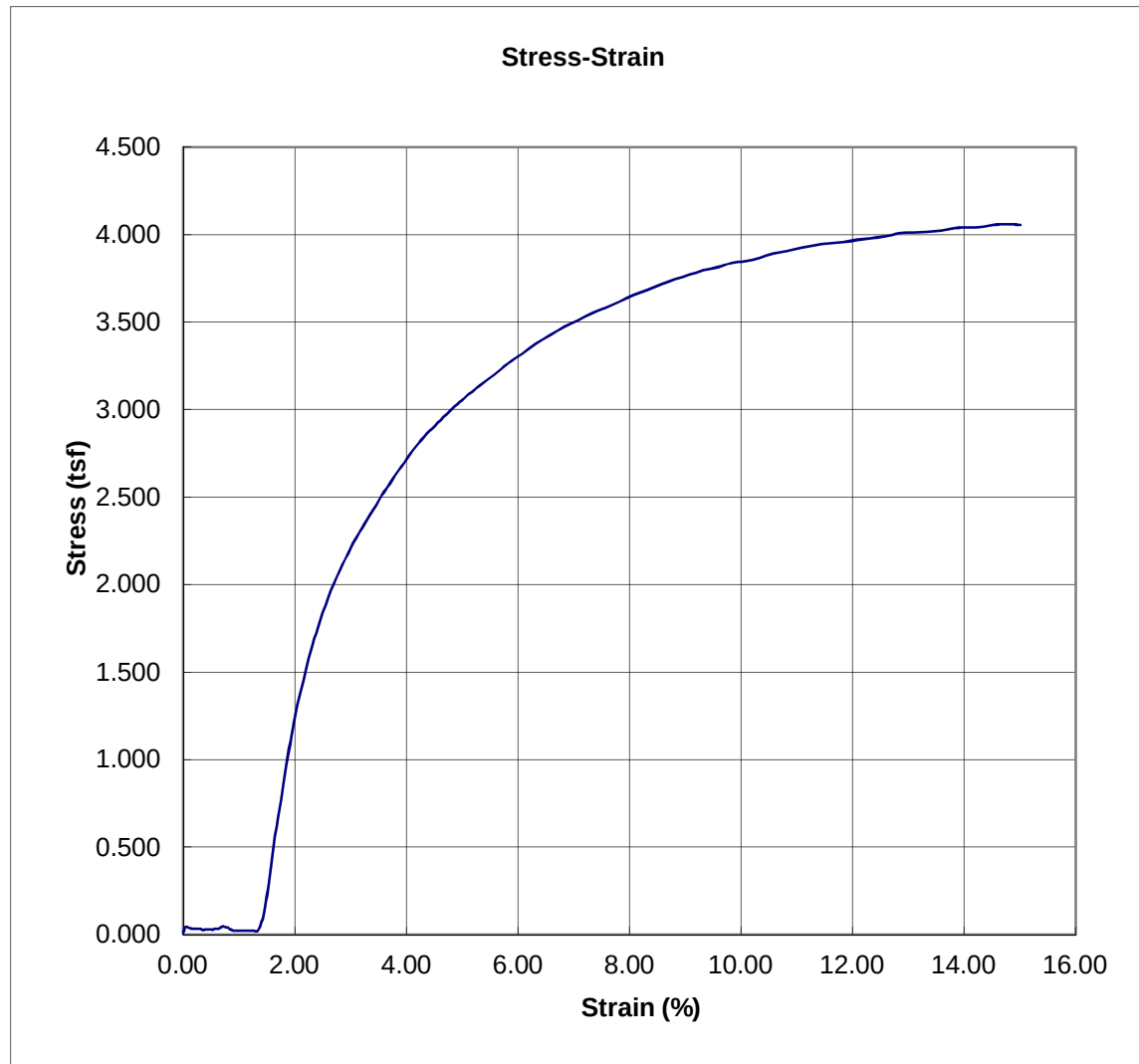
Peak Point	9.08	2.717
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-219
Depth: 53'-55'



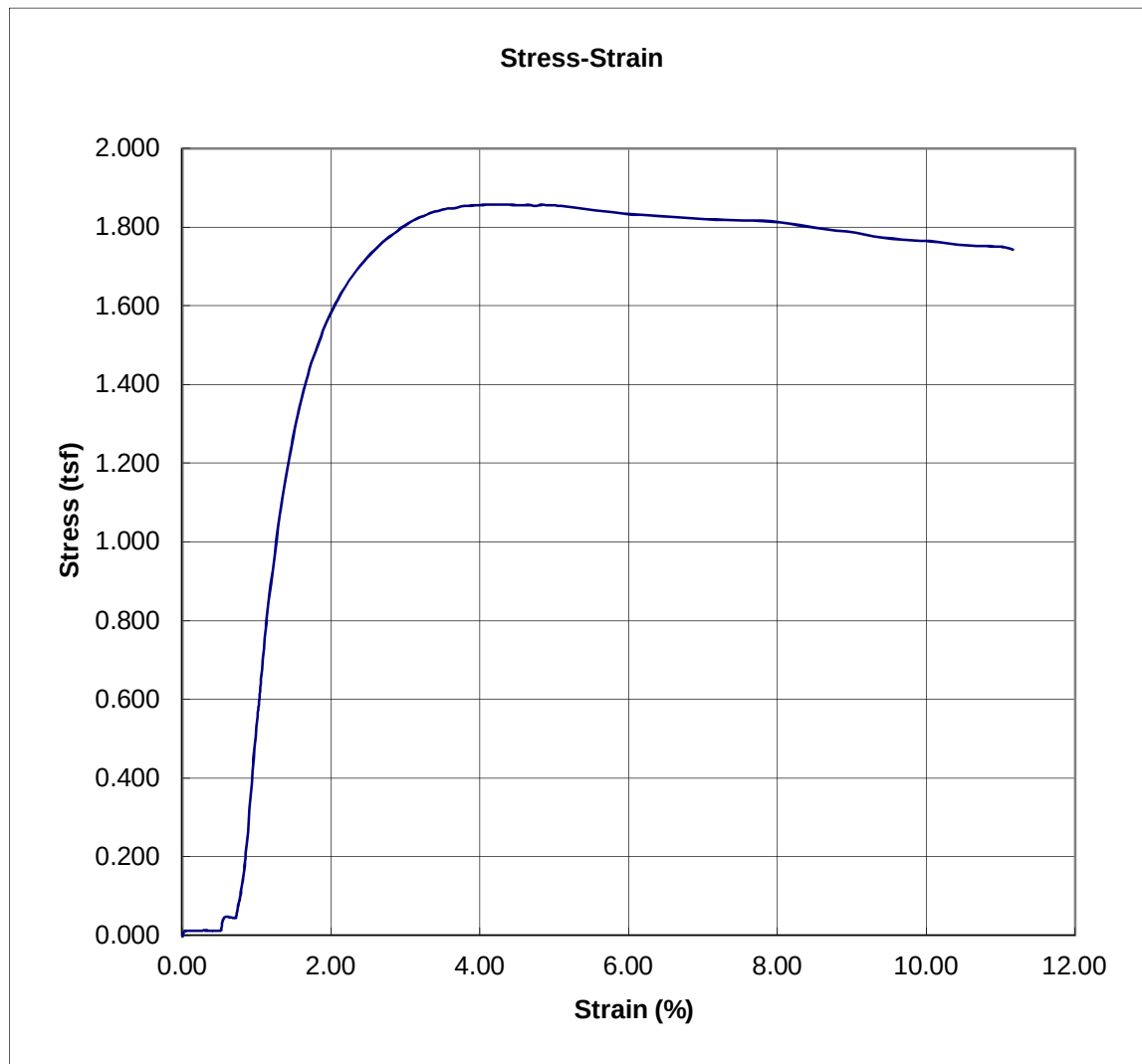
Peak Point	14.81	2.573
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-219
Depth: 88'-90'



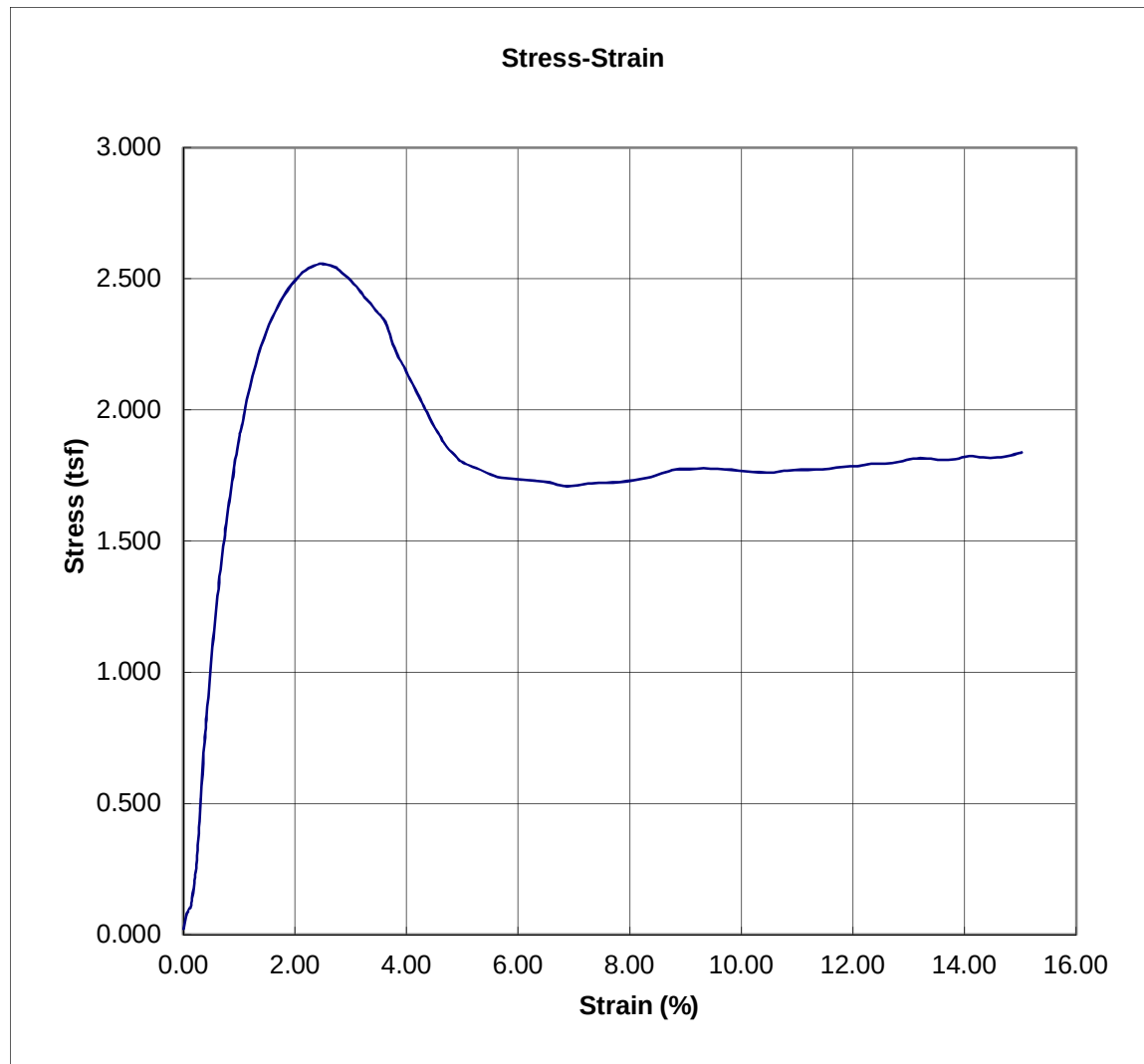
Peak Point	14.84	4.059
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-220
Depth: 33'-35'



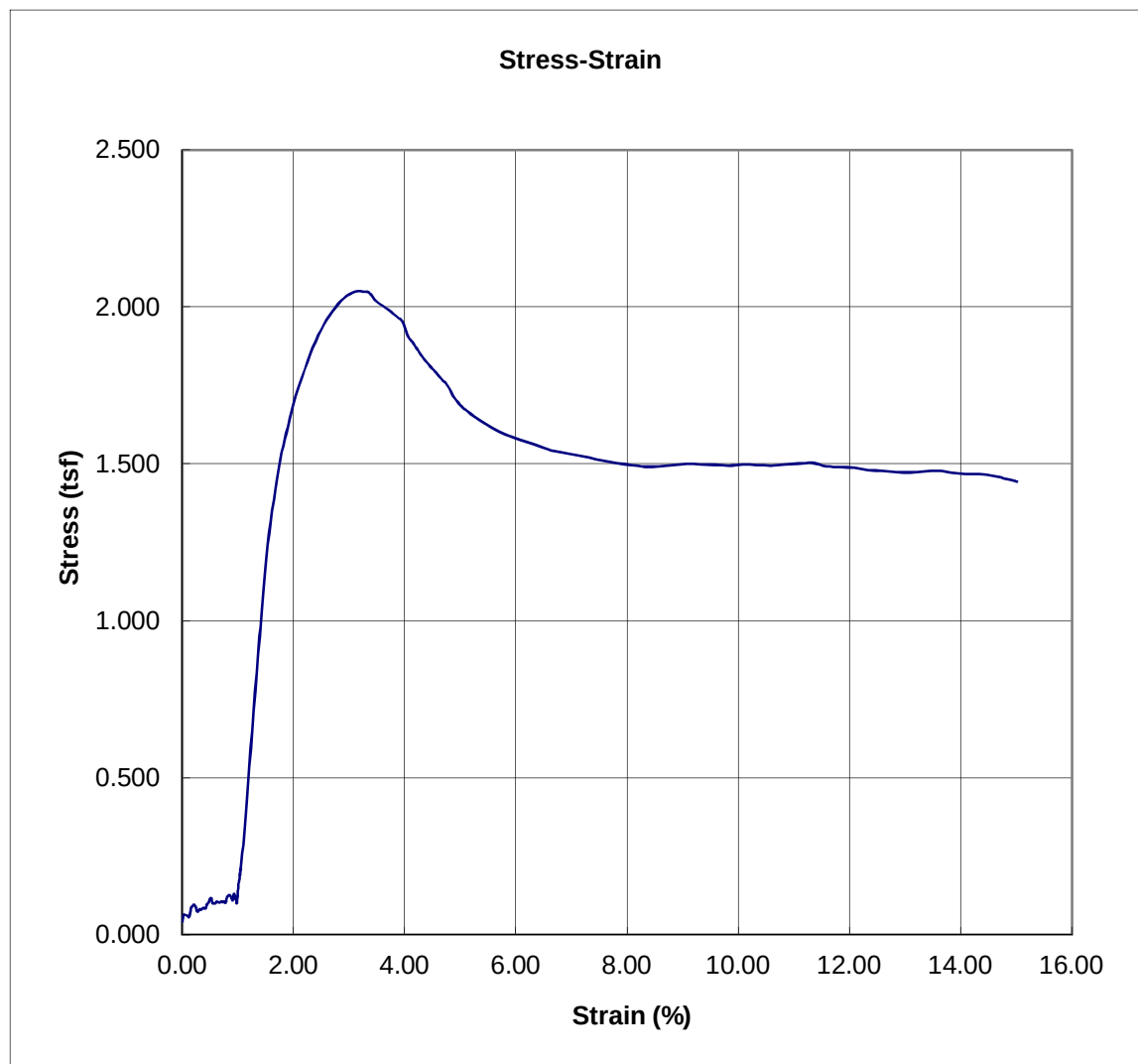
Peak Point	4.34	1.857
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-220
Depth: 48'-50'



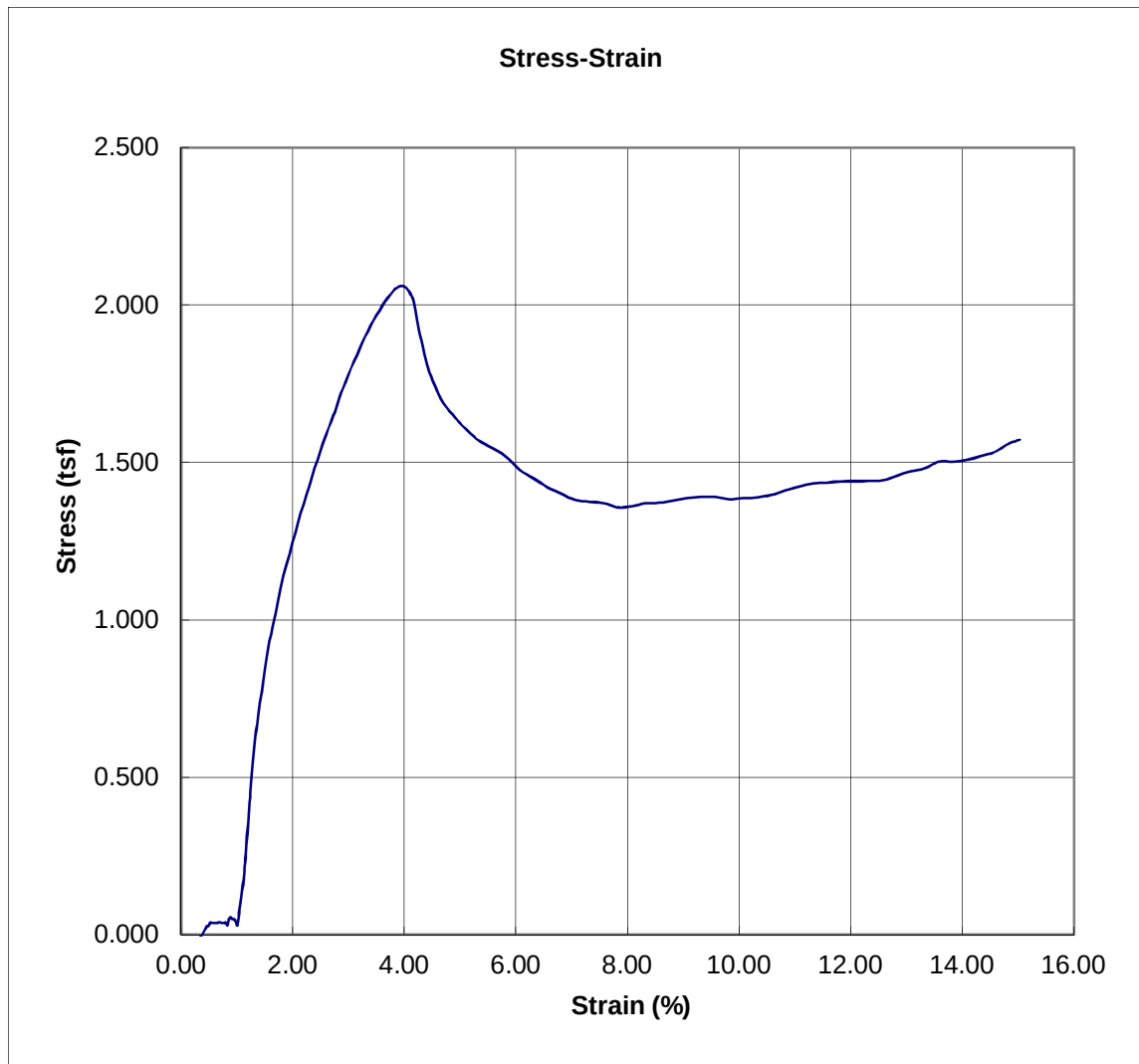
Peak Point	2.45	2.557
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-220
Depth: 53'-55'



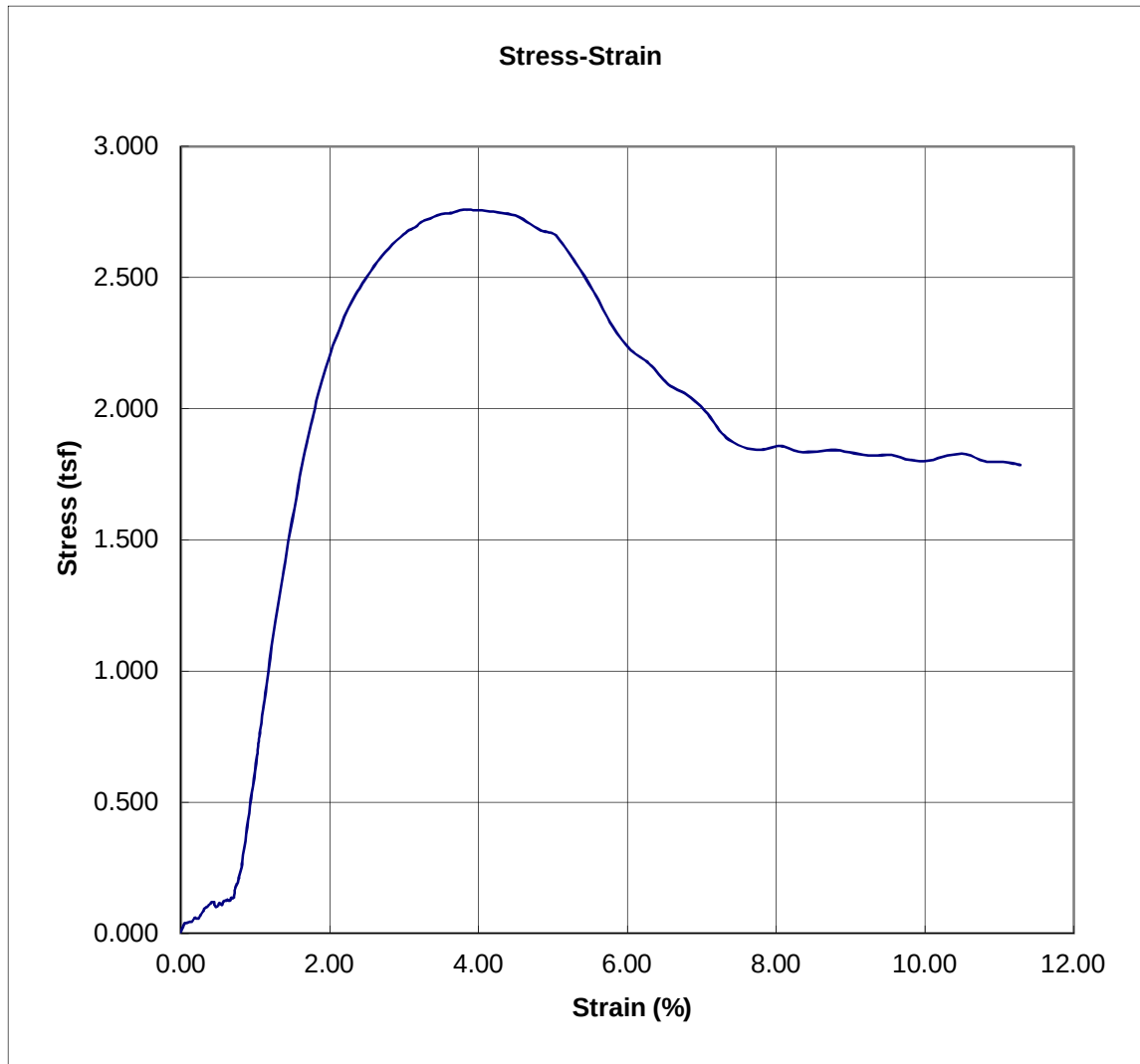
Peak Point	3.16	2.050
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-220
Depth: 78'-80'



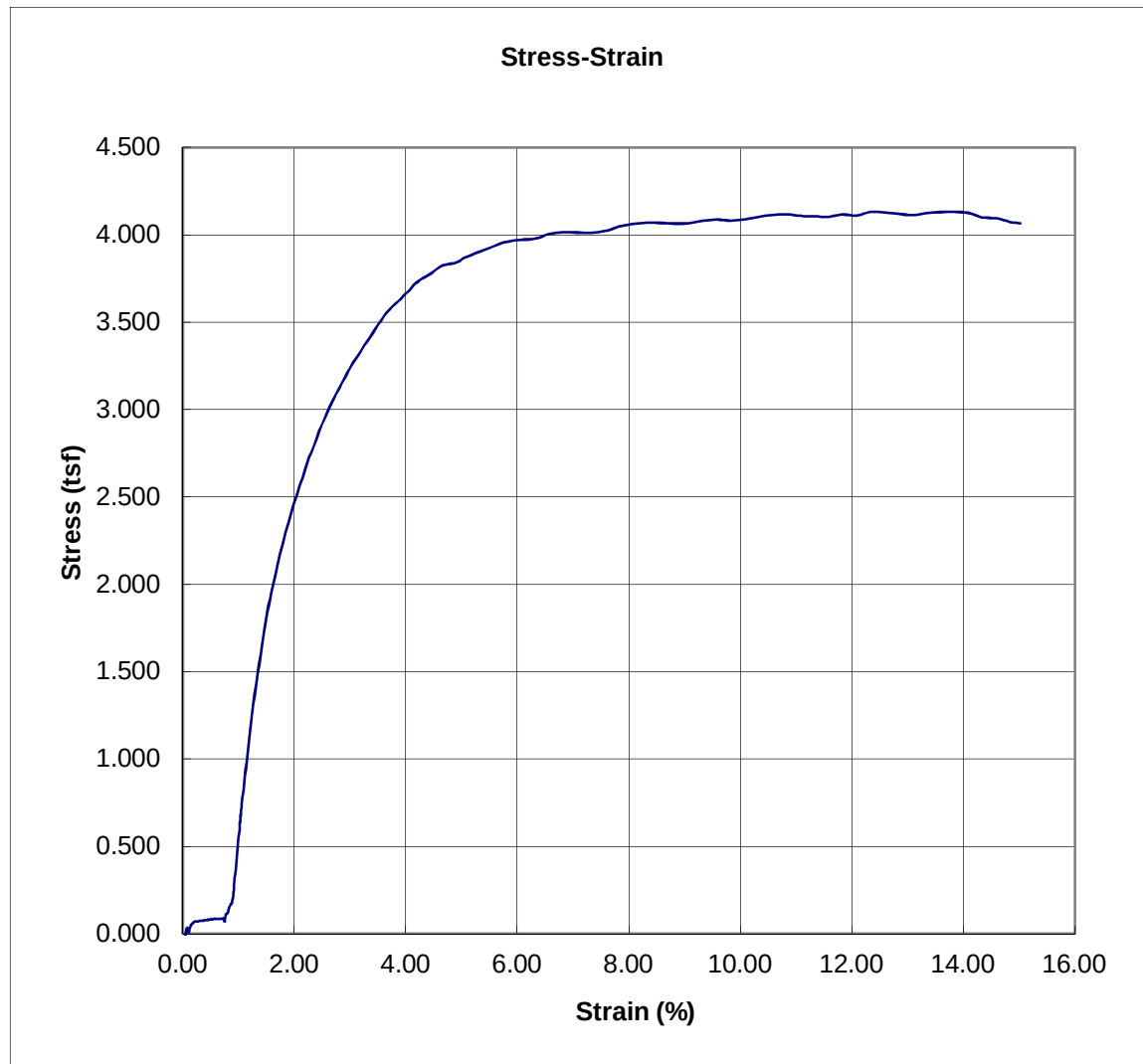
Peak Point	3.96	2.061
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-221
Depth: 48'-50'



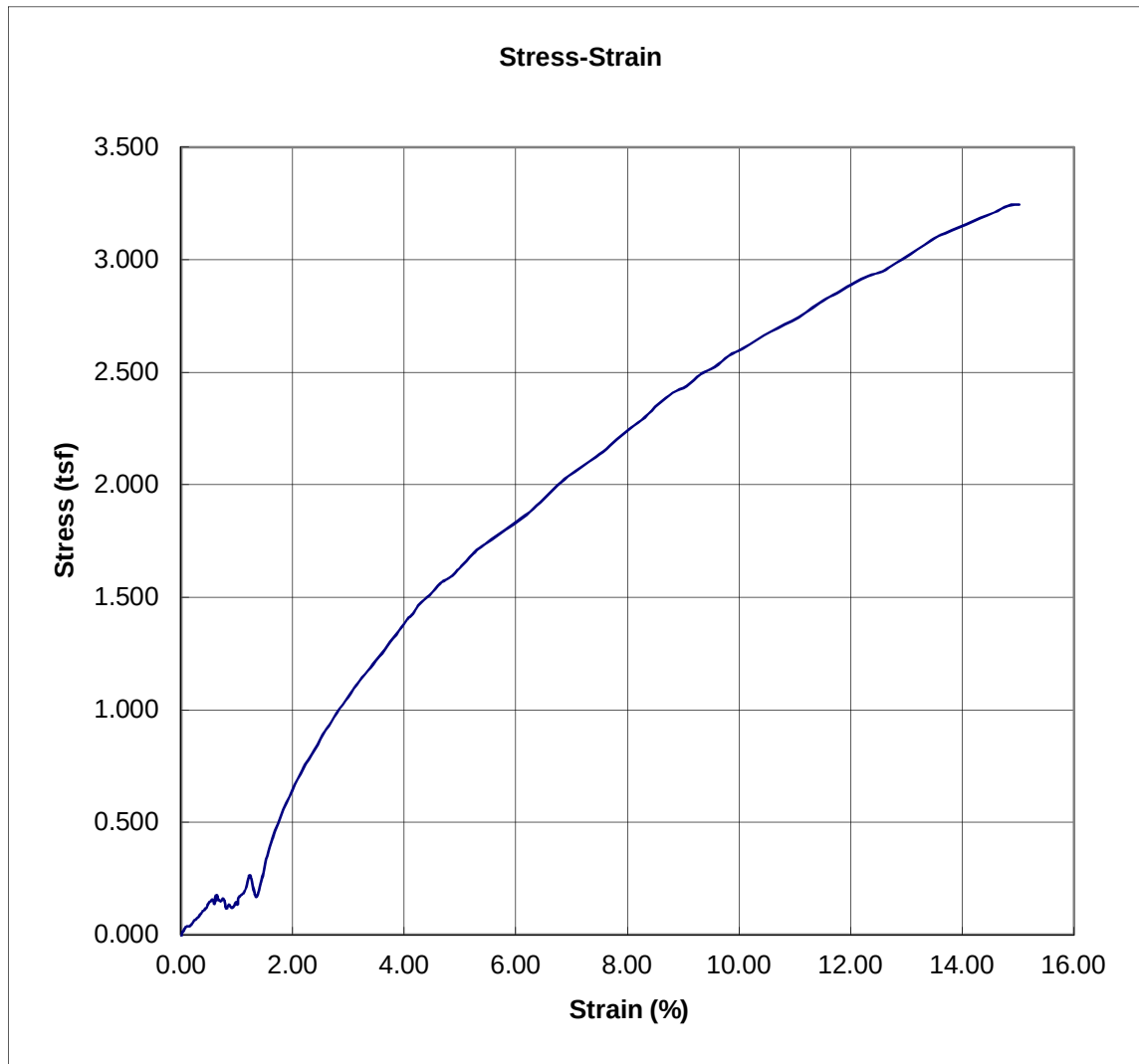
Peak Point	3.85	2.760
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-221
Depth: 78'-80'



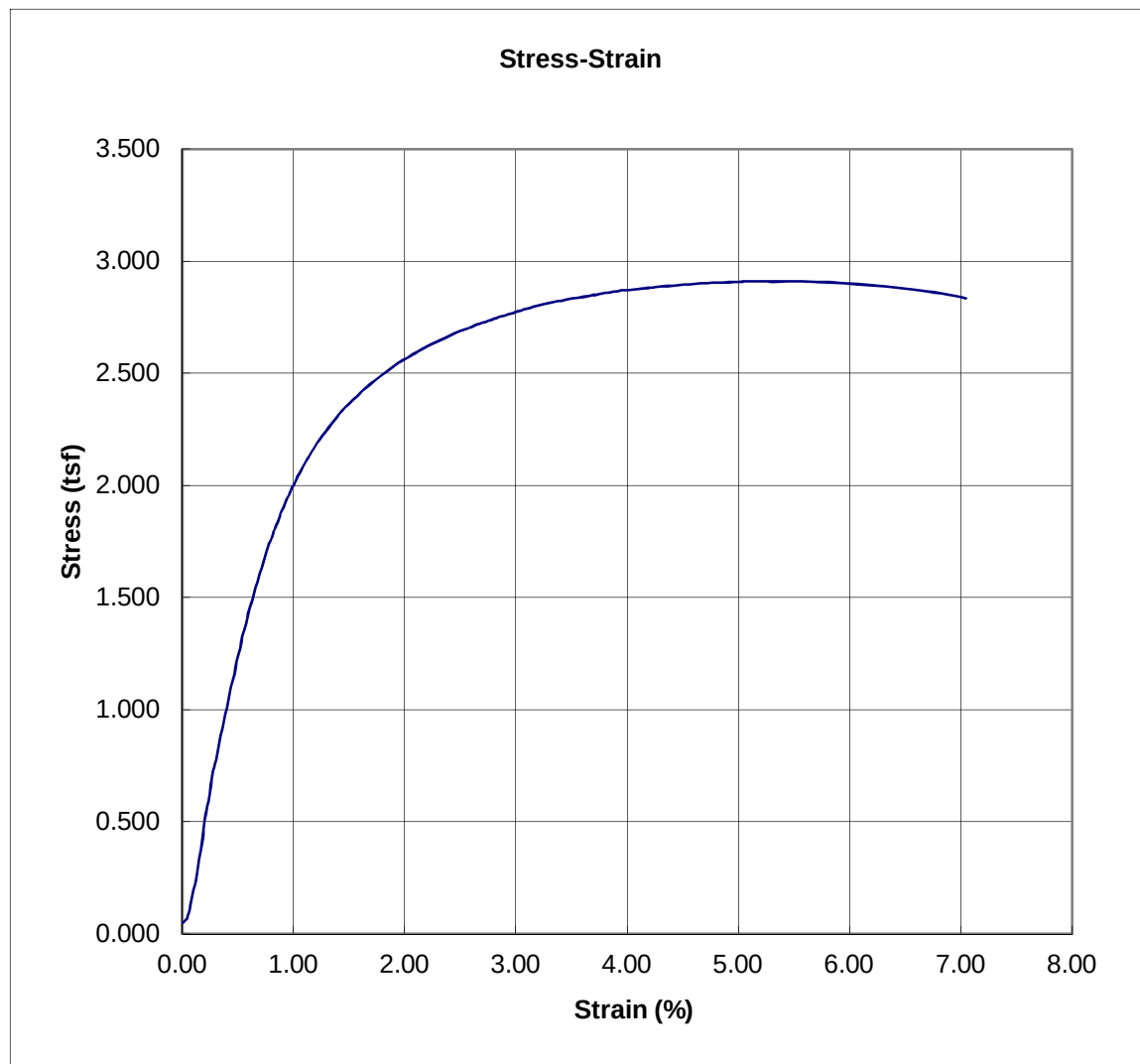
Peak Point	13.84	4.130
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-221
Depth: 88'-90'



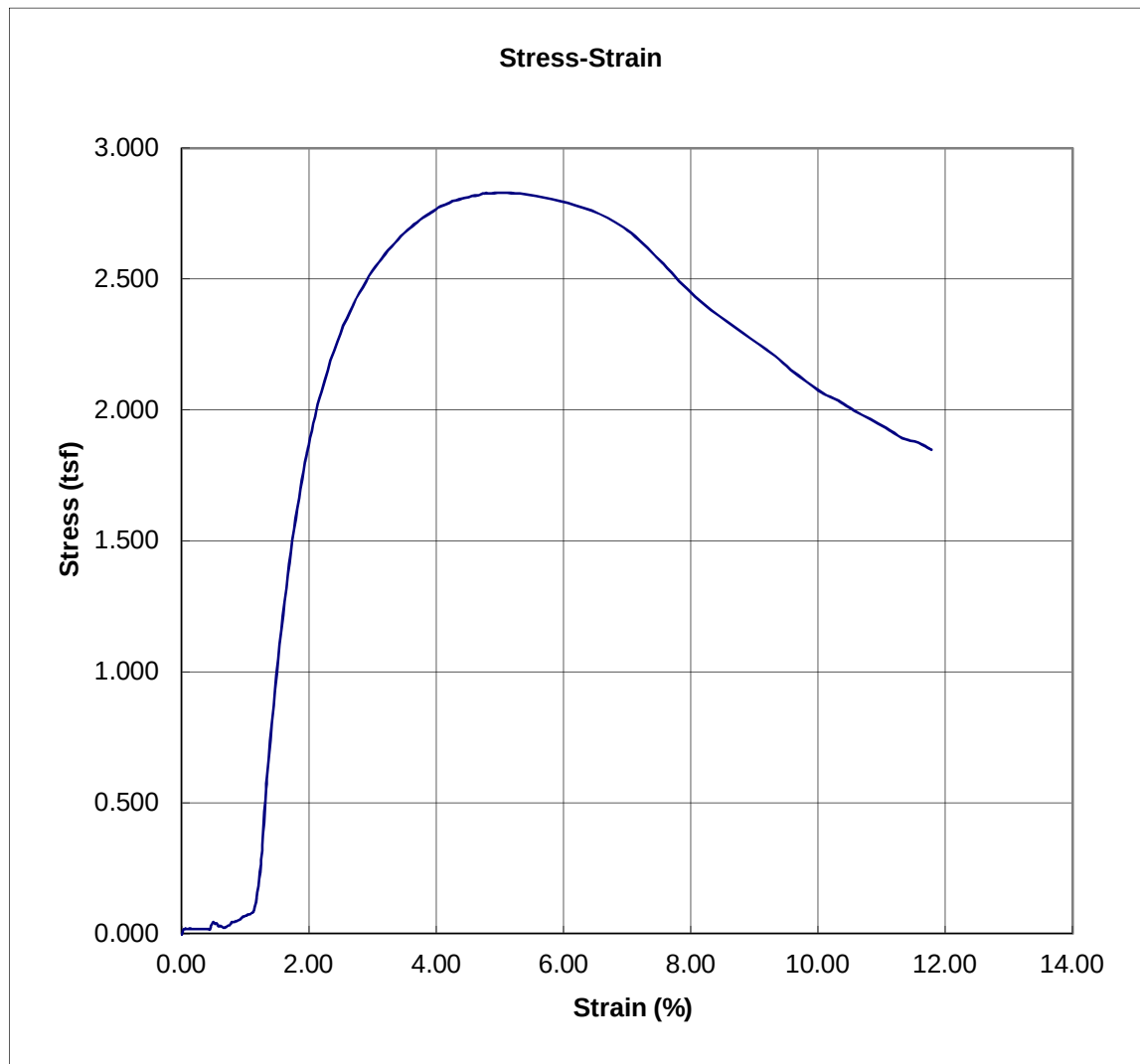
Peak Point	15.02	3.245
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-222
Depth: 38'-40'



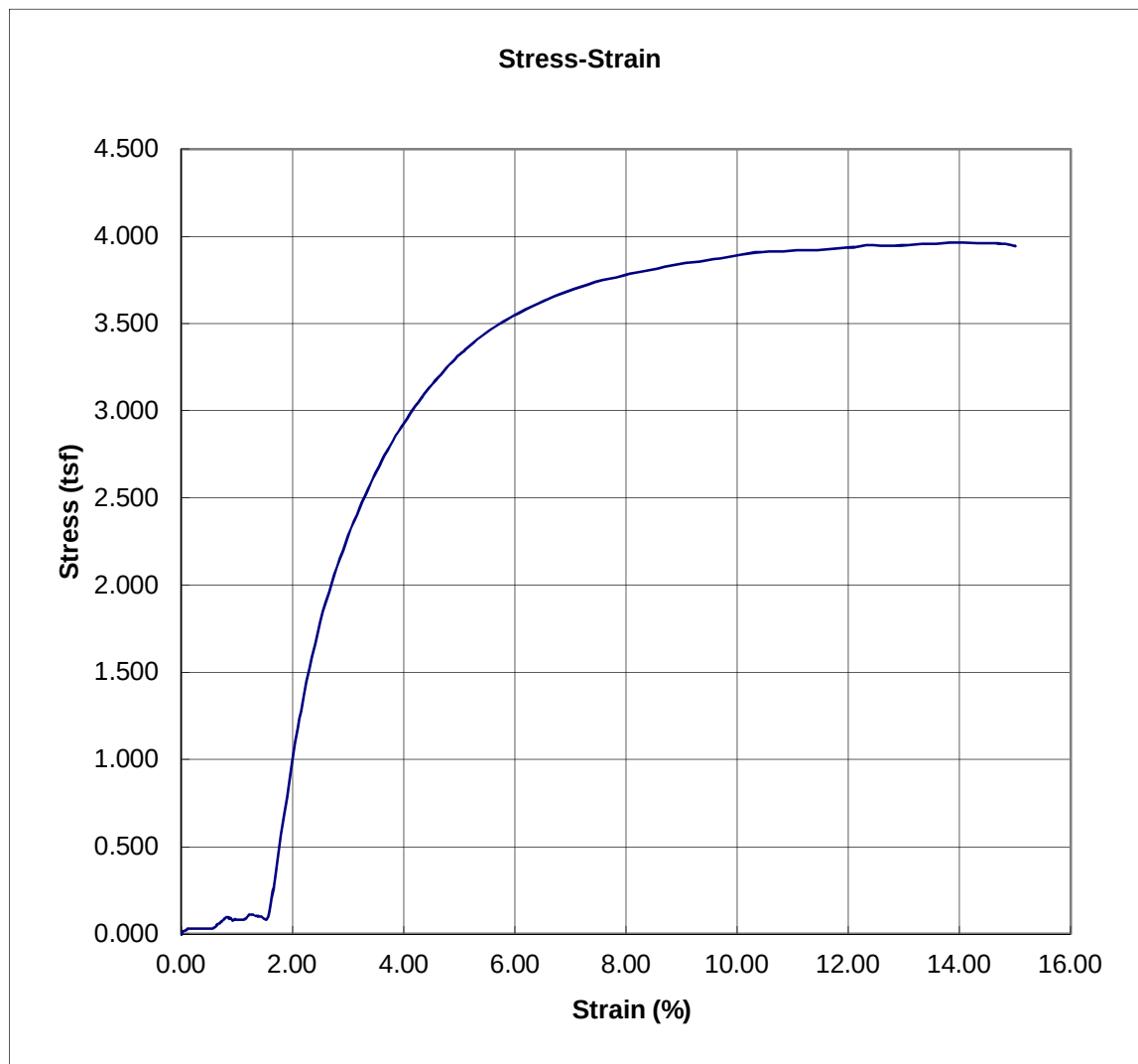
Peak Point	5.57	2.909
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-222
Depth: 48'-50'



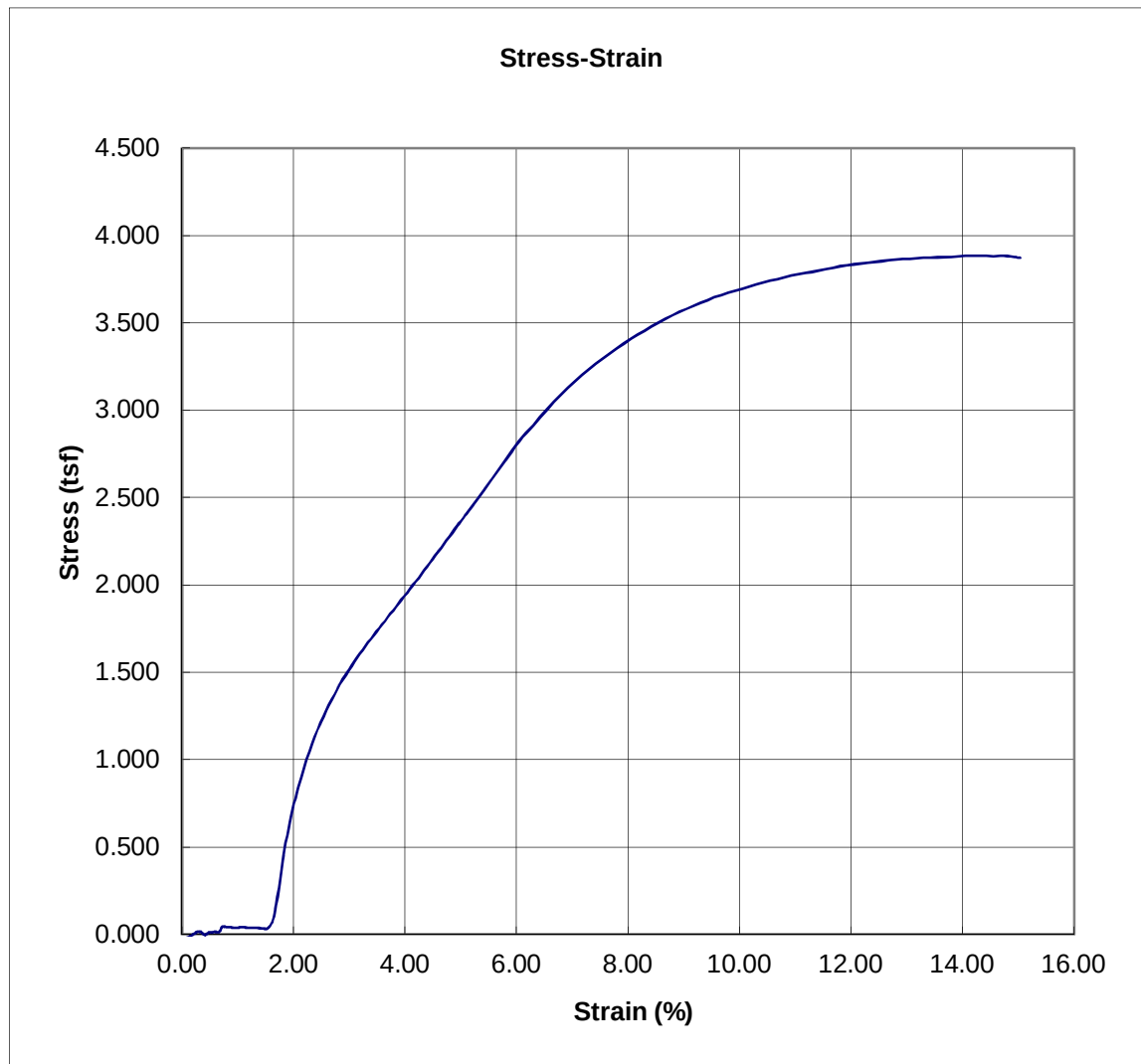
Peak Point	4.97	2.829
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-222
Depth: 63'-65'



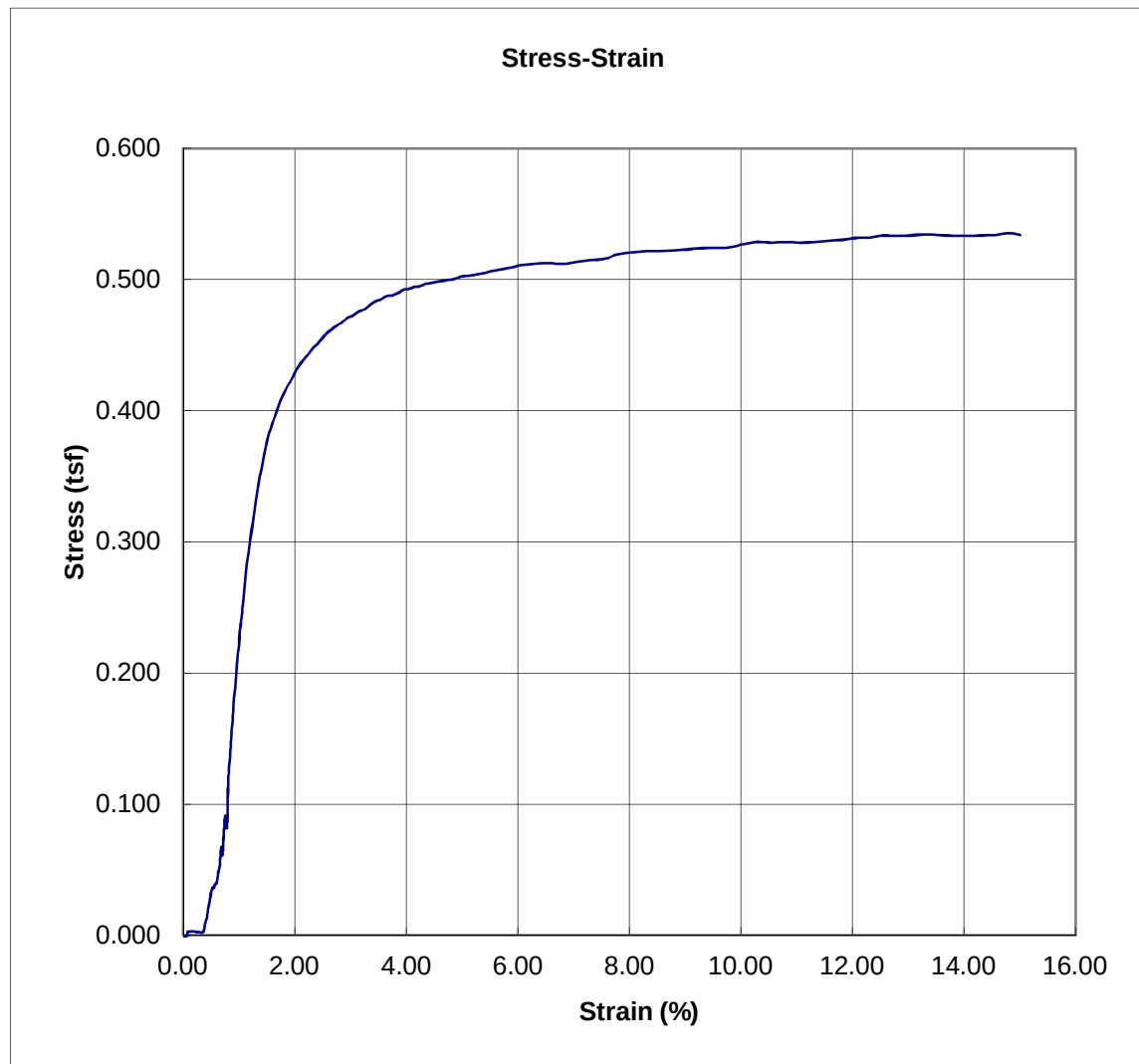
Peak Point	13.83	3.964
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-222
Depth: 83'-85'



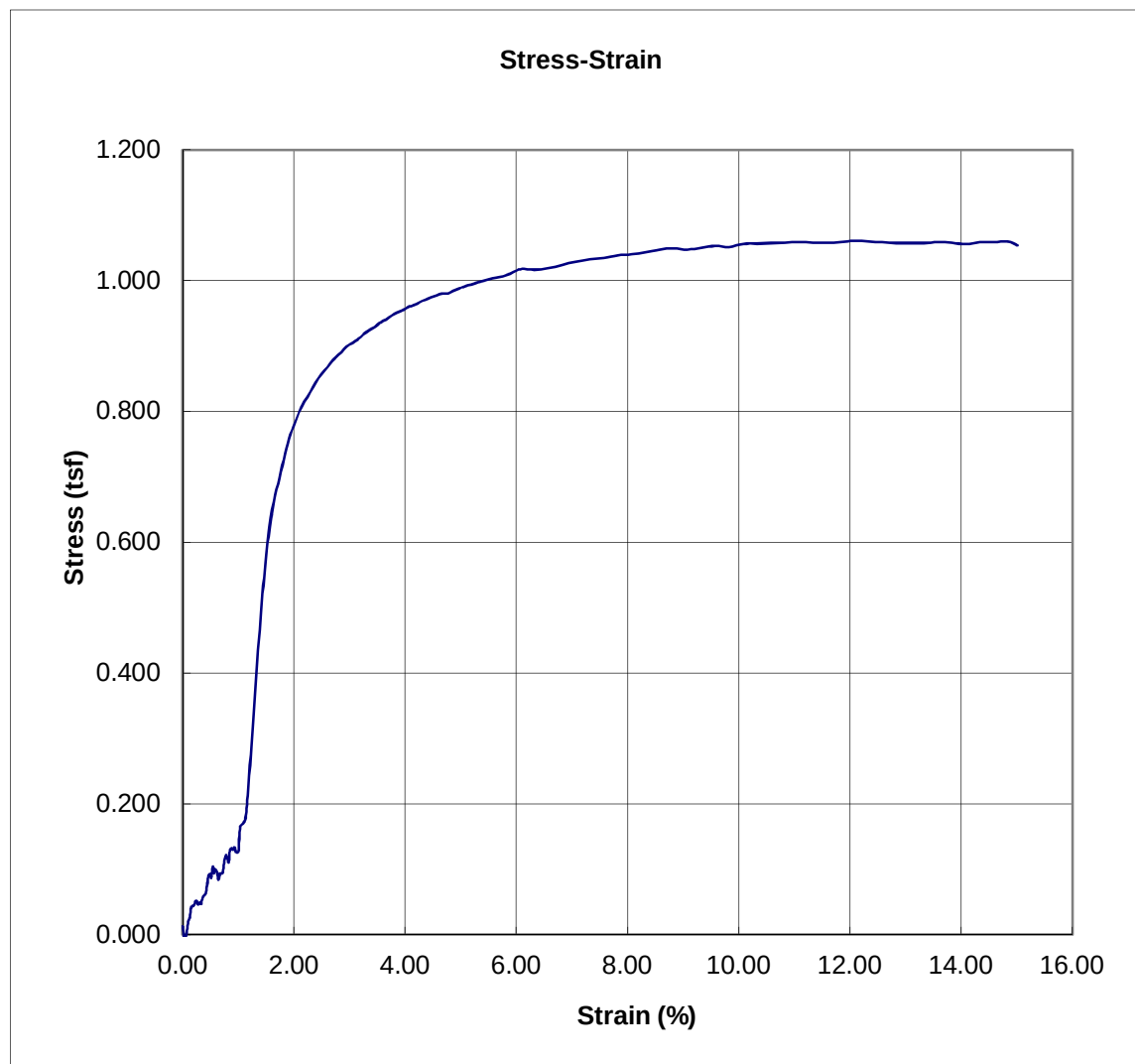
Peak Point	14.30	3.883
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-309
Depth: 23'-25'



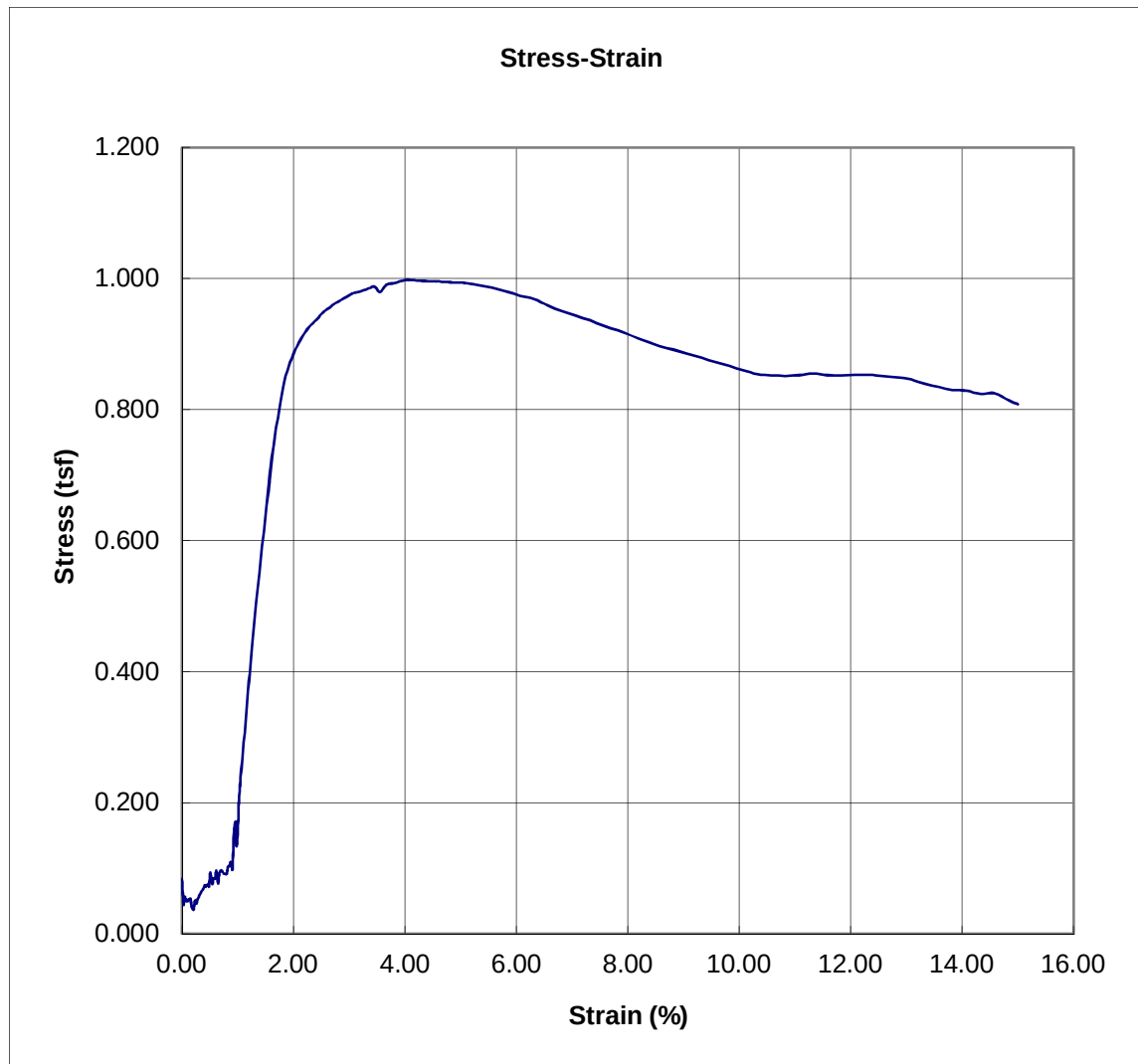
Peak Point	14.81	0.535
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-309
Depth: 33'-35'



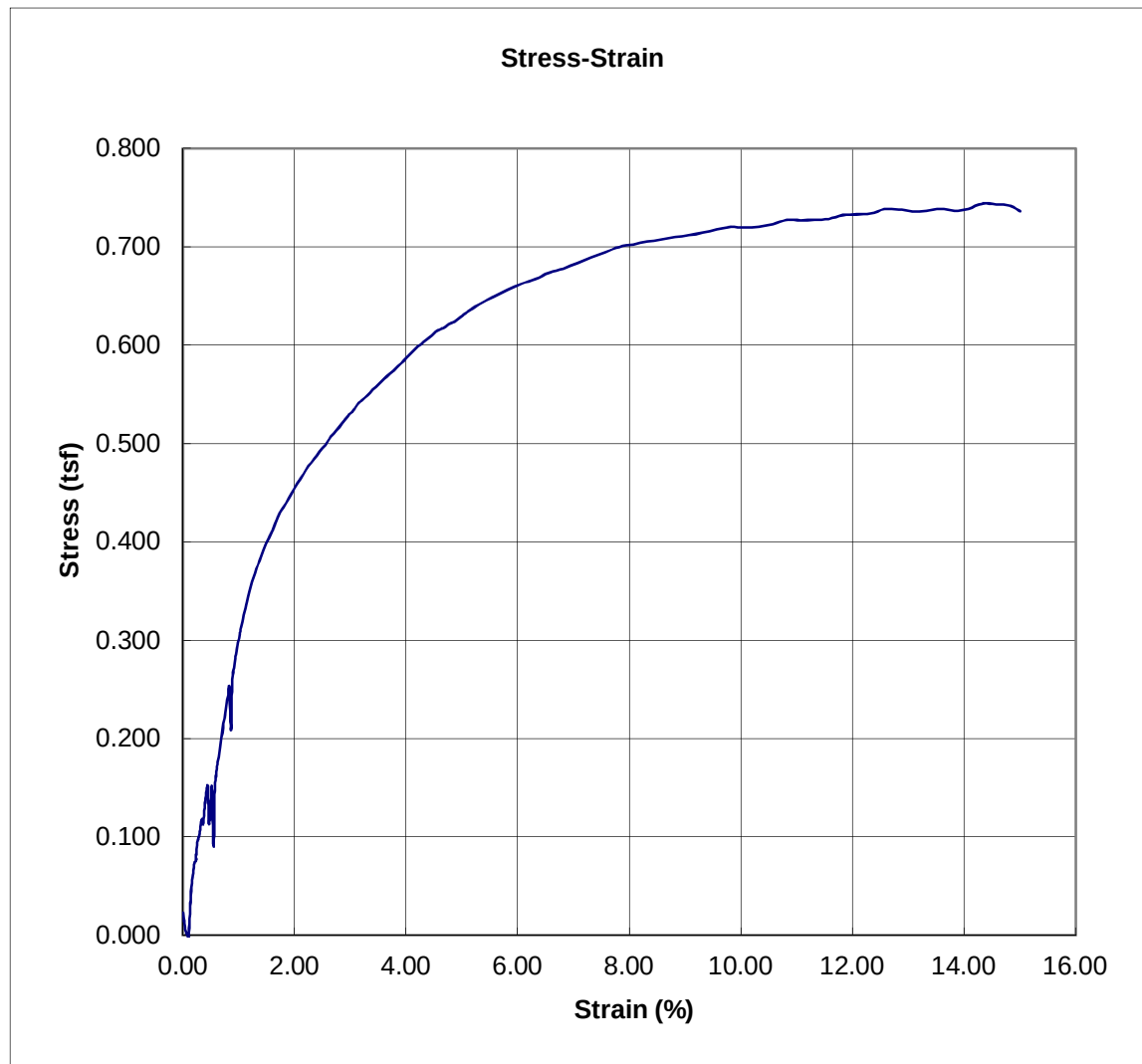
Peak Point	12.08	1.061
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-309
Depth: 43'-45'



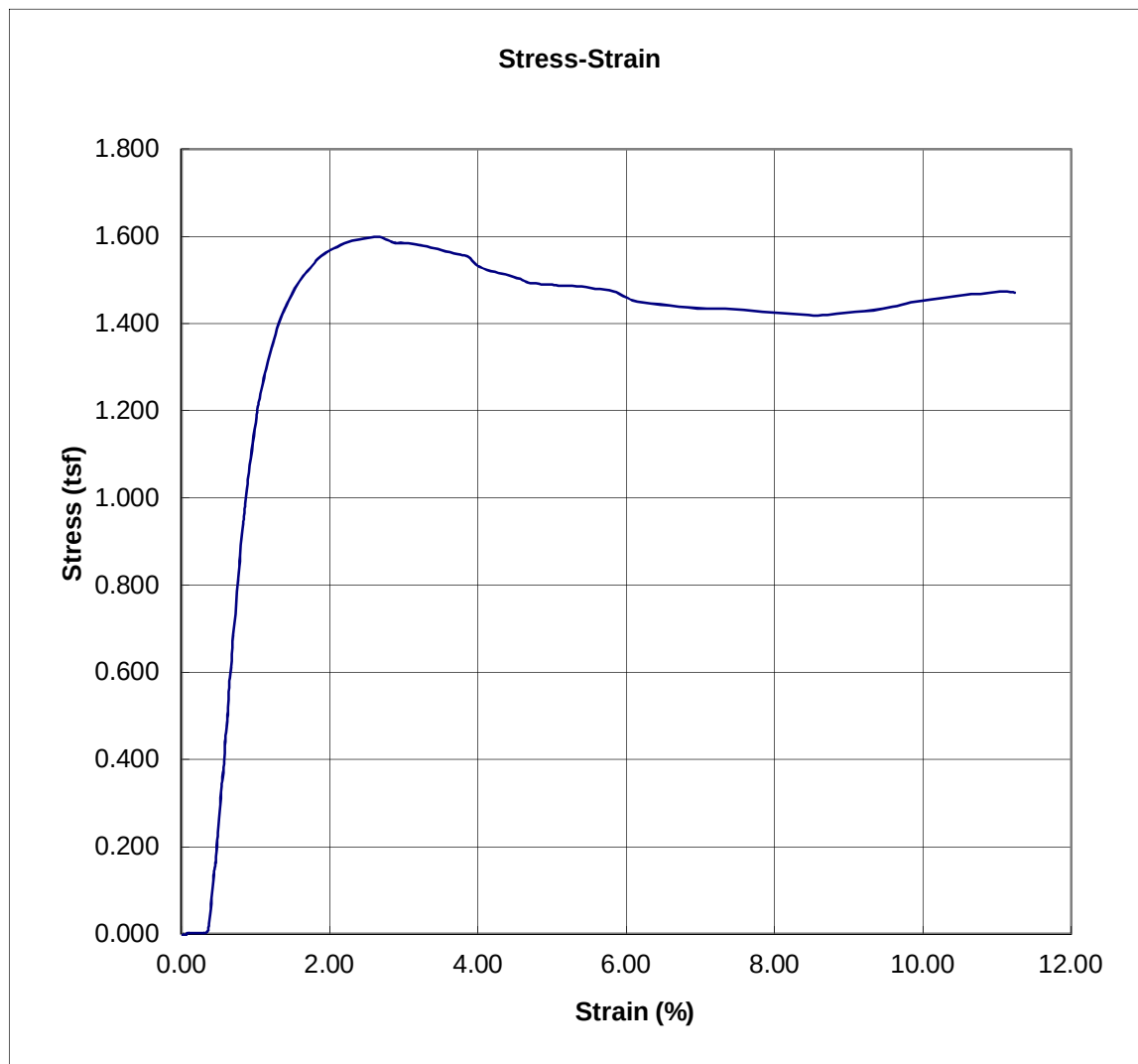
Peak Point	4.06	0.998
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-309
Depth: 53'-55'



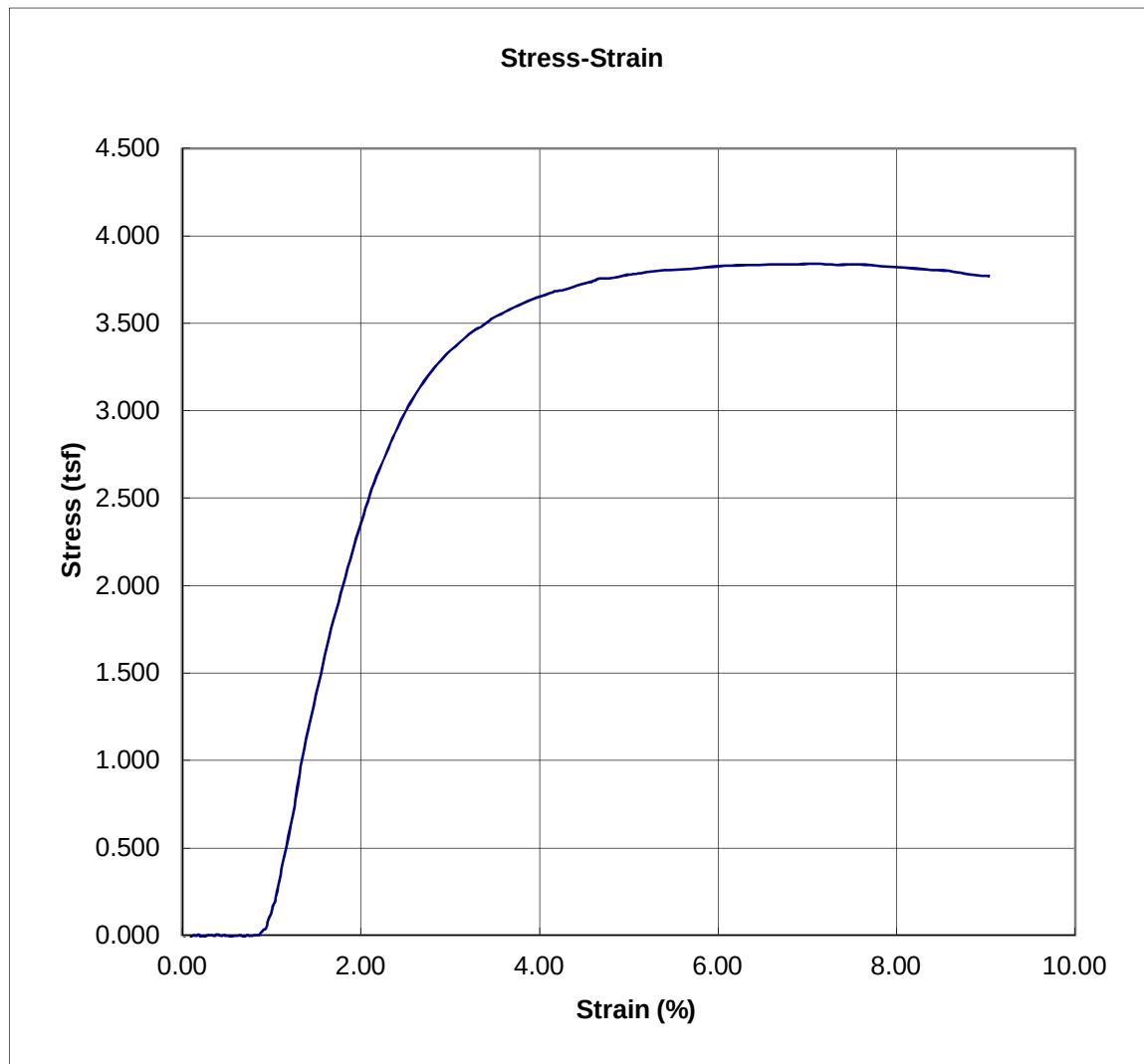
Peak Point	14.33	0.744
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-309
Depth: 63'-65'



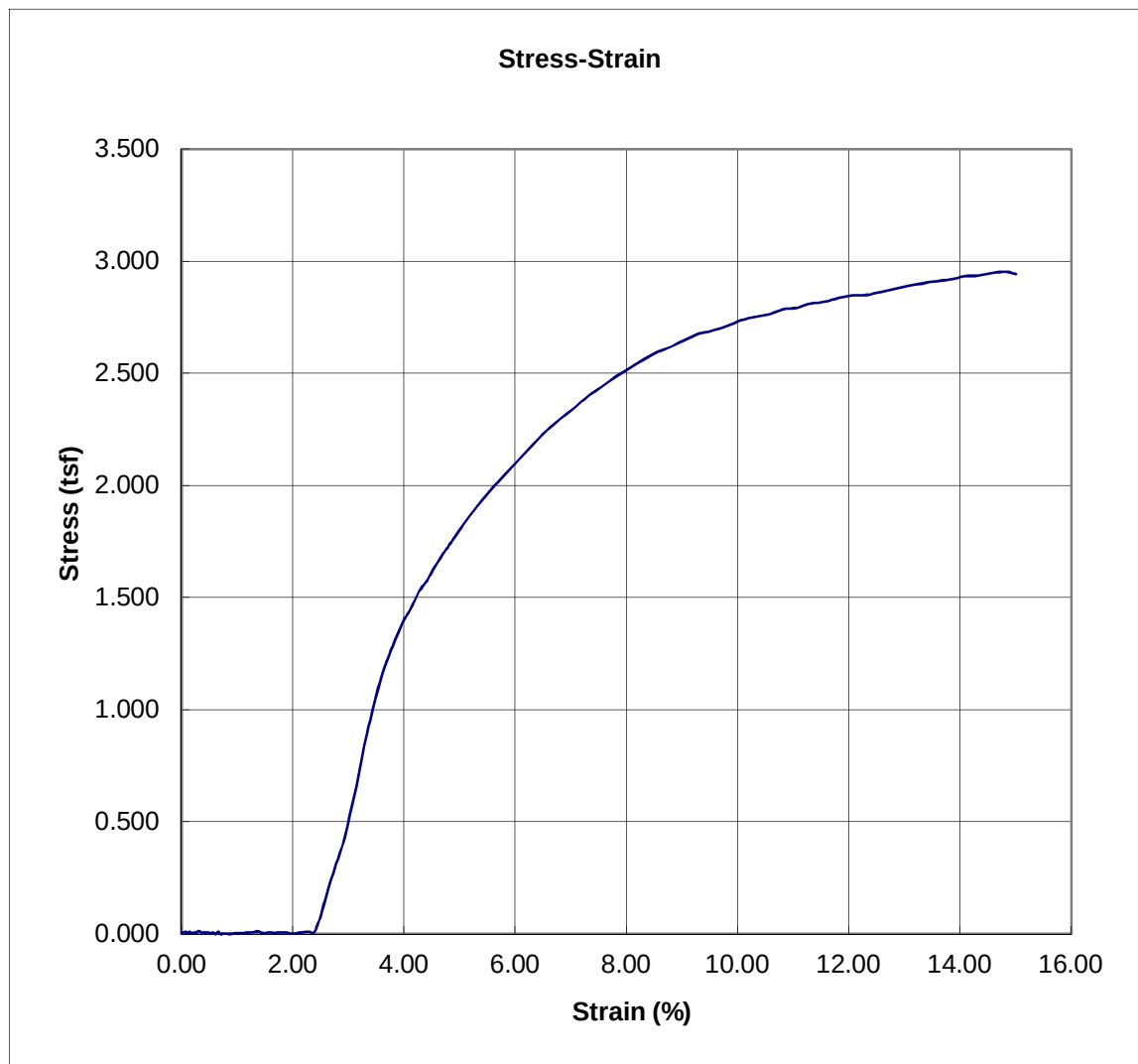
Peak Point	2.65	1.599
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-309
Depth: 78'-80'



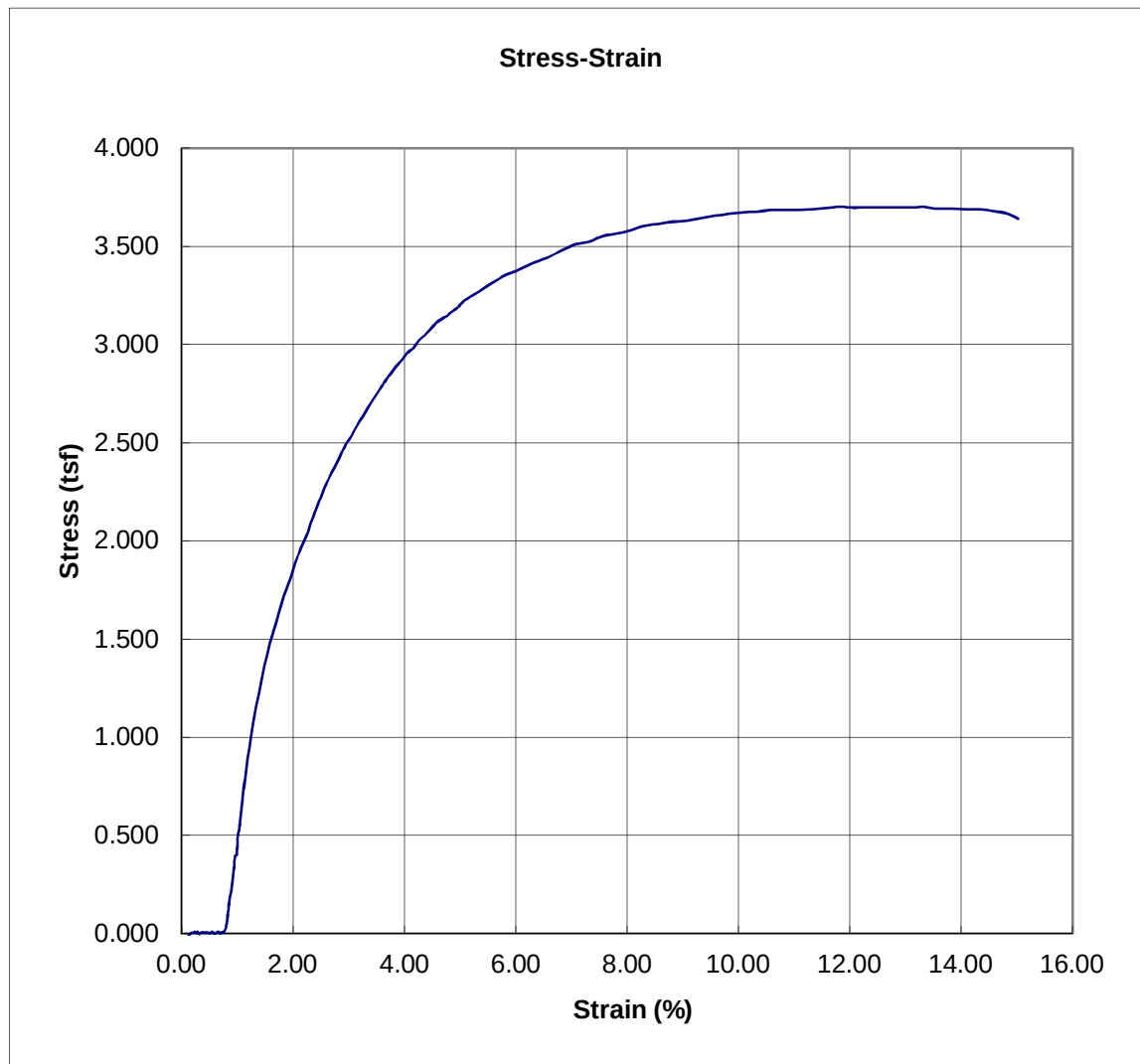
Peak Point	7.08	3.840
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-309
Depth: 83'-85'



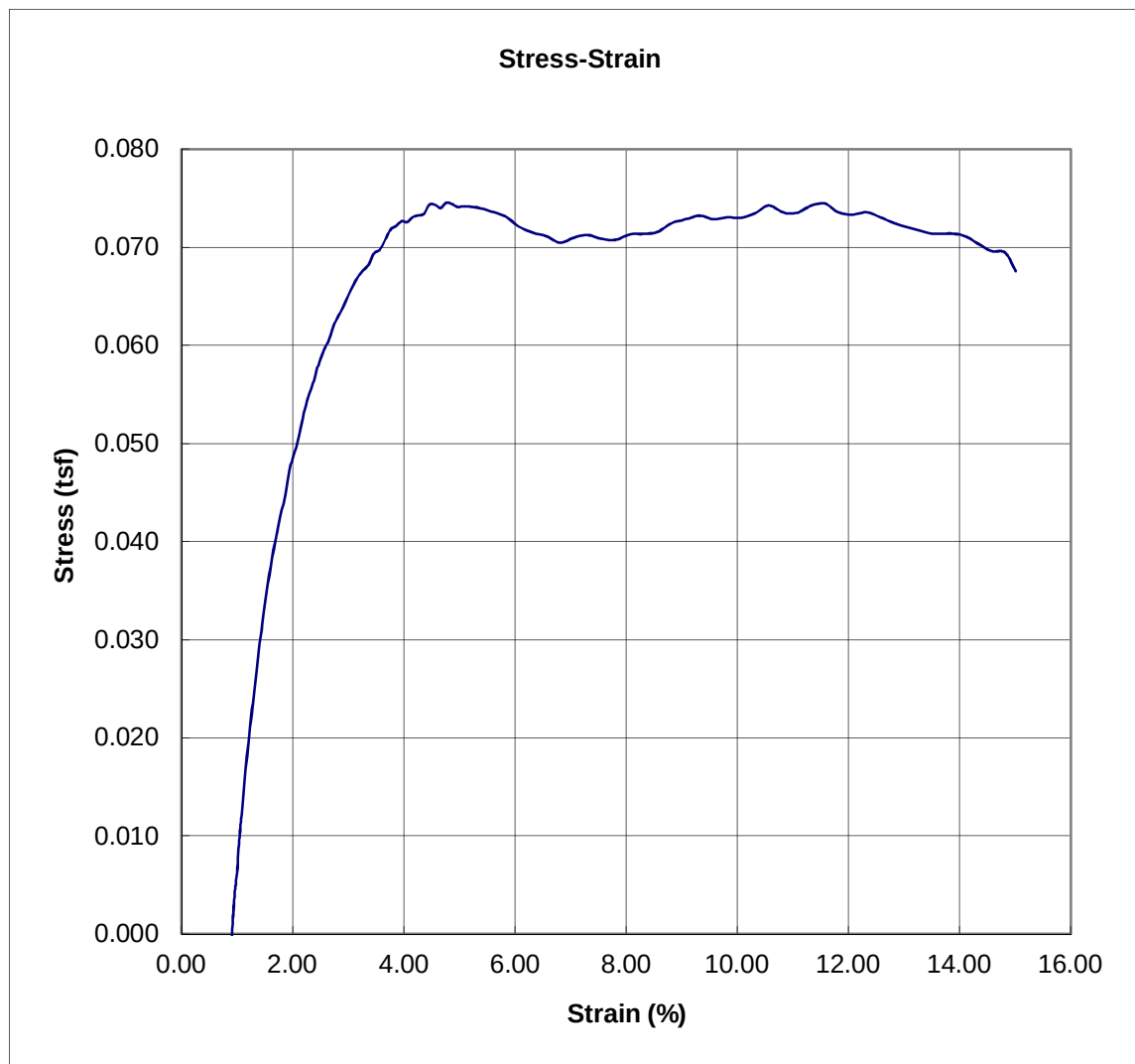
Peak Point	14.83	2.953
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-309
Depth: 93'-95'



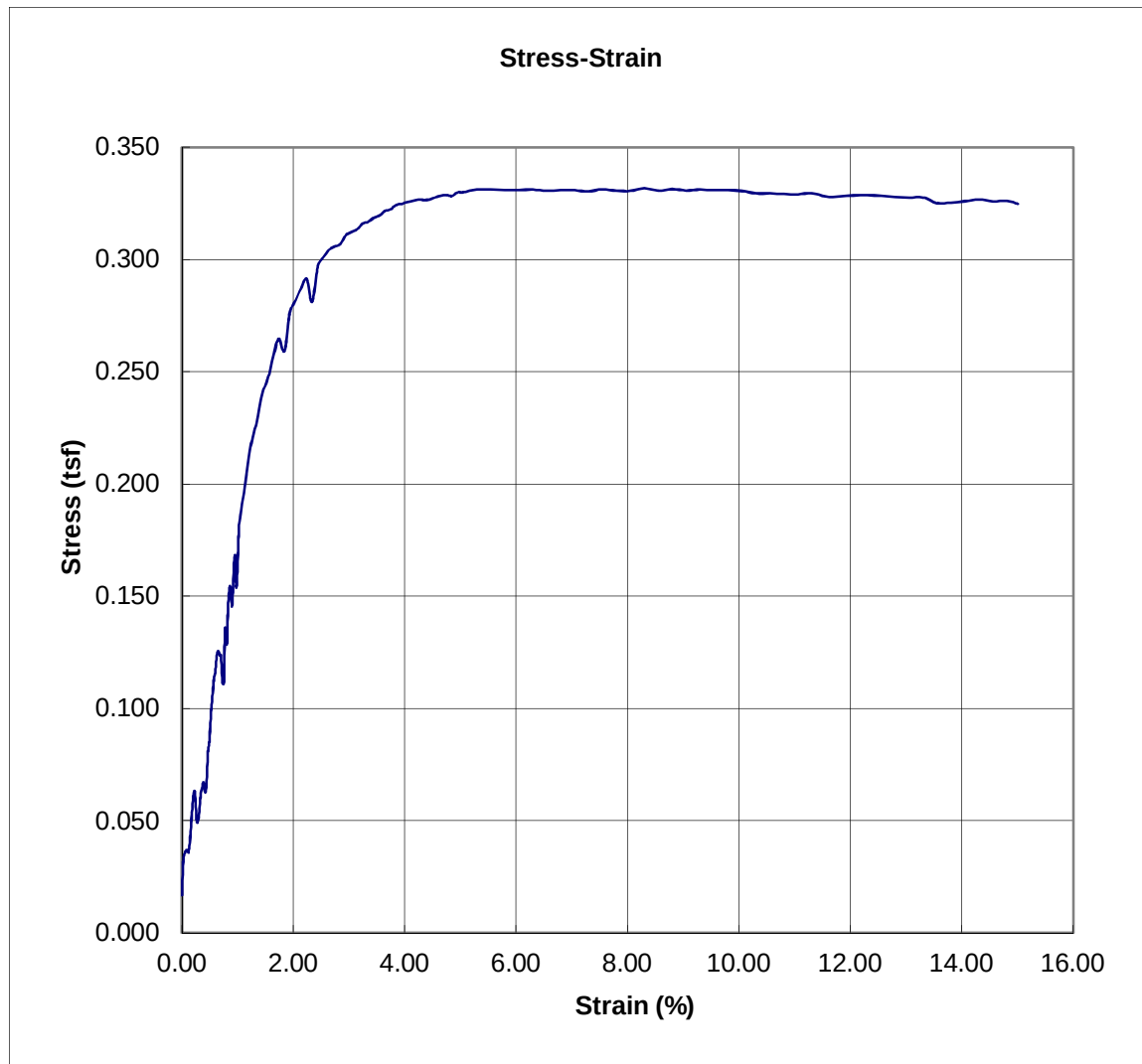
Peak Point	11.83	3.701
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-309
Depth: 118'-120'



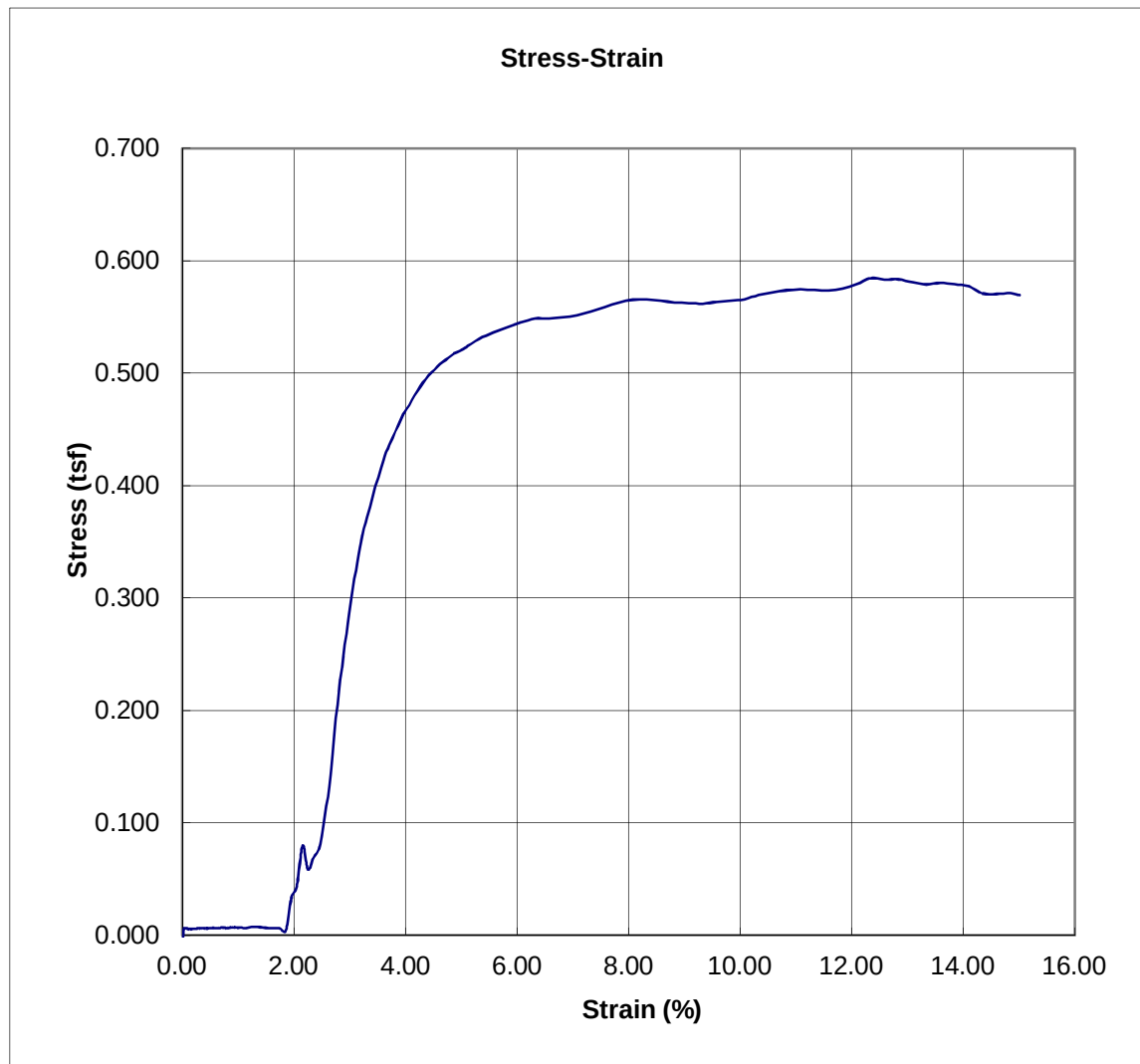
Peak Point	4.76	0.075
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-310
Depth: 28'-30'



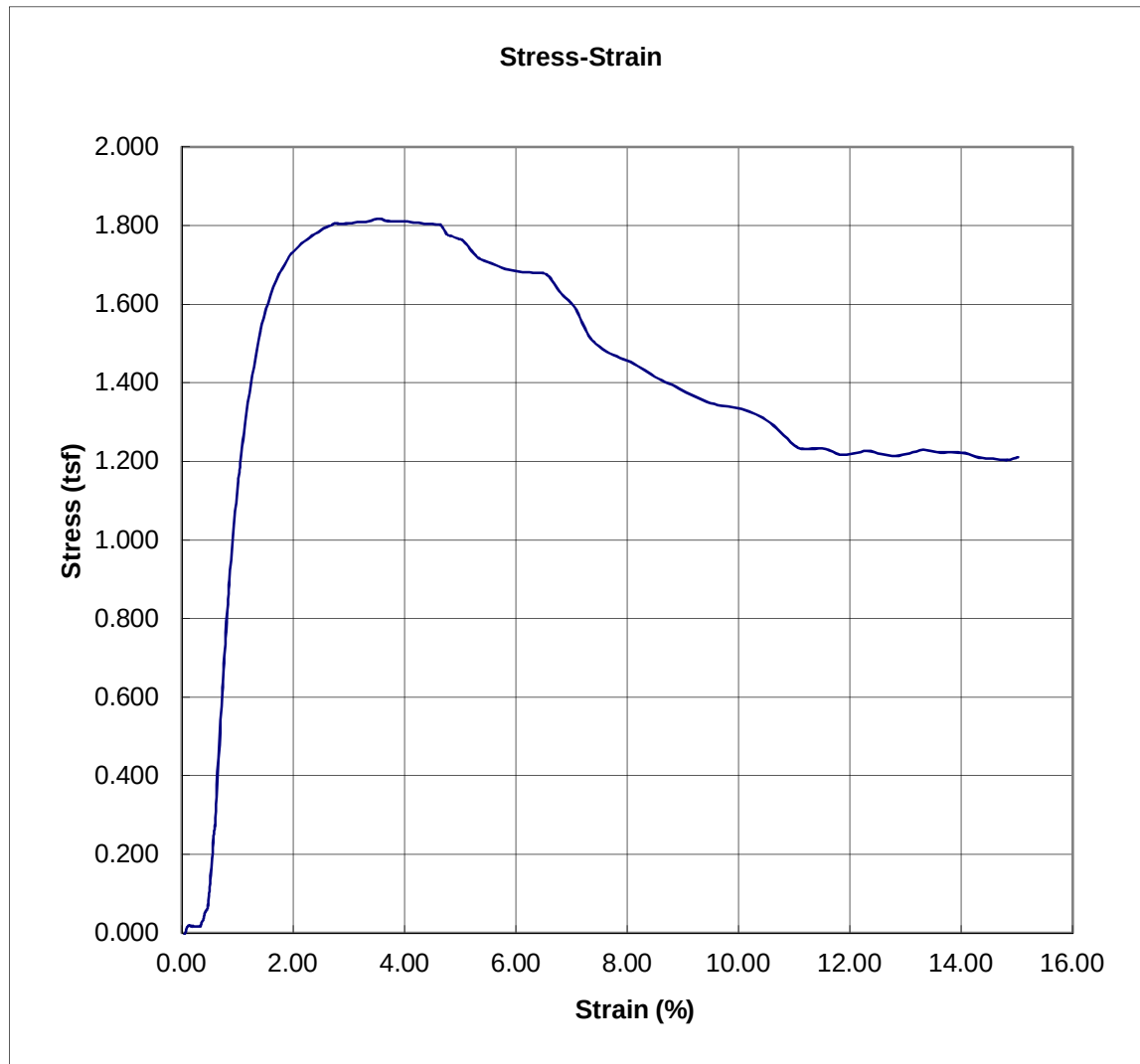
Peak Point	8.30	0.332
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-310
Depth: 43'-45'



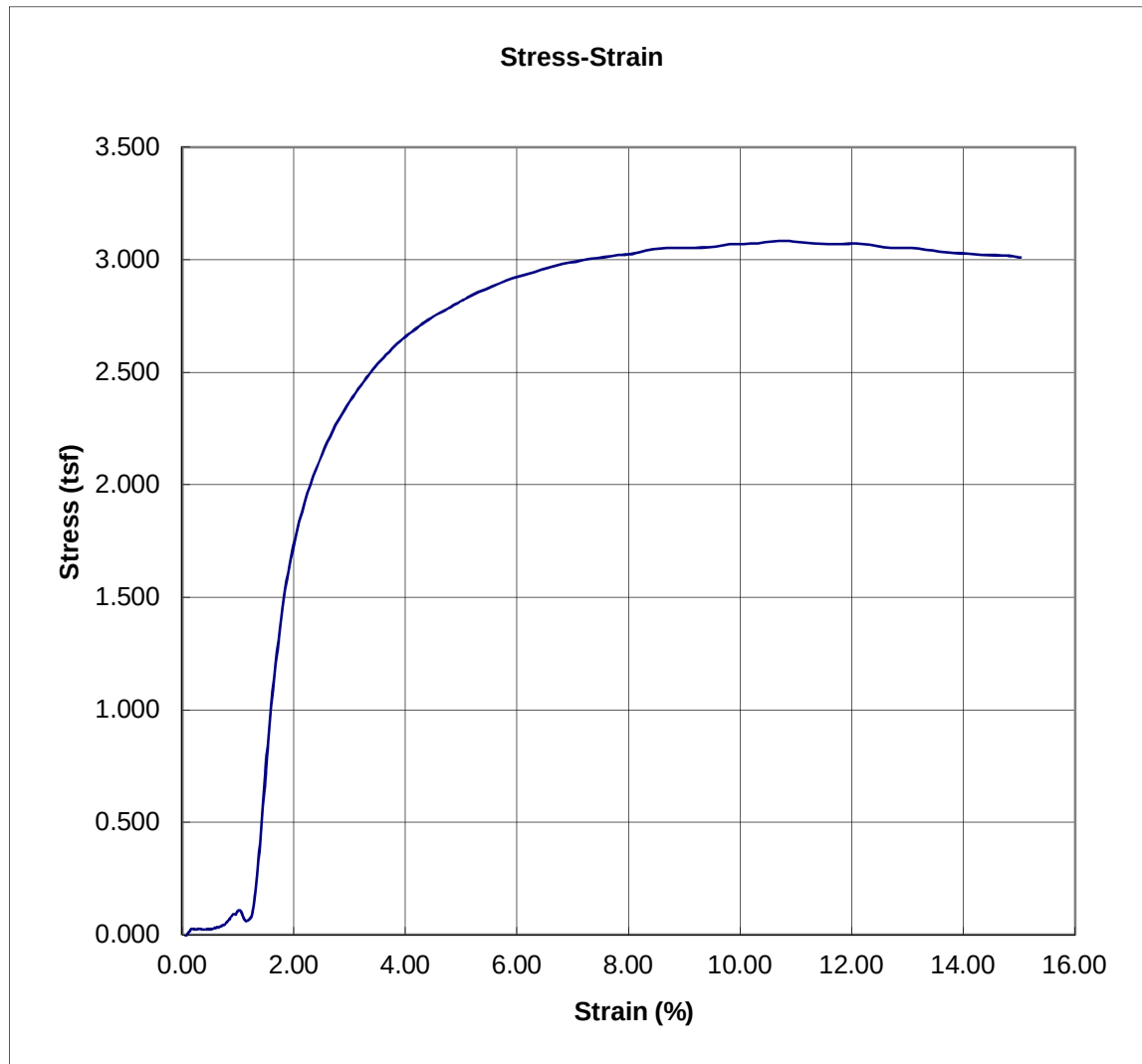
Peak Point	12.34	0.584
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-310
Depth: 53'-55'



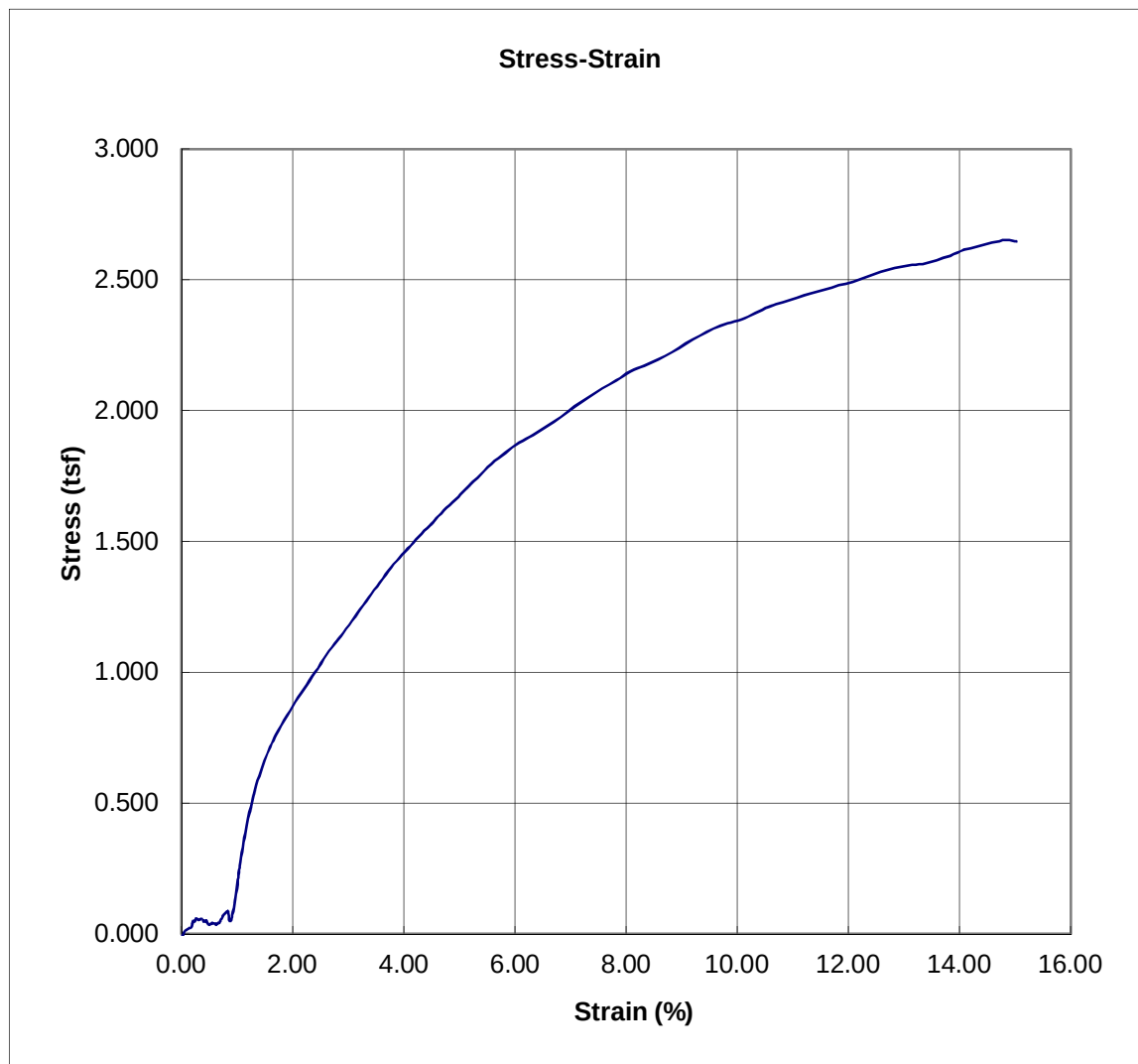
Peak Point	3.56	1.818
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-310
Depth: 63'-65'



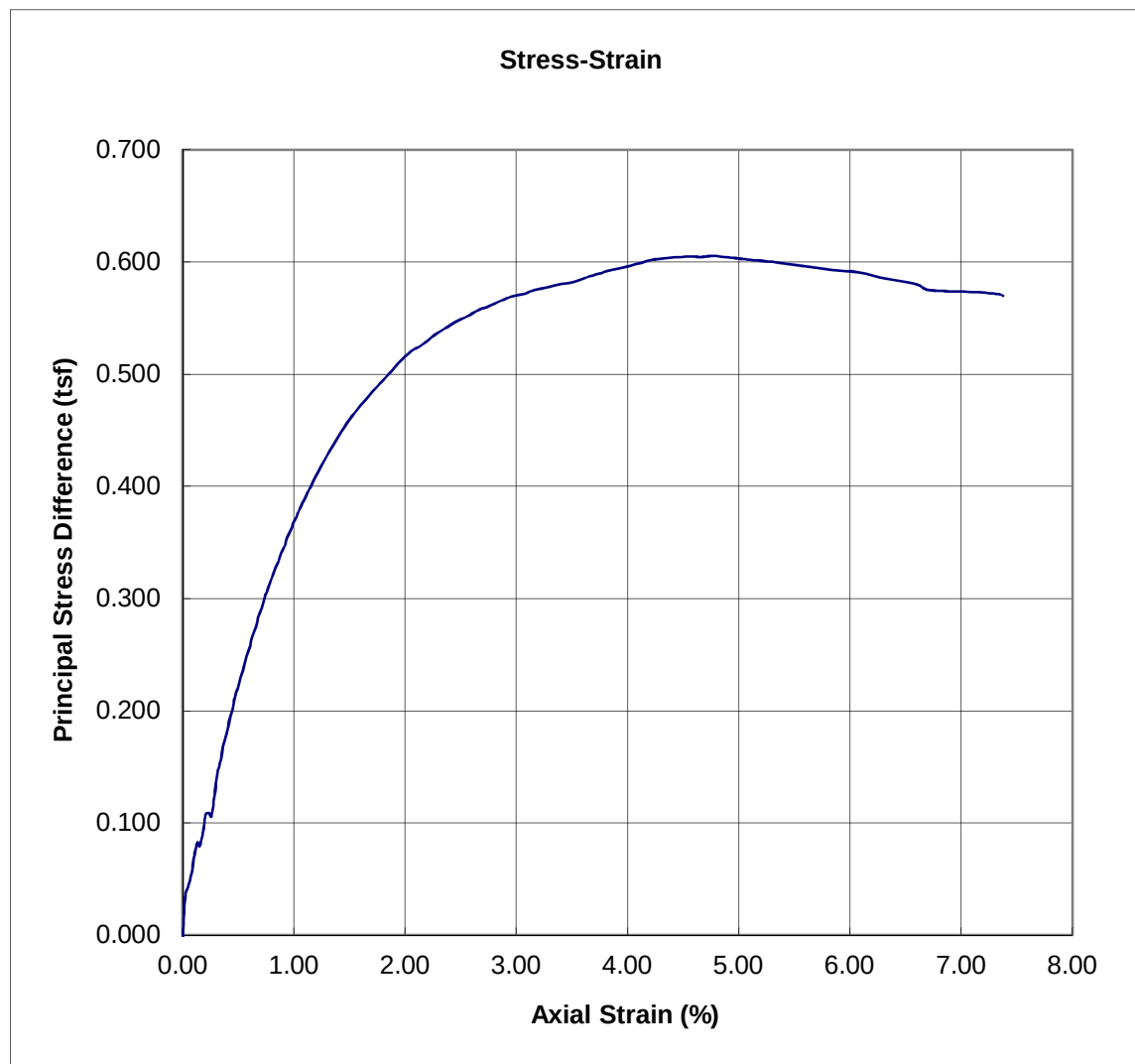
Peak Point	10.82	3.085
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-310
Depth: 73'-75'



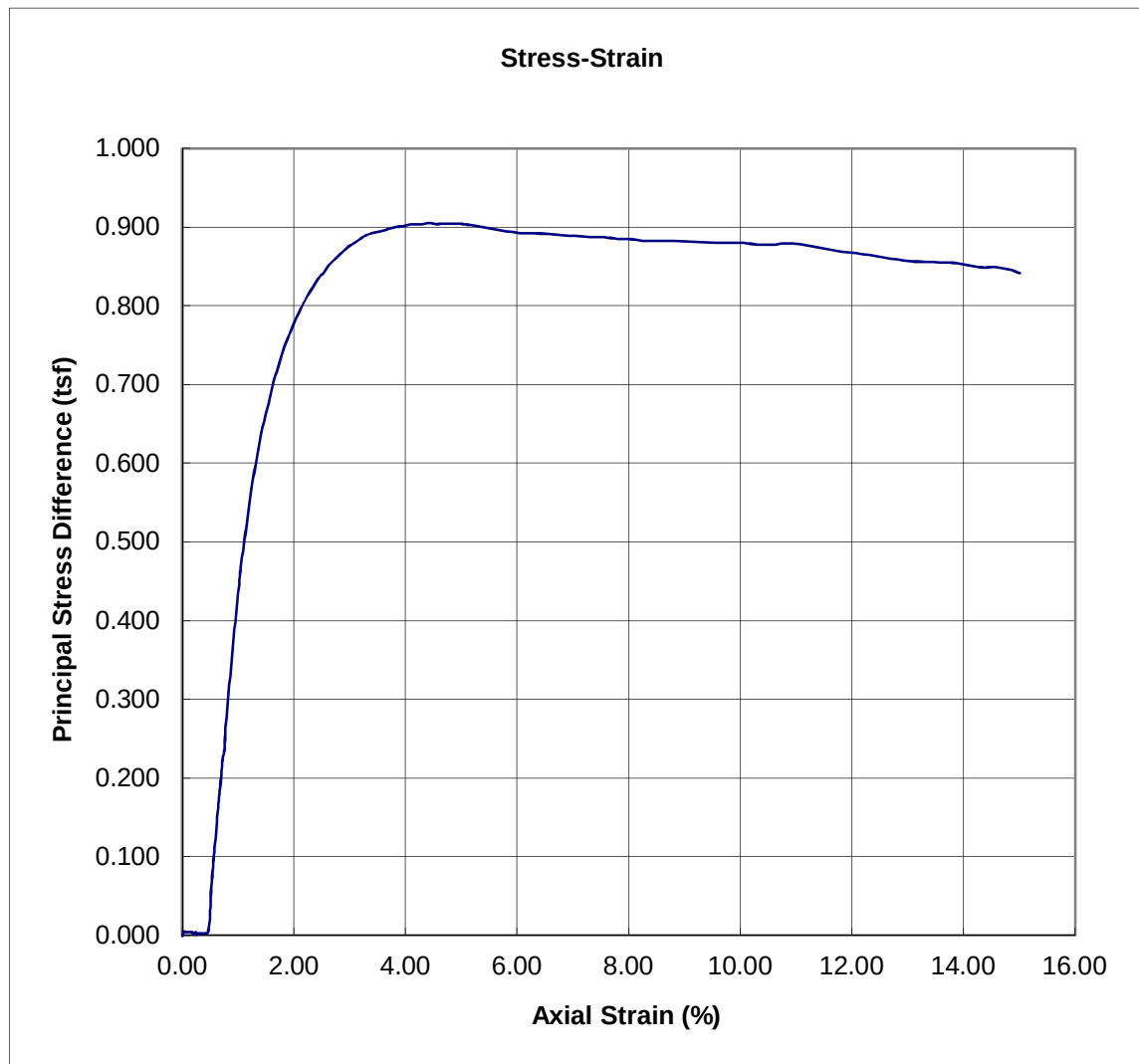
Peak Point	14.84	2.653
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-311
Depth: 28'-30'



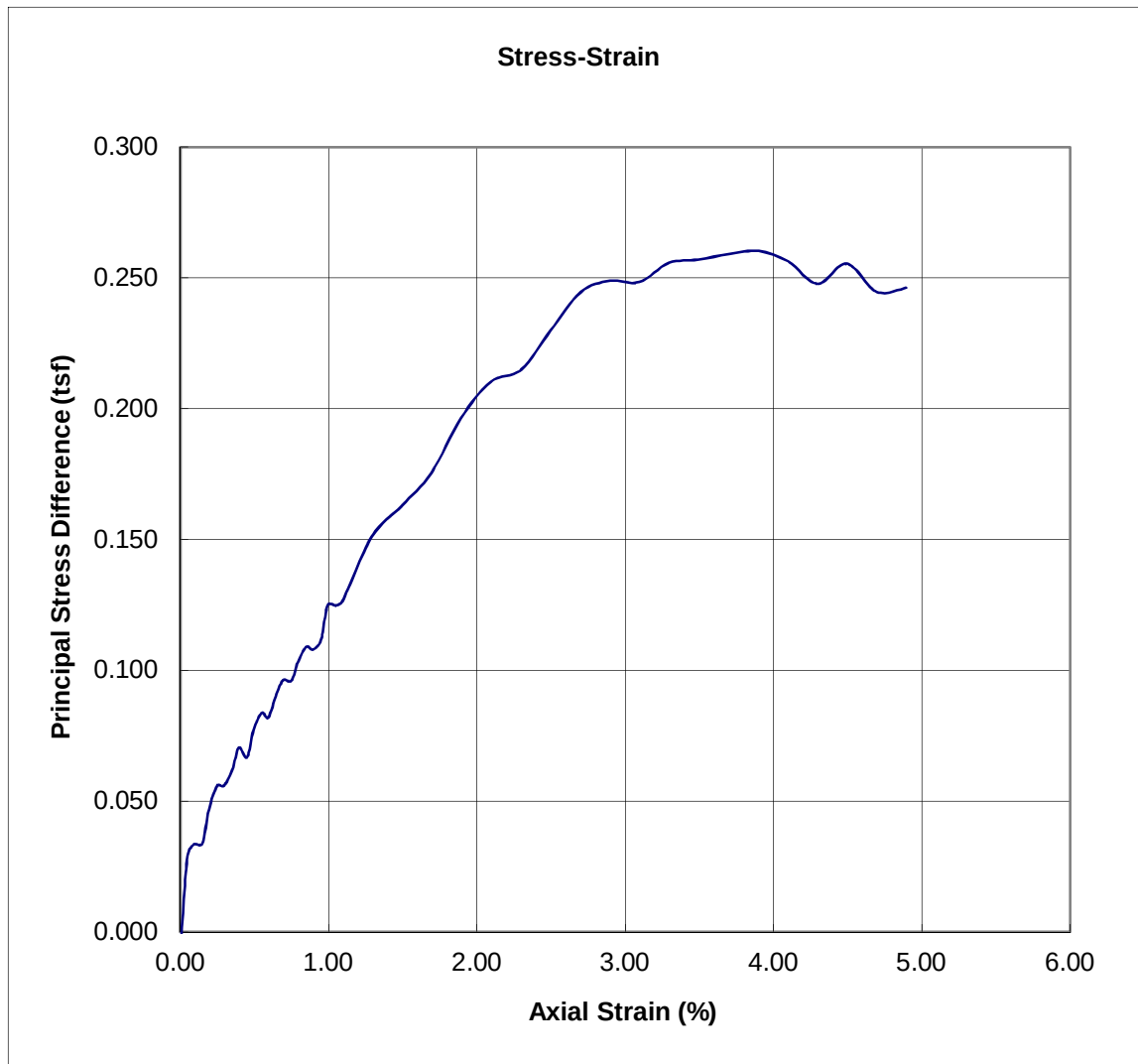
Peak Point	4.77	0.606
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-311
Depth: 33'-35'



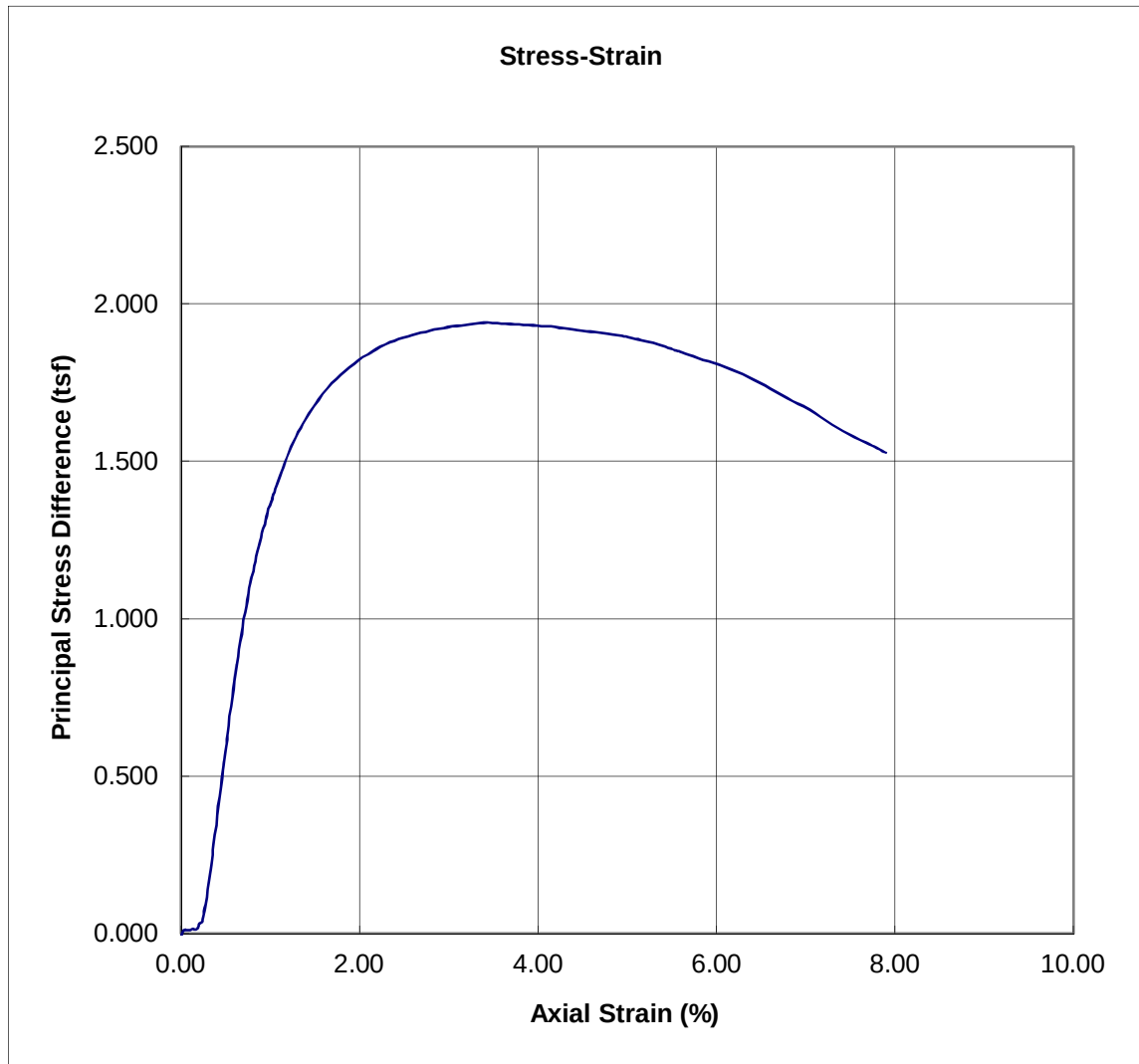
Peak Point	4.44	0.905
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-311
Depth: 48'-50'



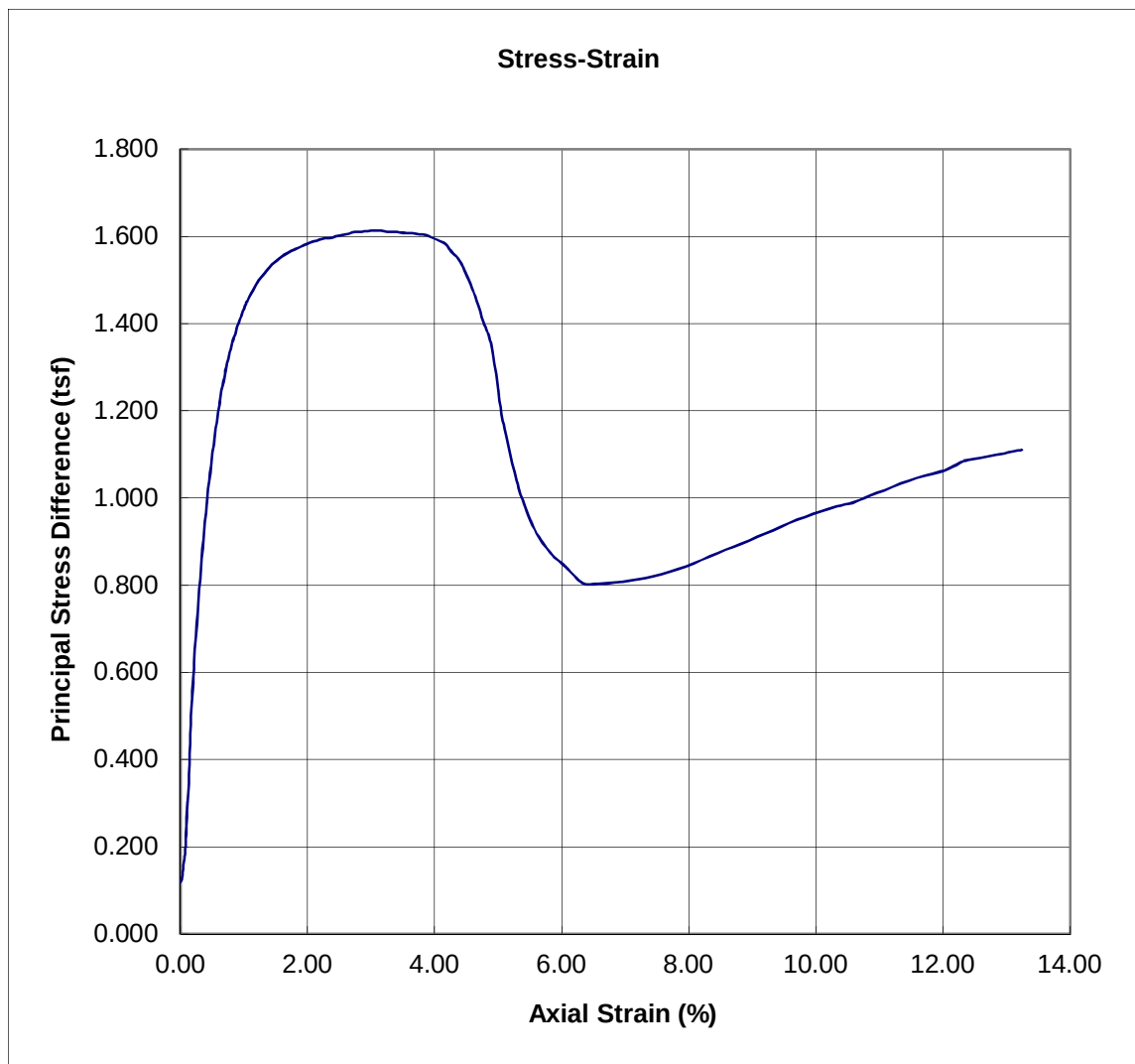
Peak Point	3.90	0.260
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-311
Depth: 53'-55'



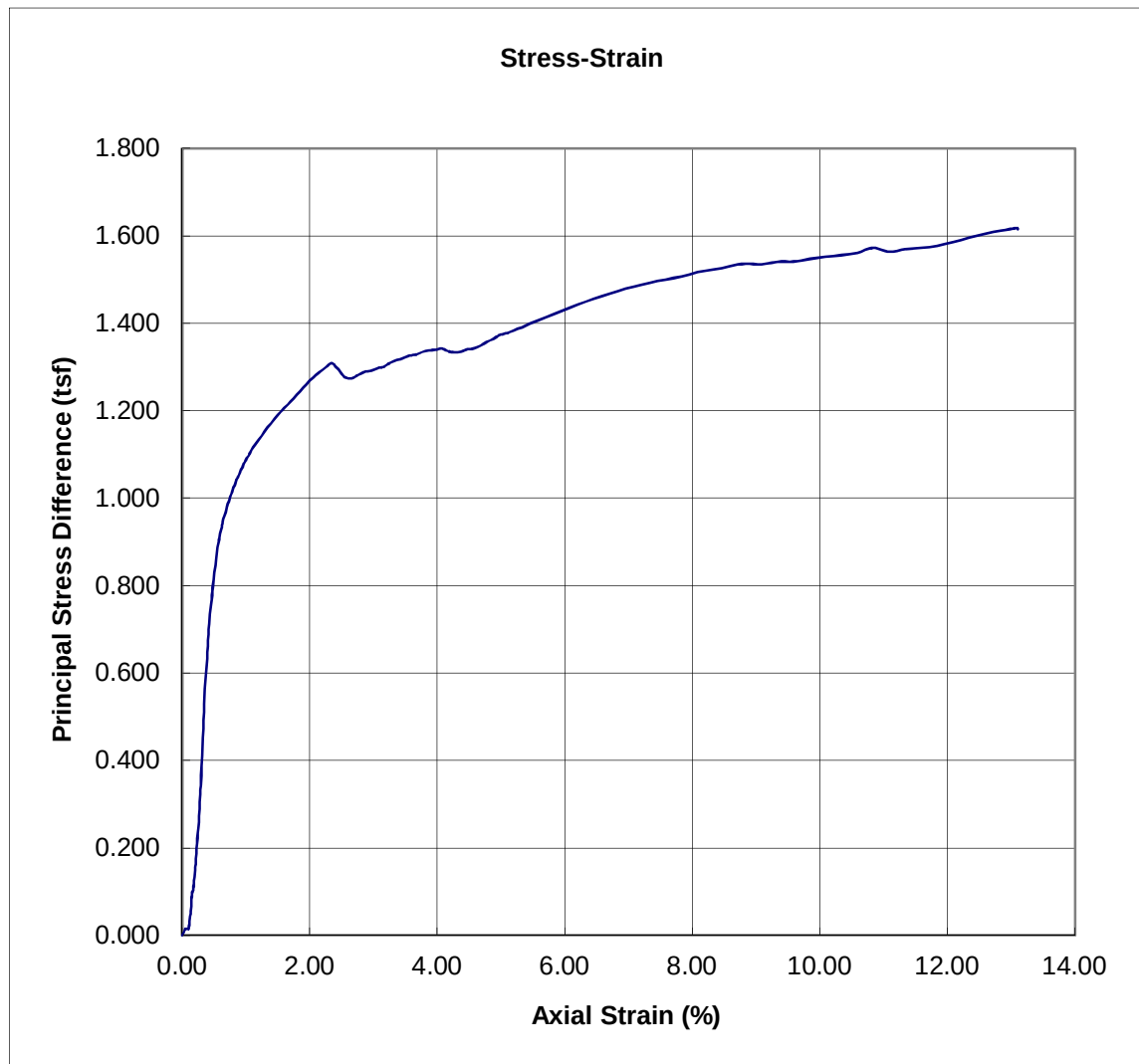
Peak Point	3.44	1.941
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-311
Depth: 63'-65'



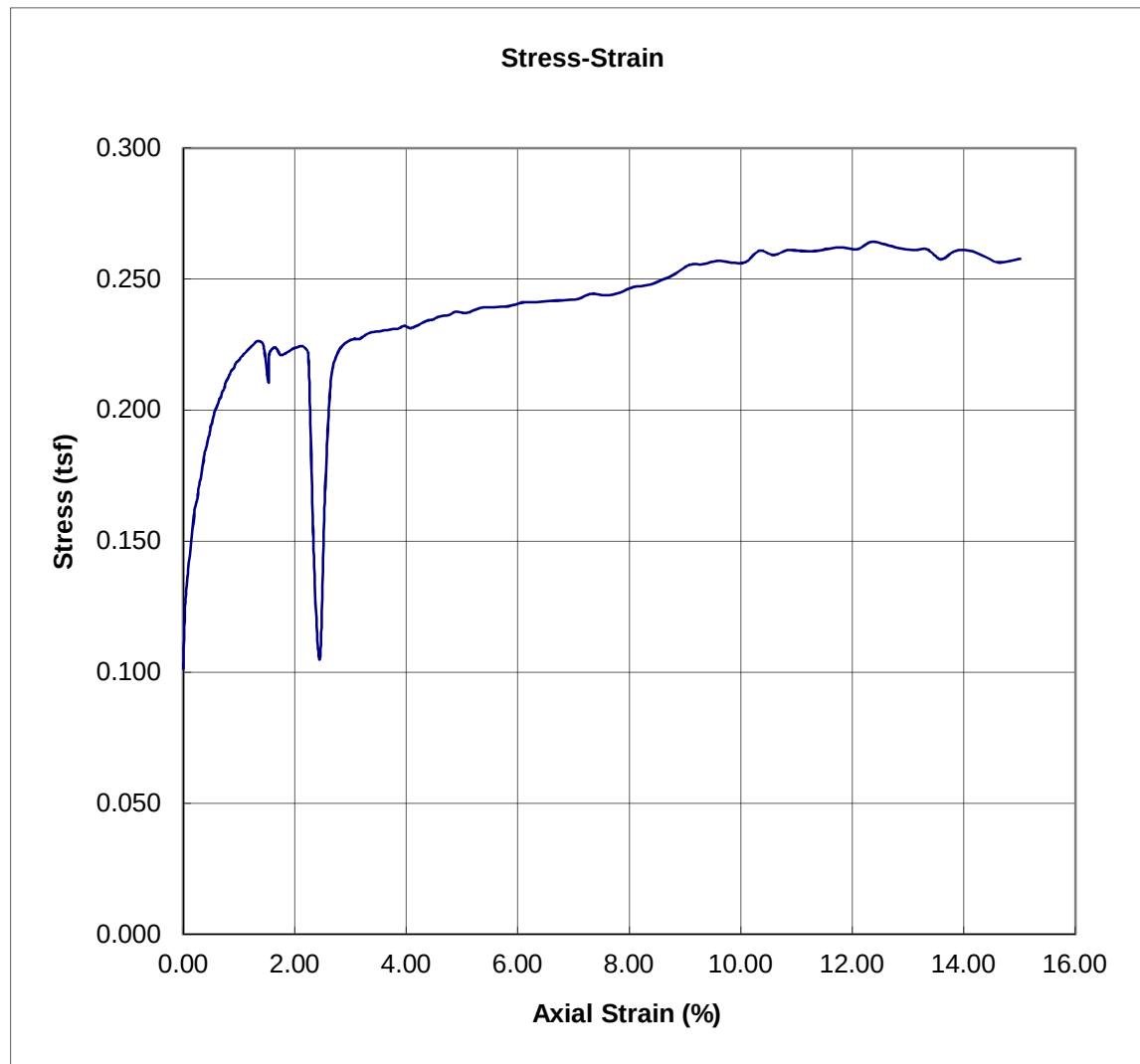
Peak Point	3.05	1.614
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-311
Depth: 73'-75'



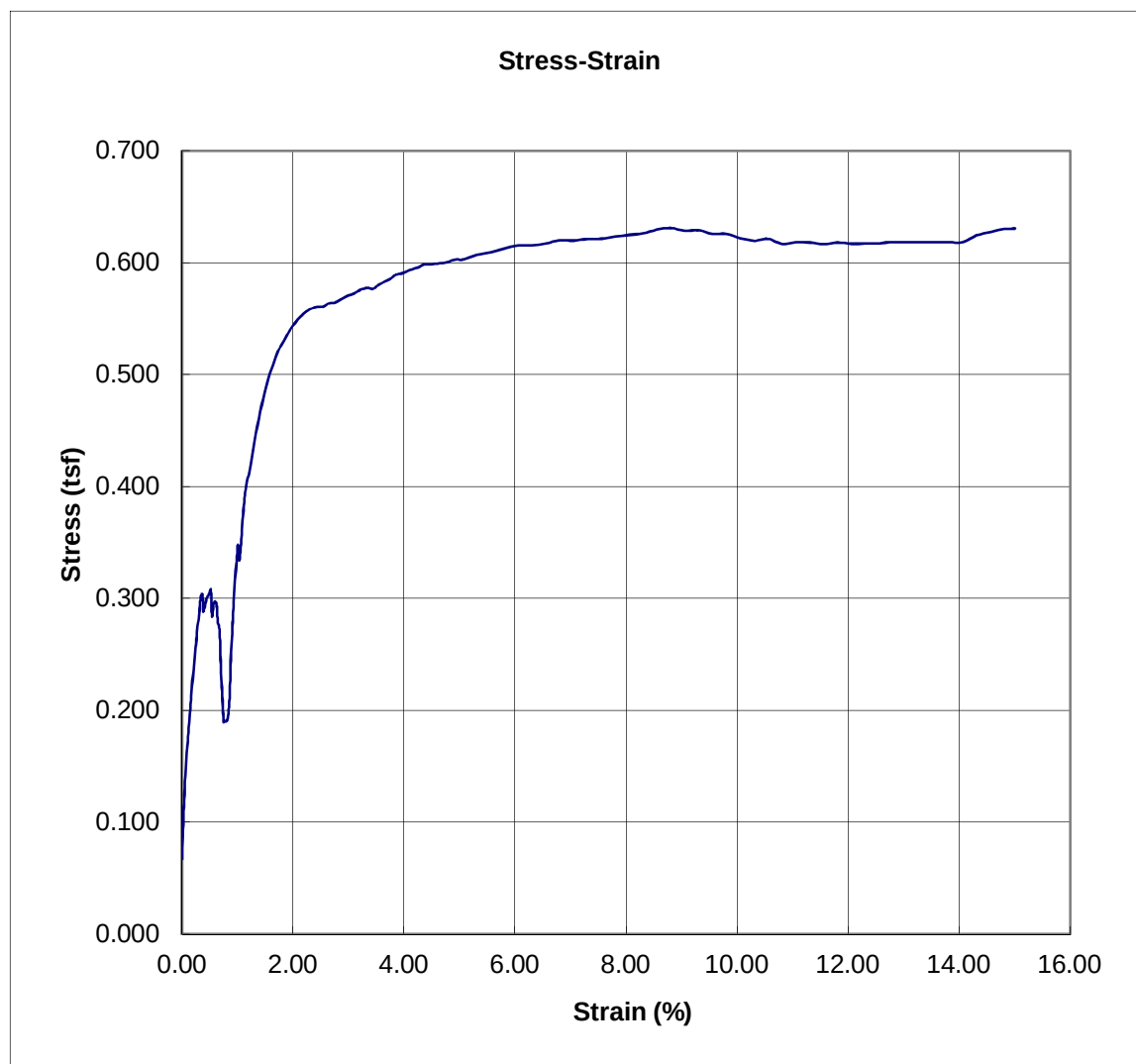
Peak Point	13.09	1.618
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-313
Depth: 23'-25'



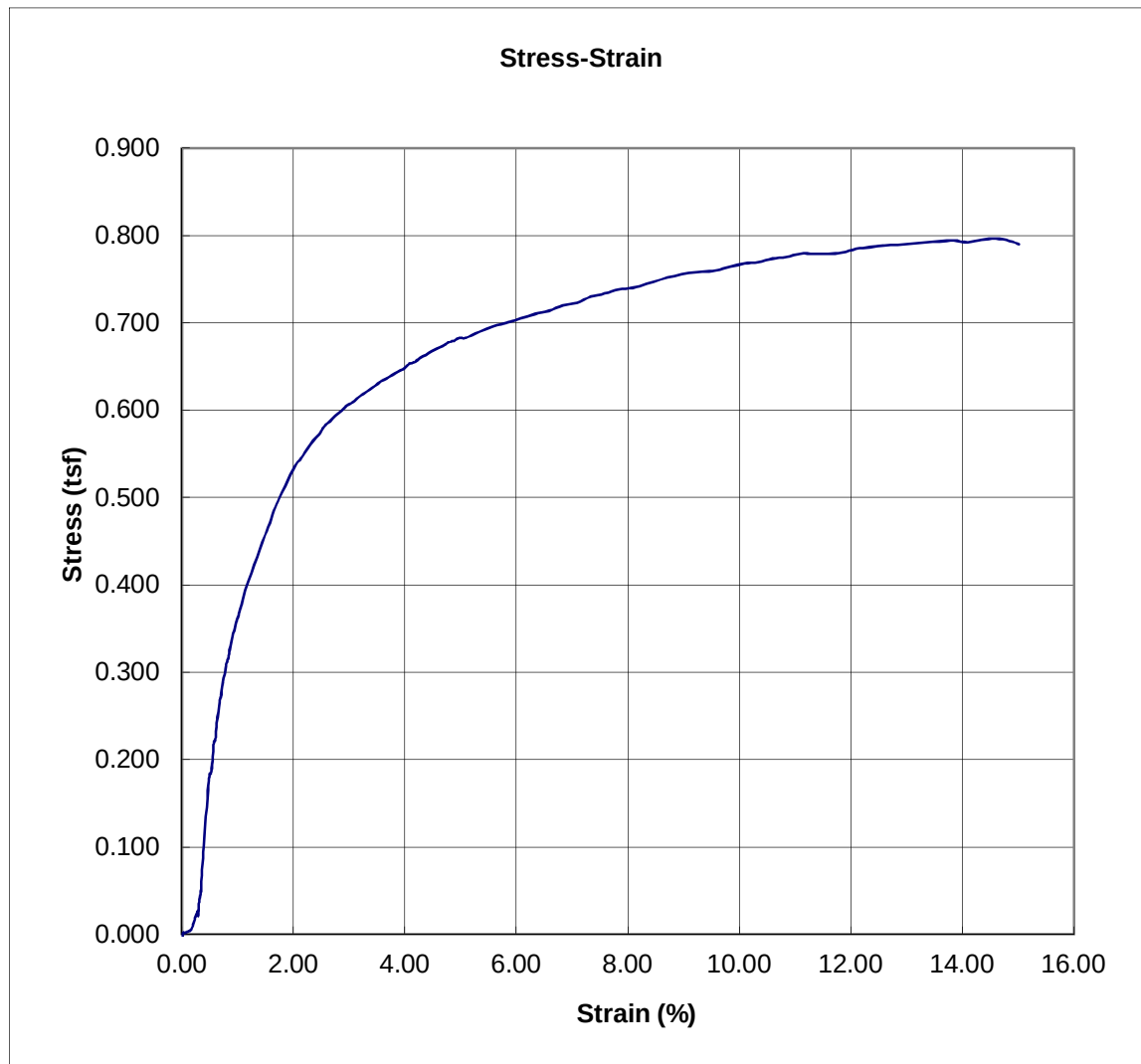
Peak Point	12.34	0.264
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-313
Depth: 28'-30'



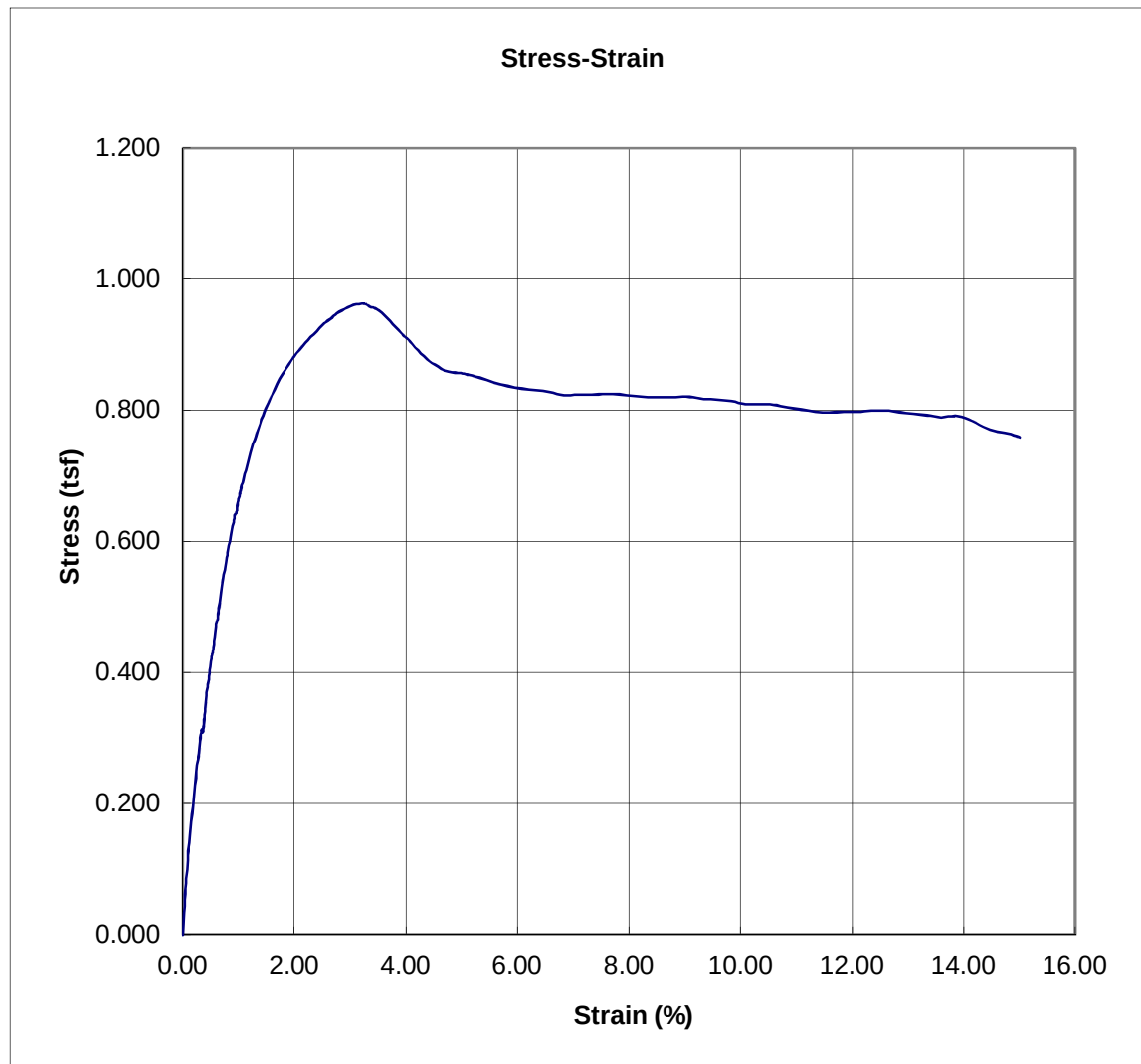
Peak Point	8.81	0.631
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-313
Depth: 38'-40'



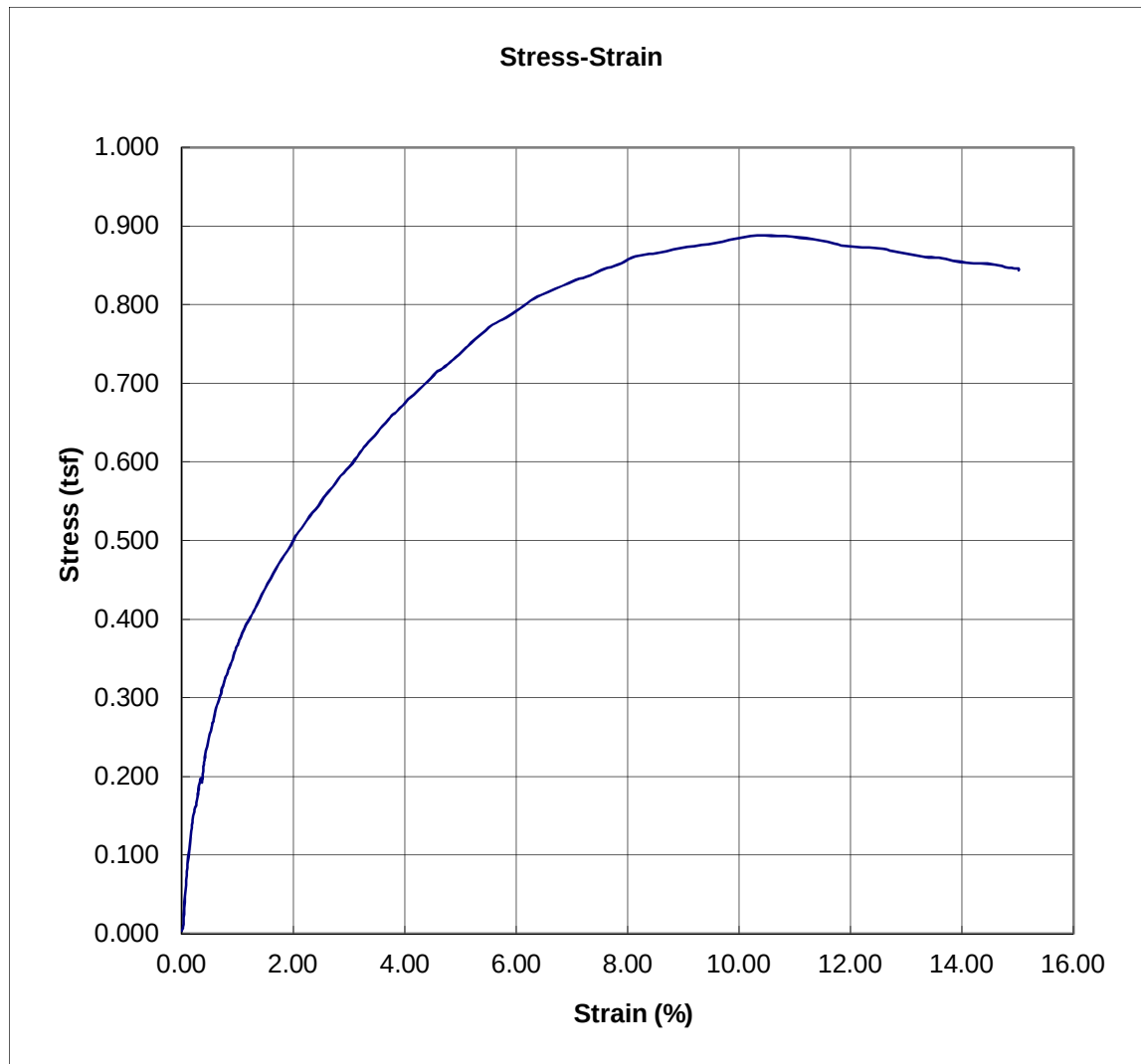
Peak Point	14.60	0.796
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-313
Depth: 43'-45'



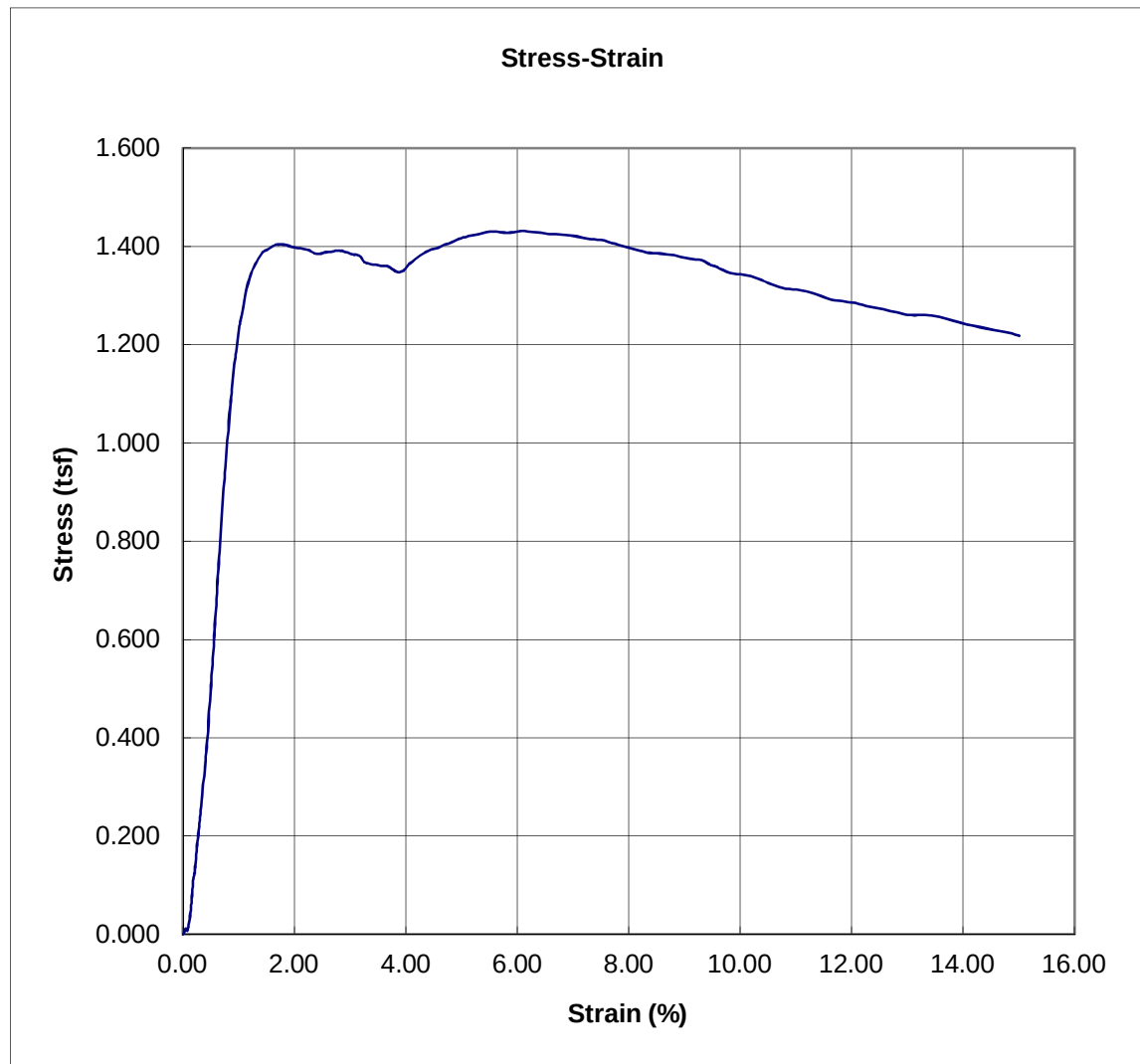
Peak Point	3.26	0.962
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-313
Depth: 53'-55'



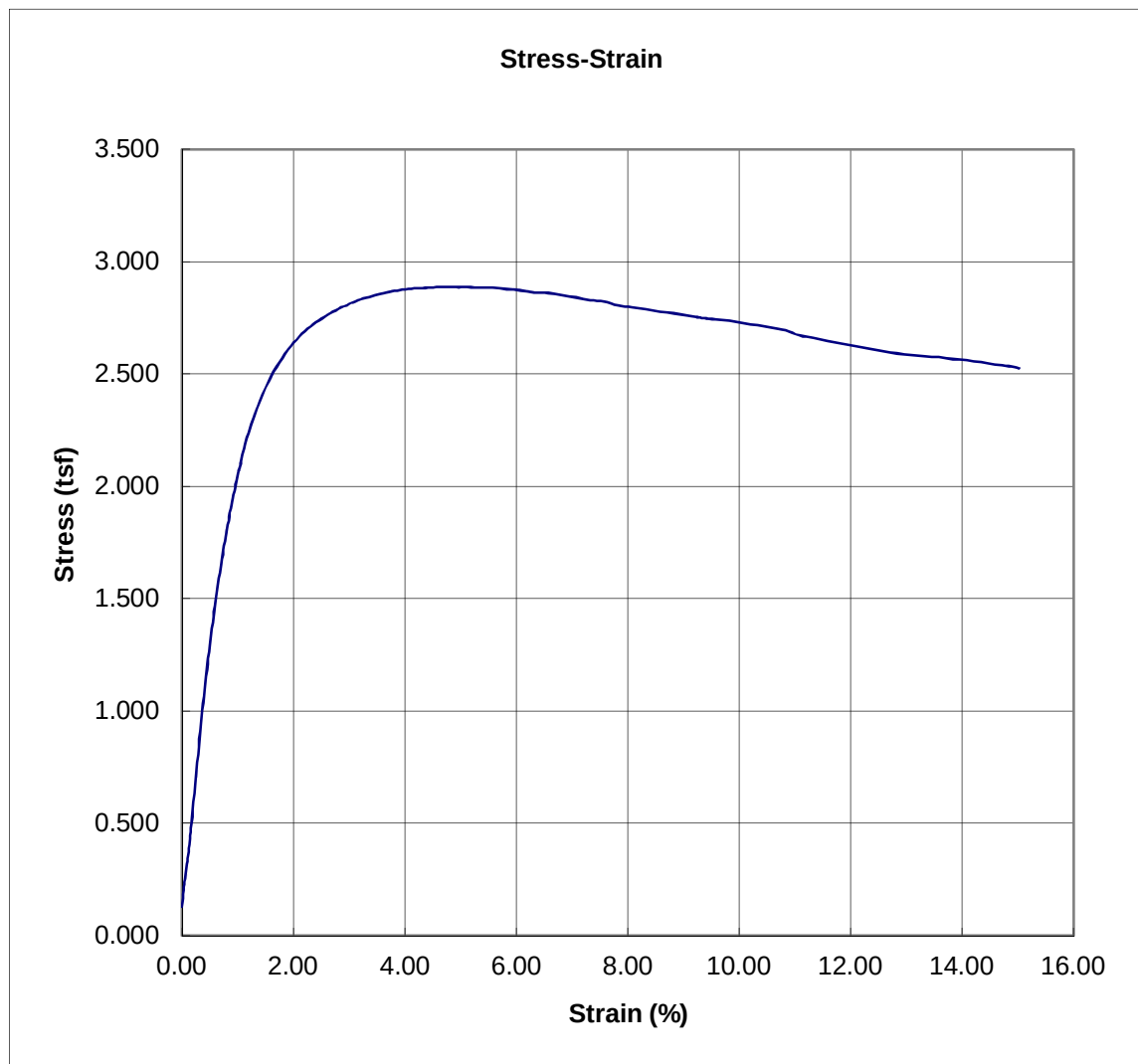
Peak Point	10.33	0.888
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-313
Depth: 58'-60'



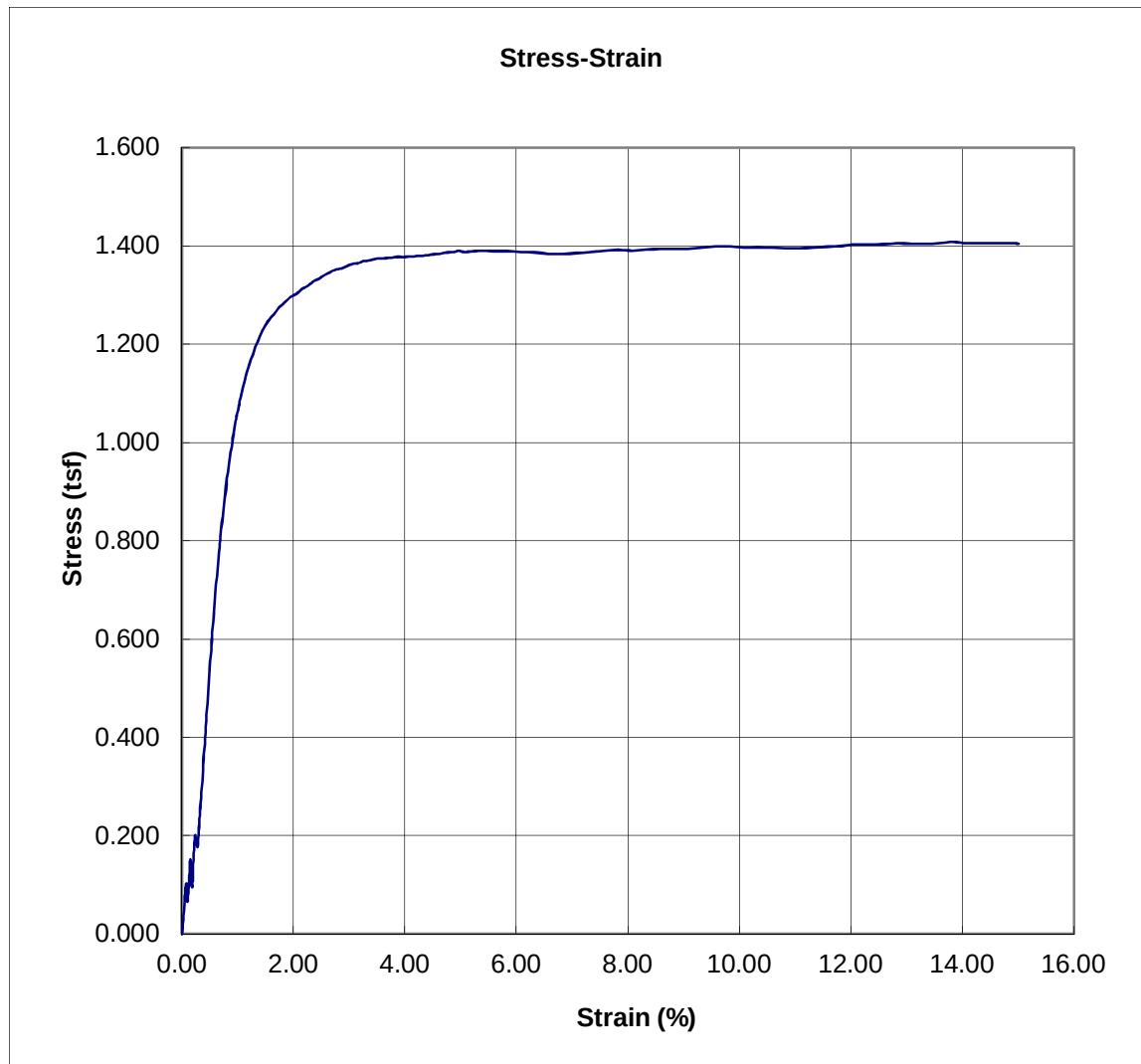
Peak Point	6.07	1.431
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-313
Depth: 73'-75'



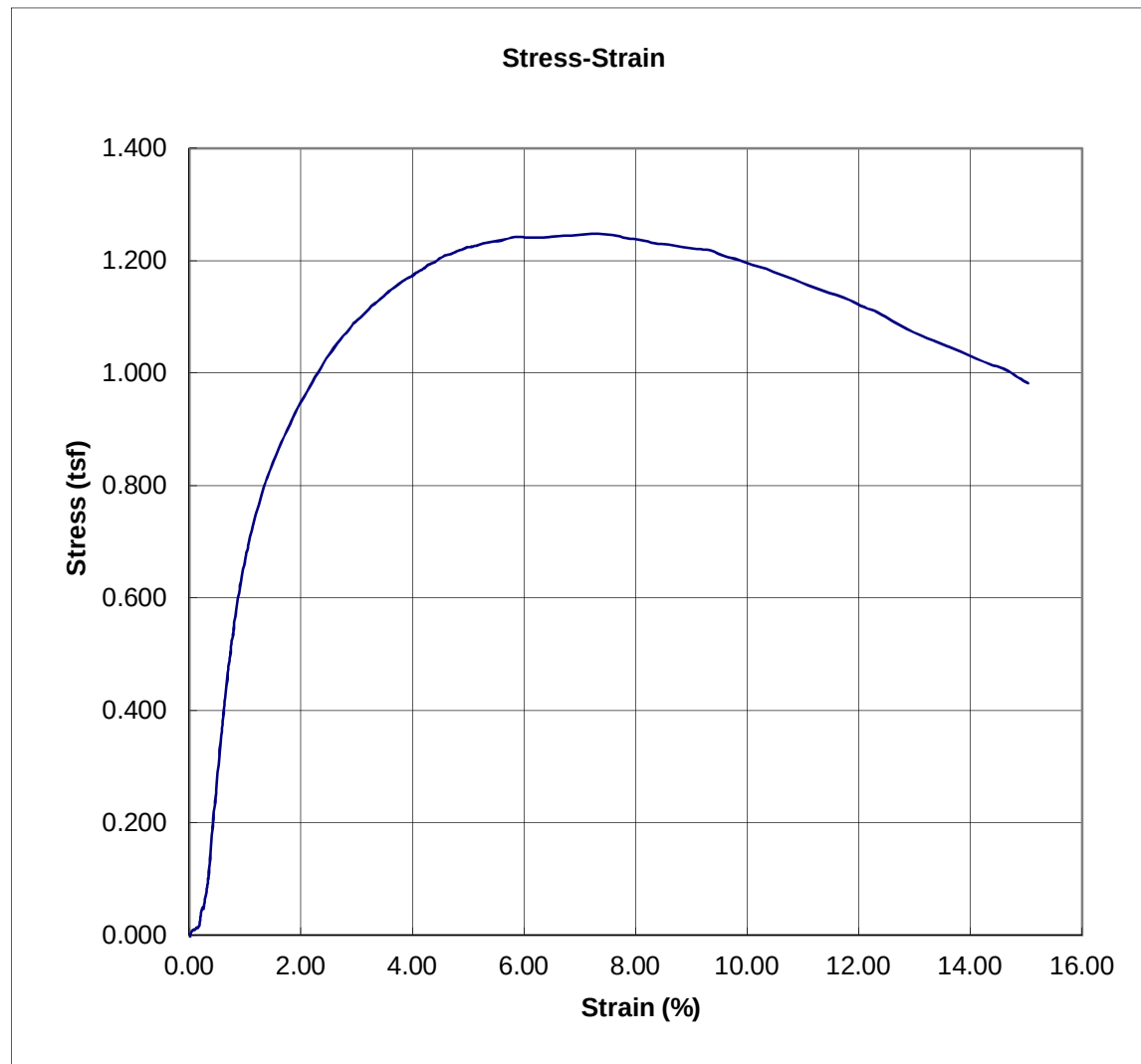
Peak Point	4.87	2.888
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-315
Depth: 48'-50'



Peak Point	13.84	1.408
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-315
Depth: 53'-55'



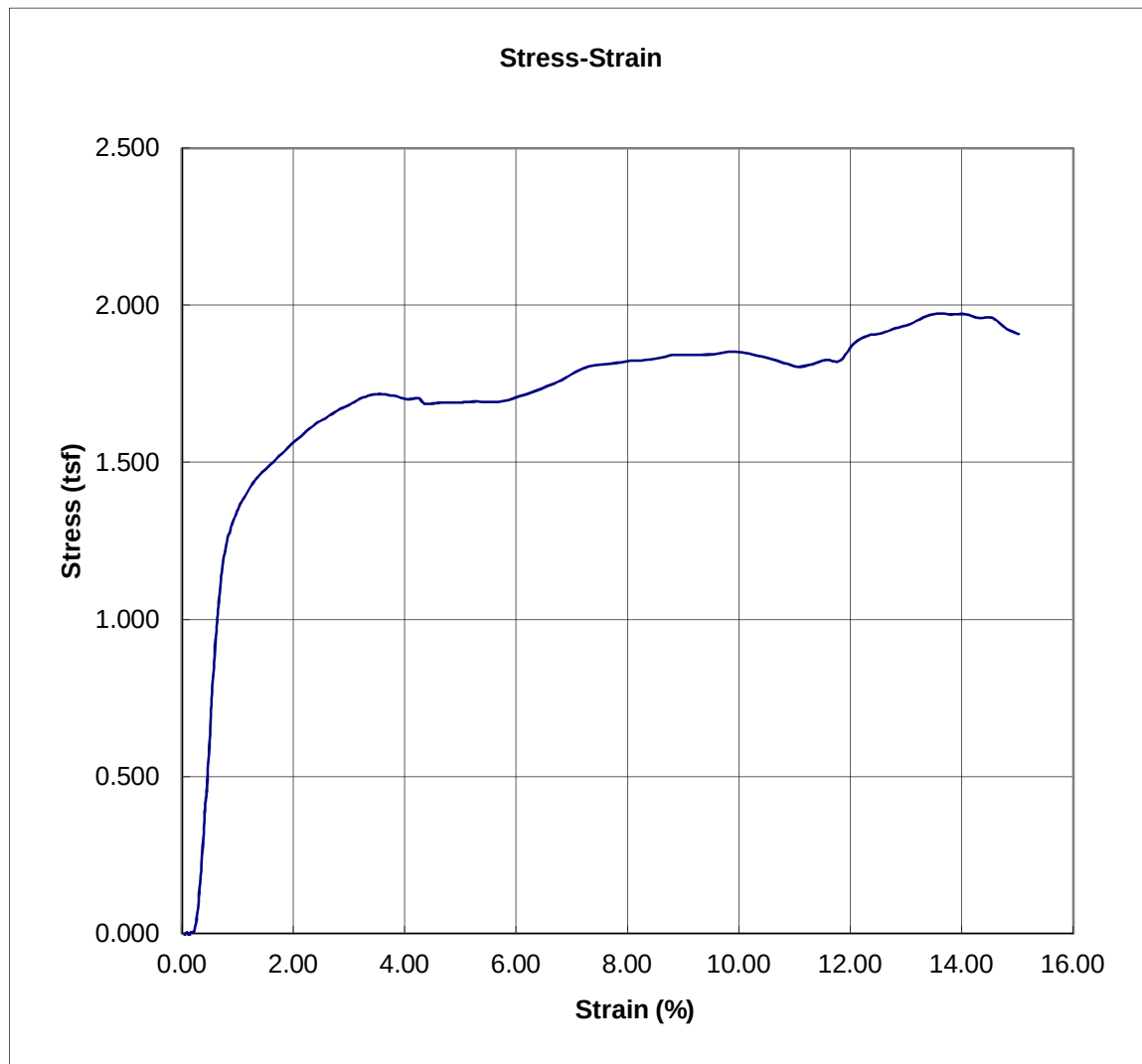
Peak Point	7.34	1.248
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-315
Depth: 63'-65'



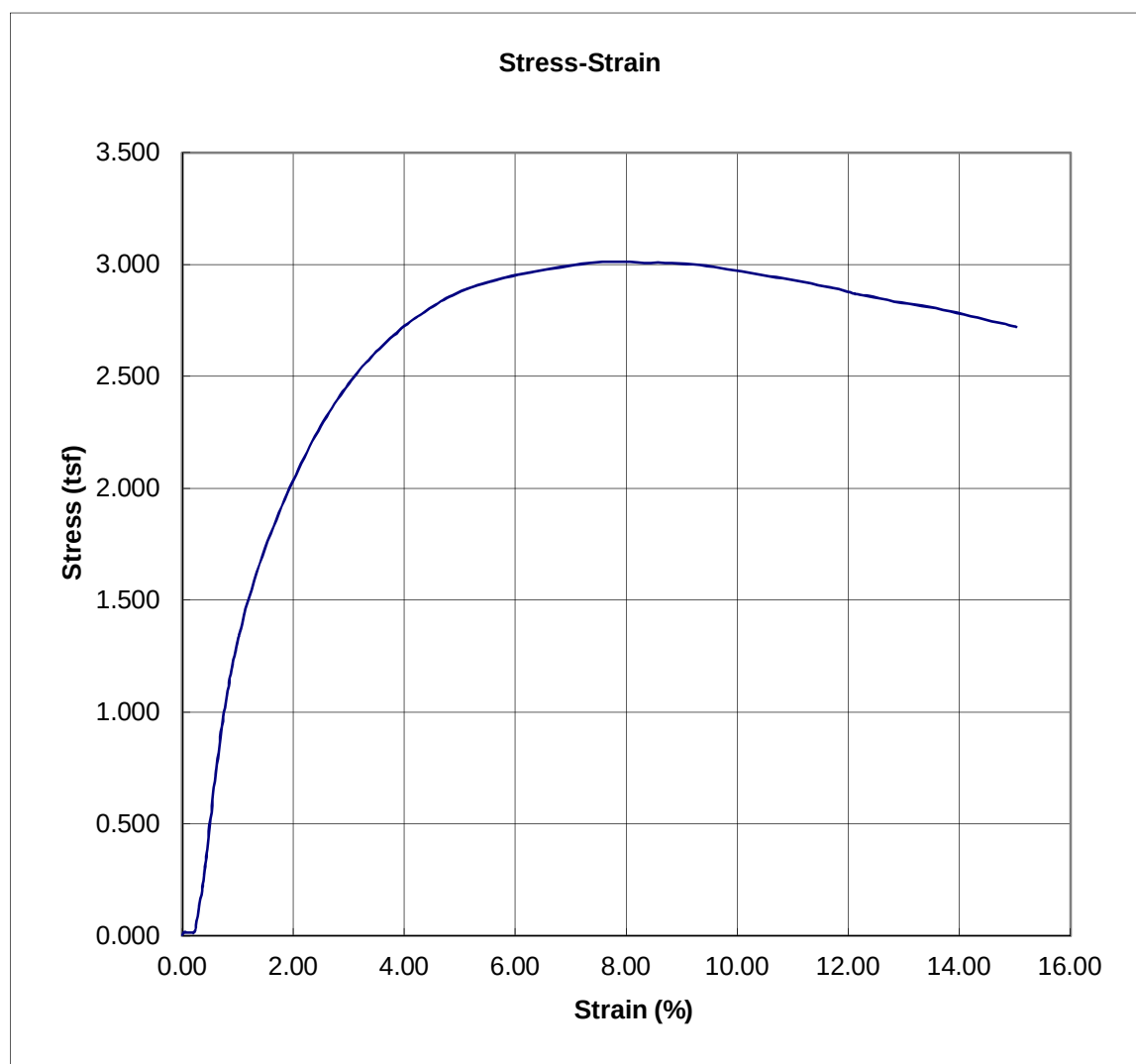
Peak Point	5.04	2.572
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-315
Depth: 73'-75'



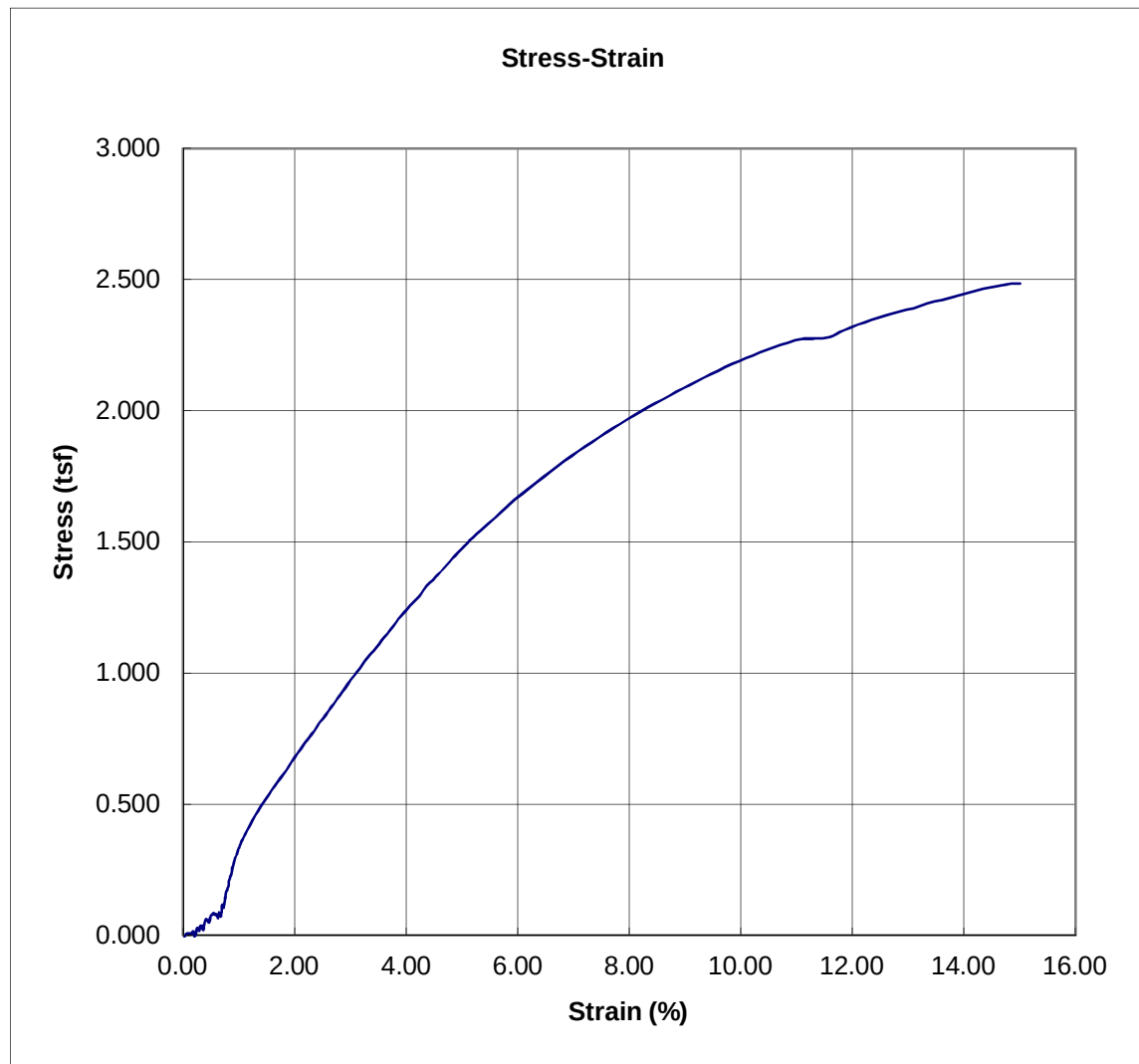
Peak Point	13.56	1.974
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-315
Depth: 78'-80'



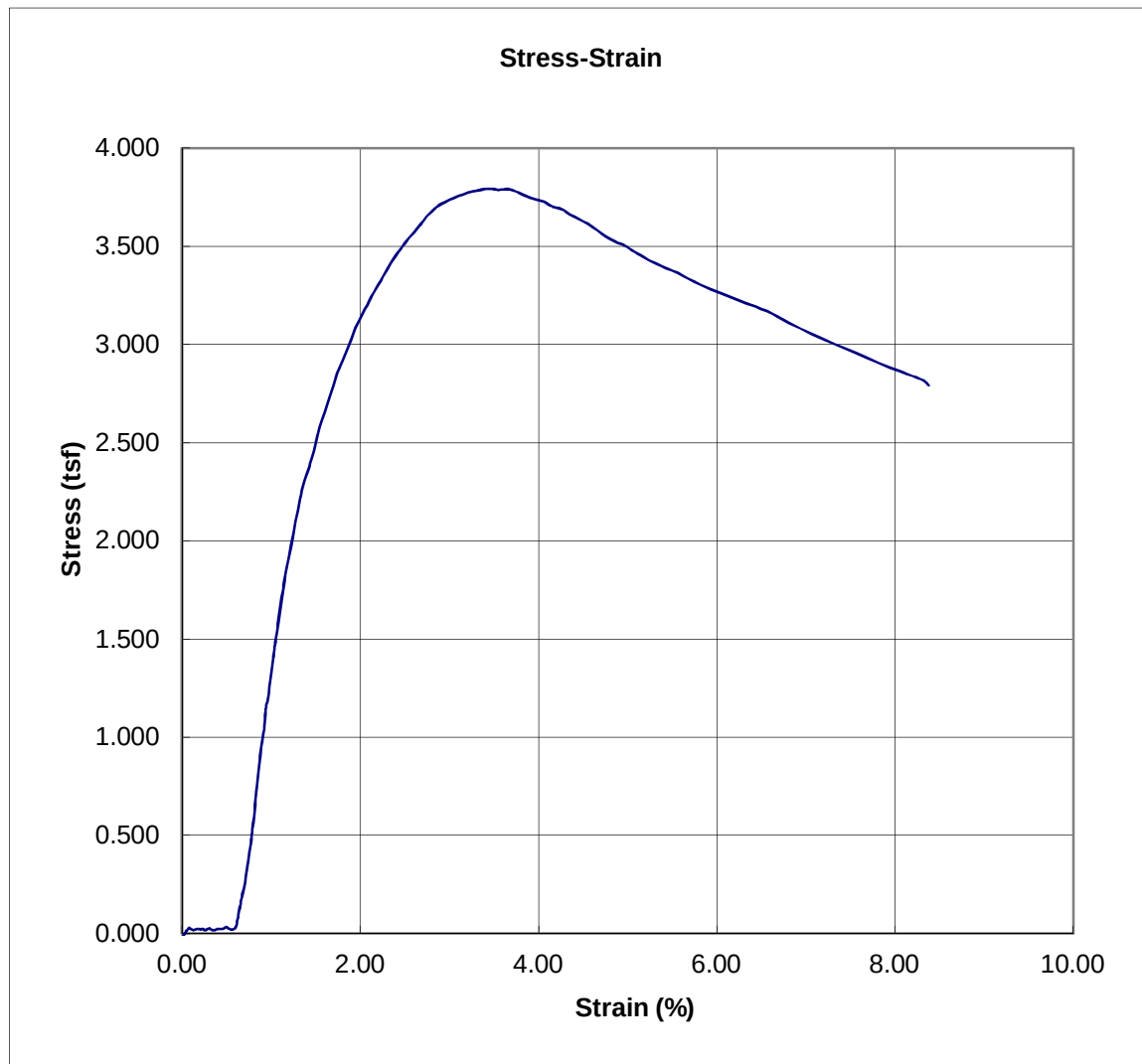
Peak Point	7.82	3.012
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-315
Depth: 93'-95'



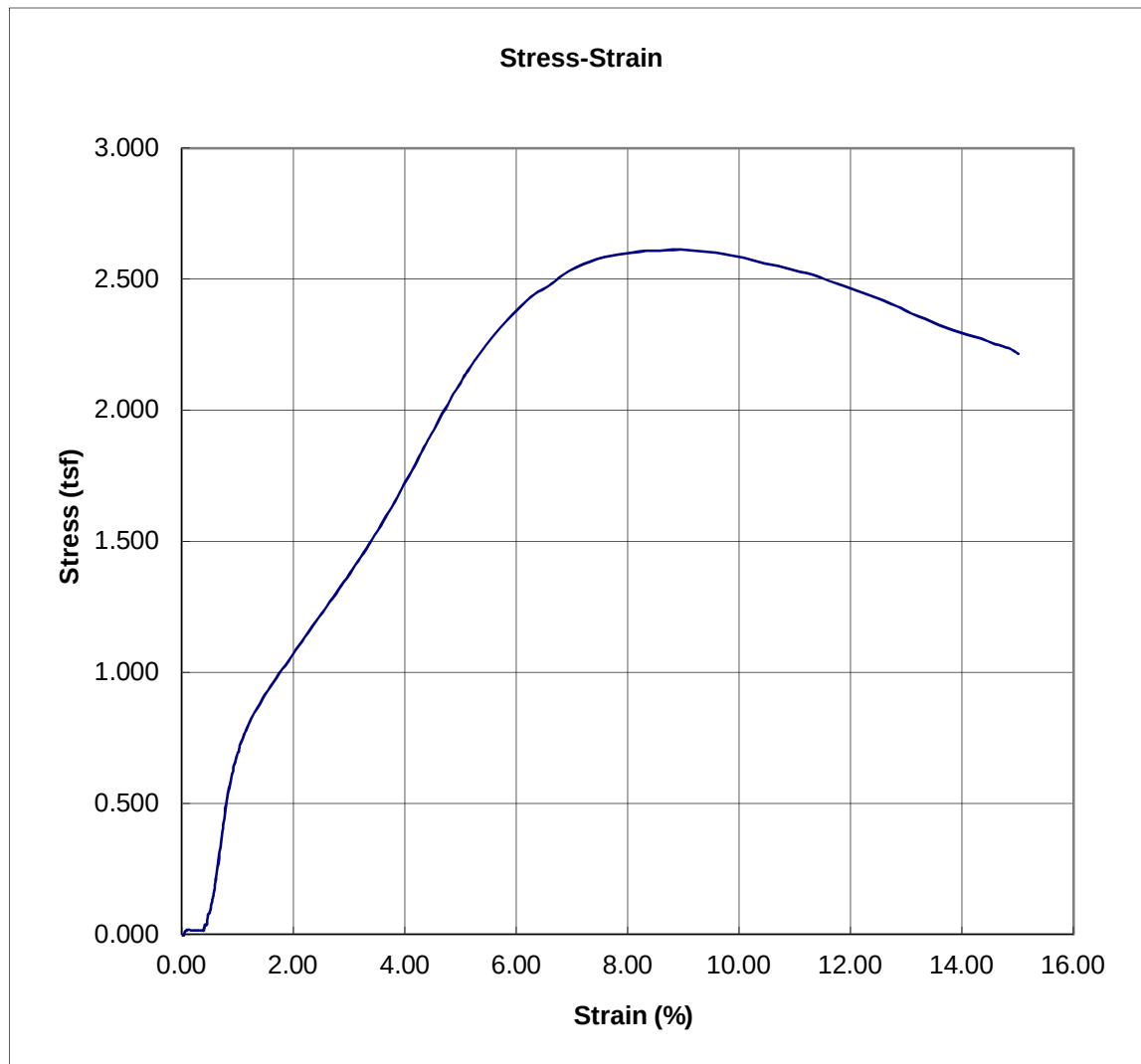
Peak Point	14.85	2.485
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-315
Depth: 128'-130'



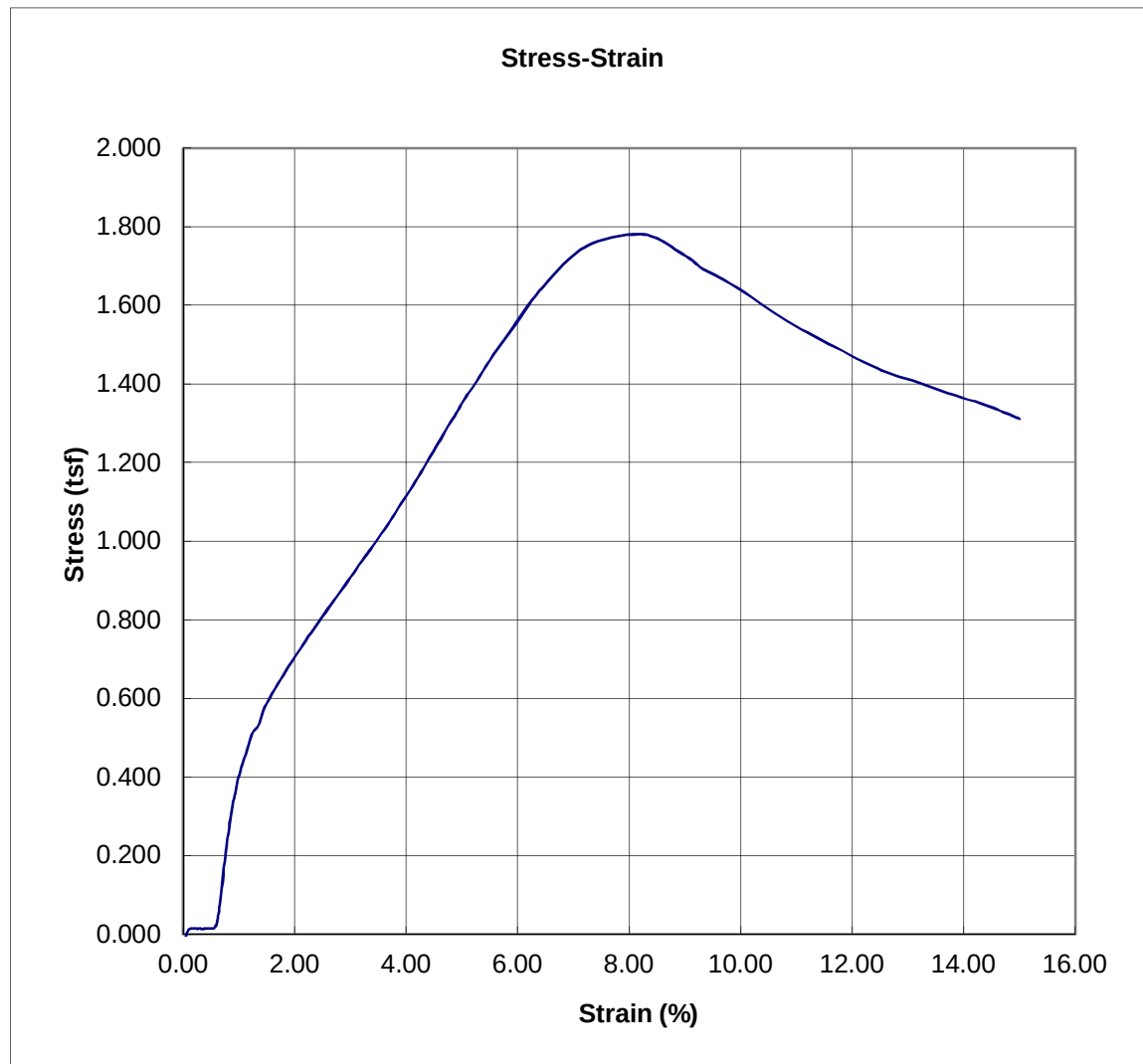
Peak Point	3.46	3.793
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-315
Depth: 138'-140'



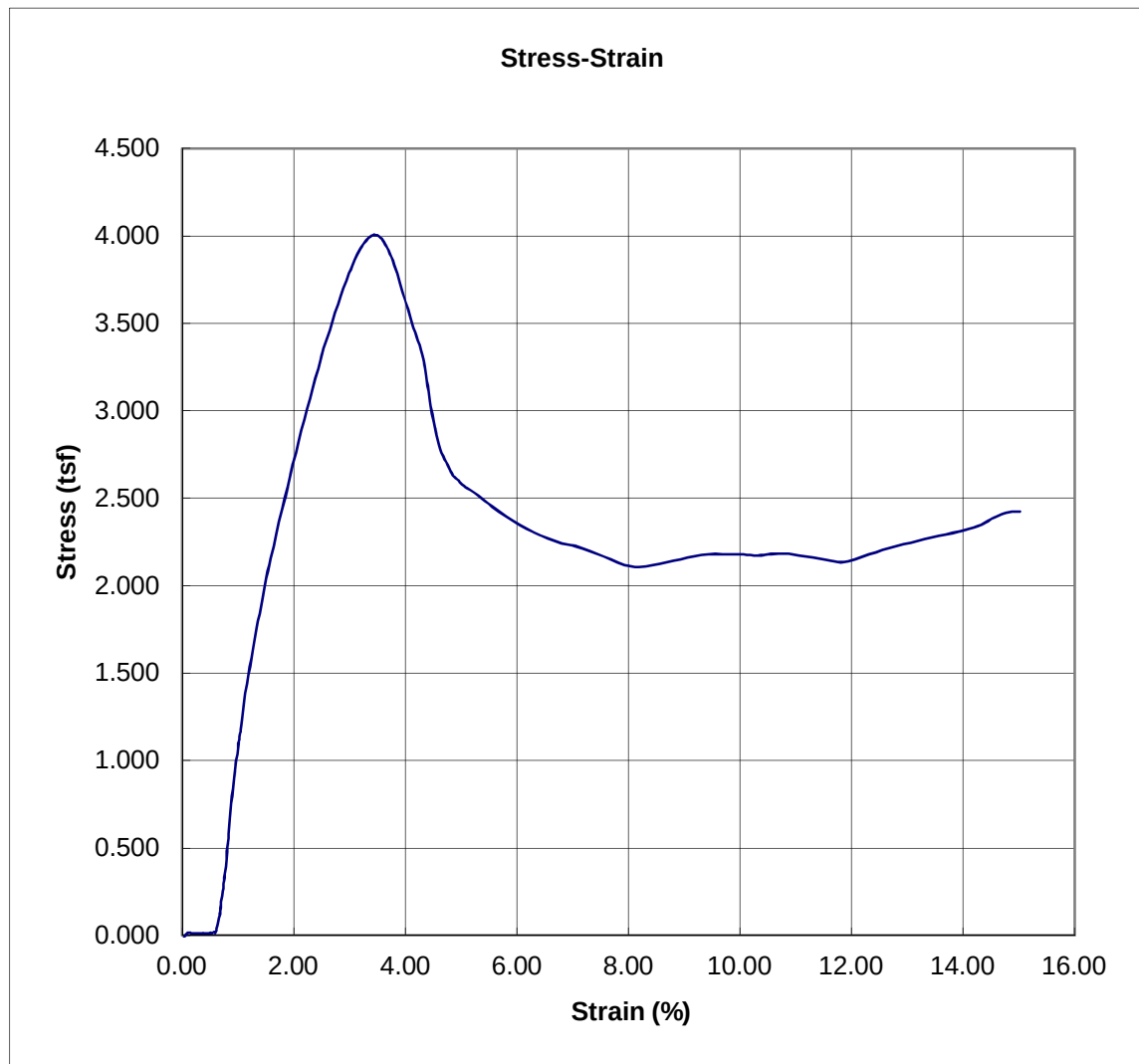
Peak Point	8.83	2.612
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-315
Depth: 148'-150'



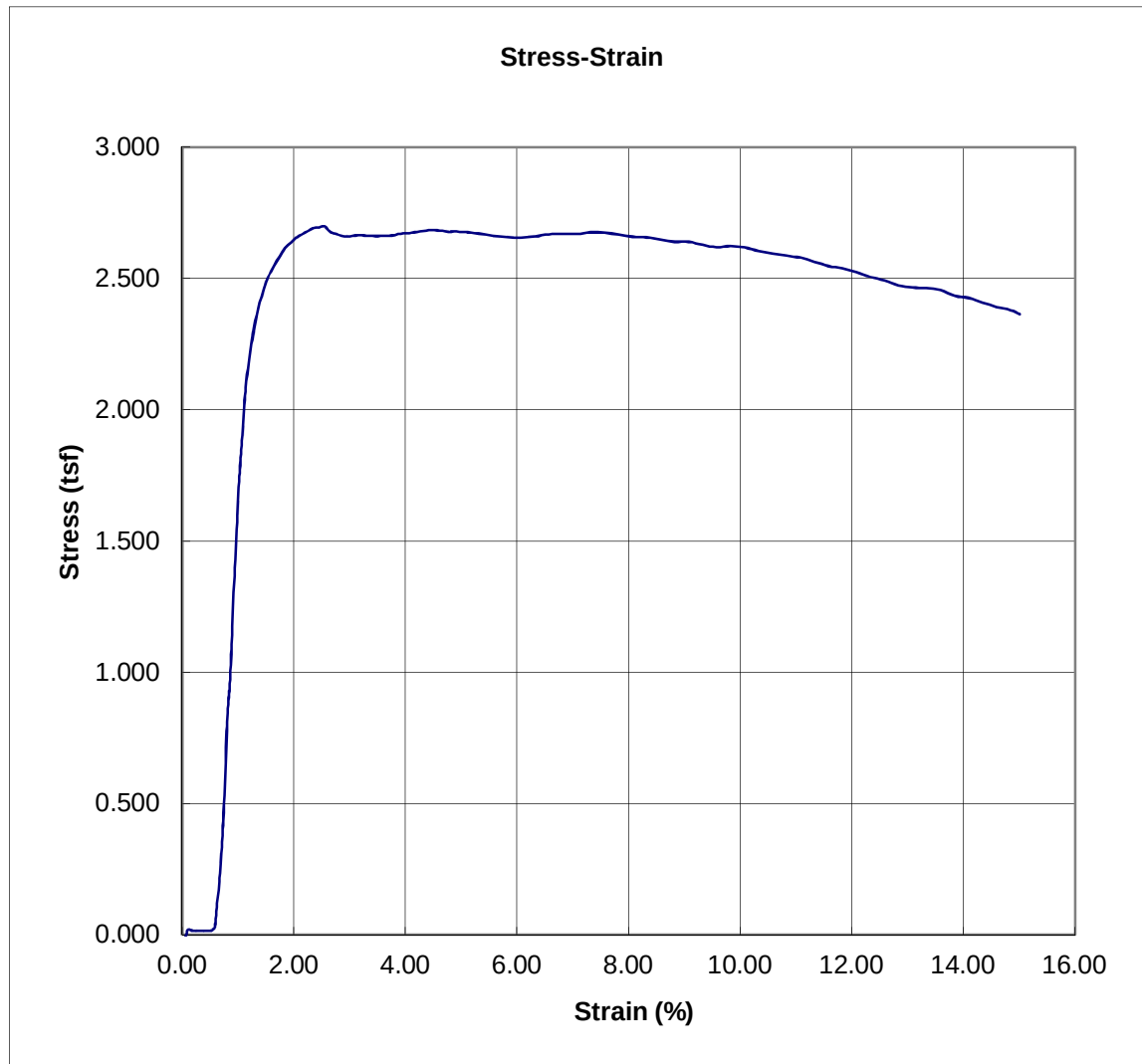
Peak Point	8.07	1.780
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-315
Depth: 158'-160'



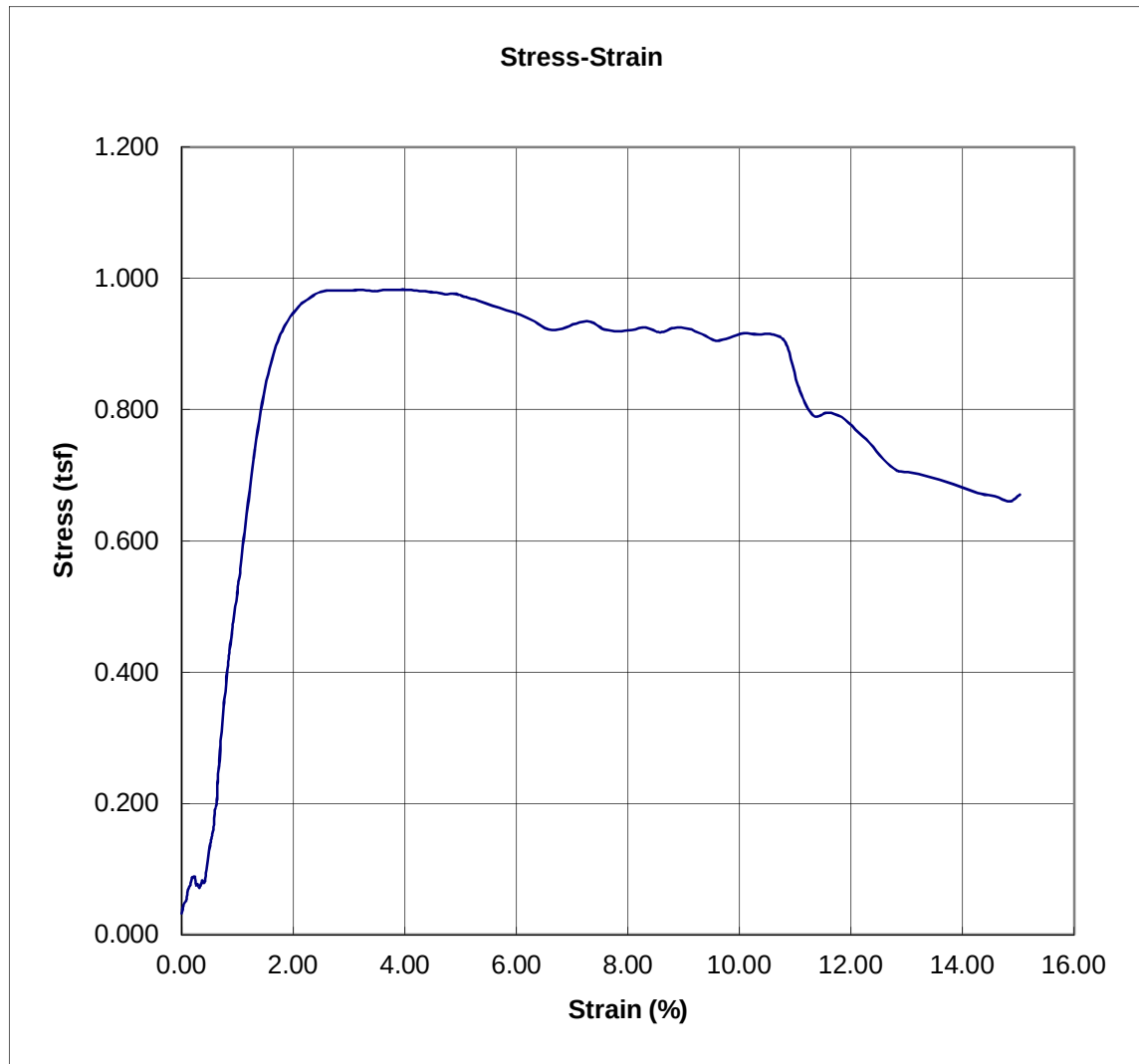
Peak Point	3.44	4.006
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-315
Depth: 168'-170'



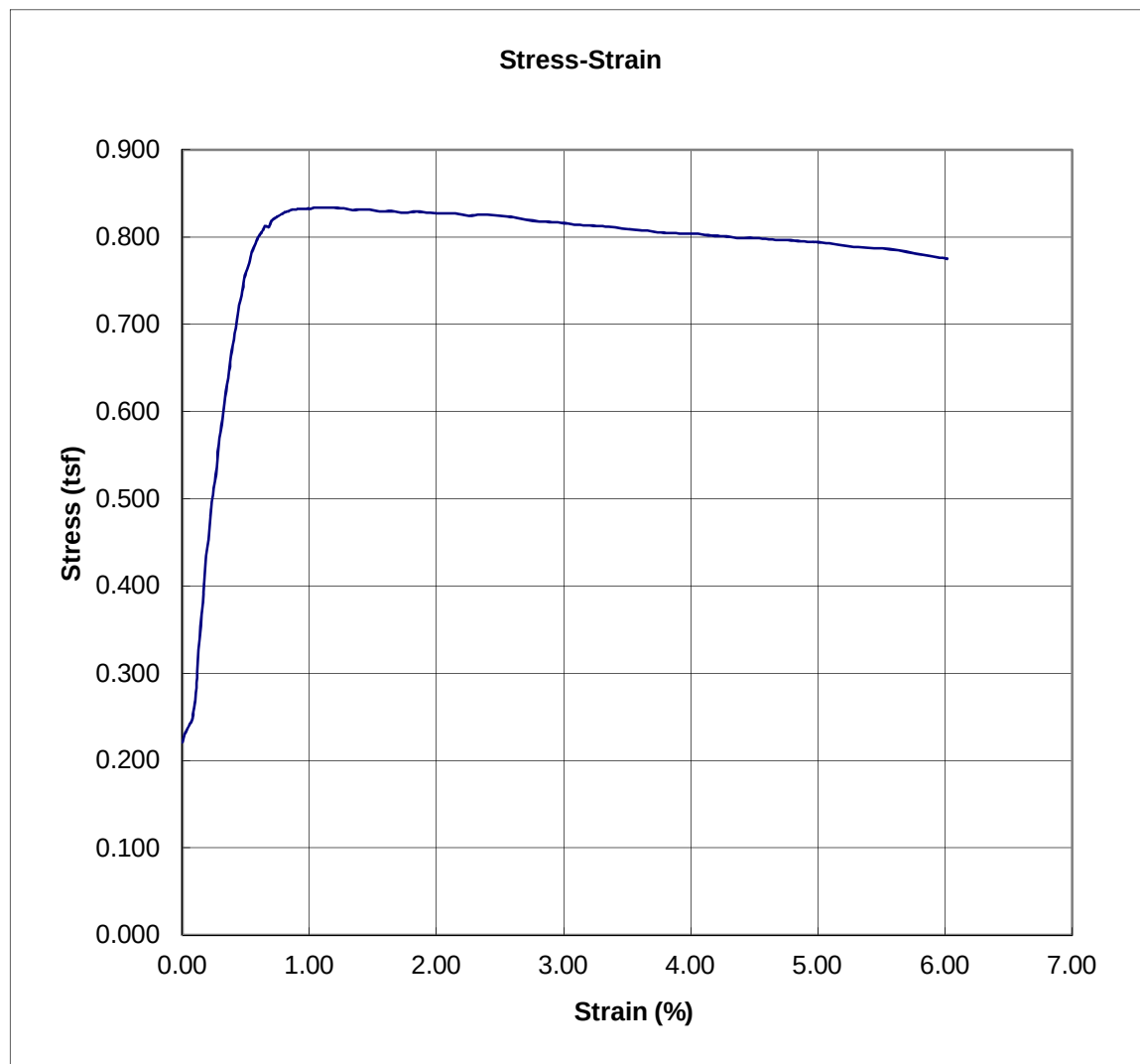
Peak Point	2.56	2.698
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-316
Depth: 28'-30'



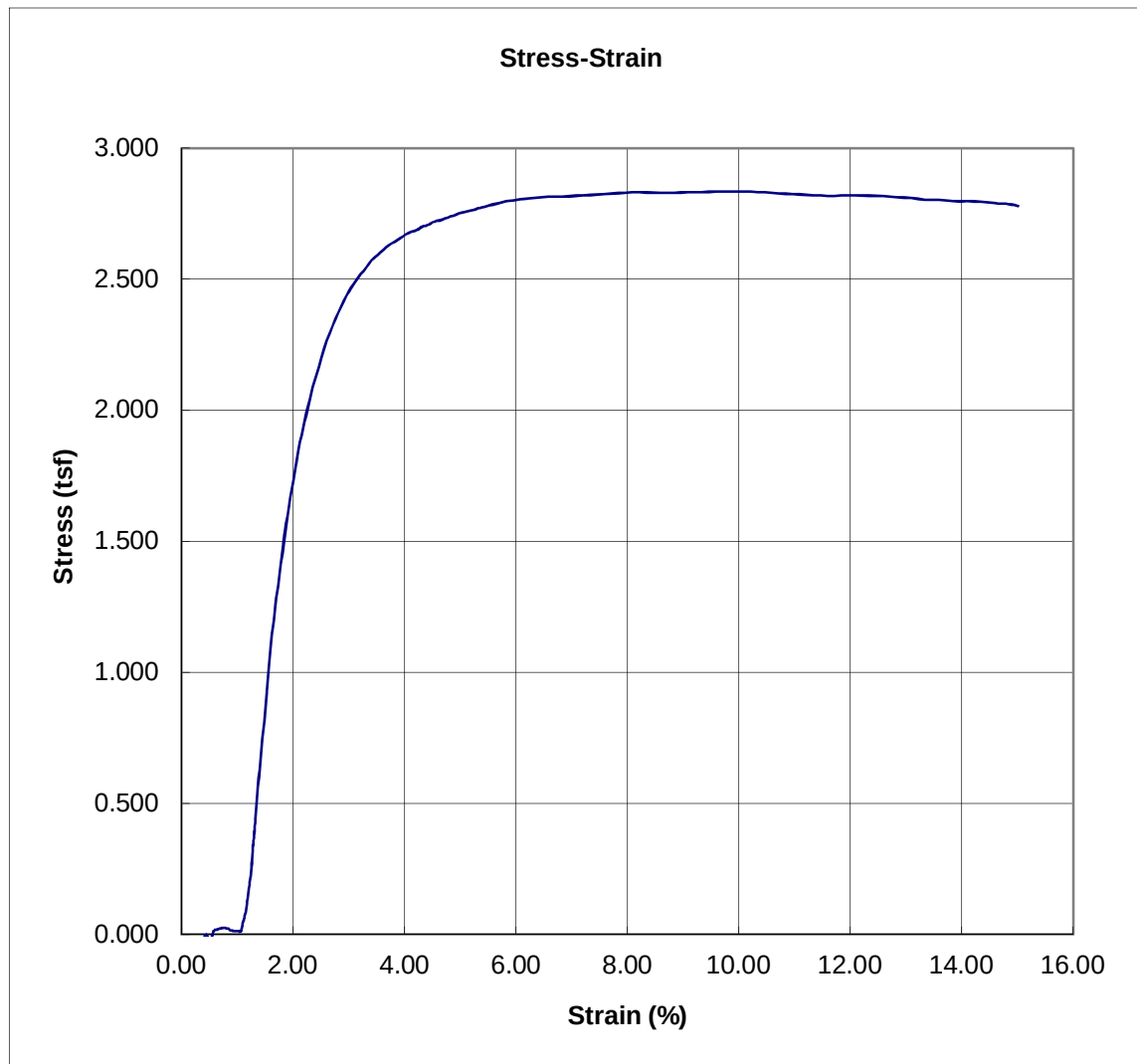
Peak Point	3.97	0.983
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-316
Depth: 33'-35'



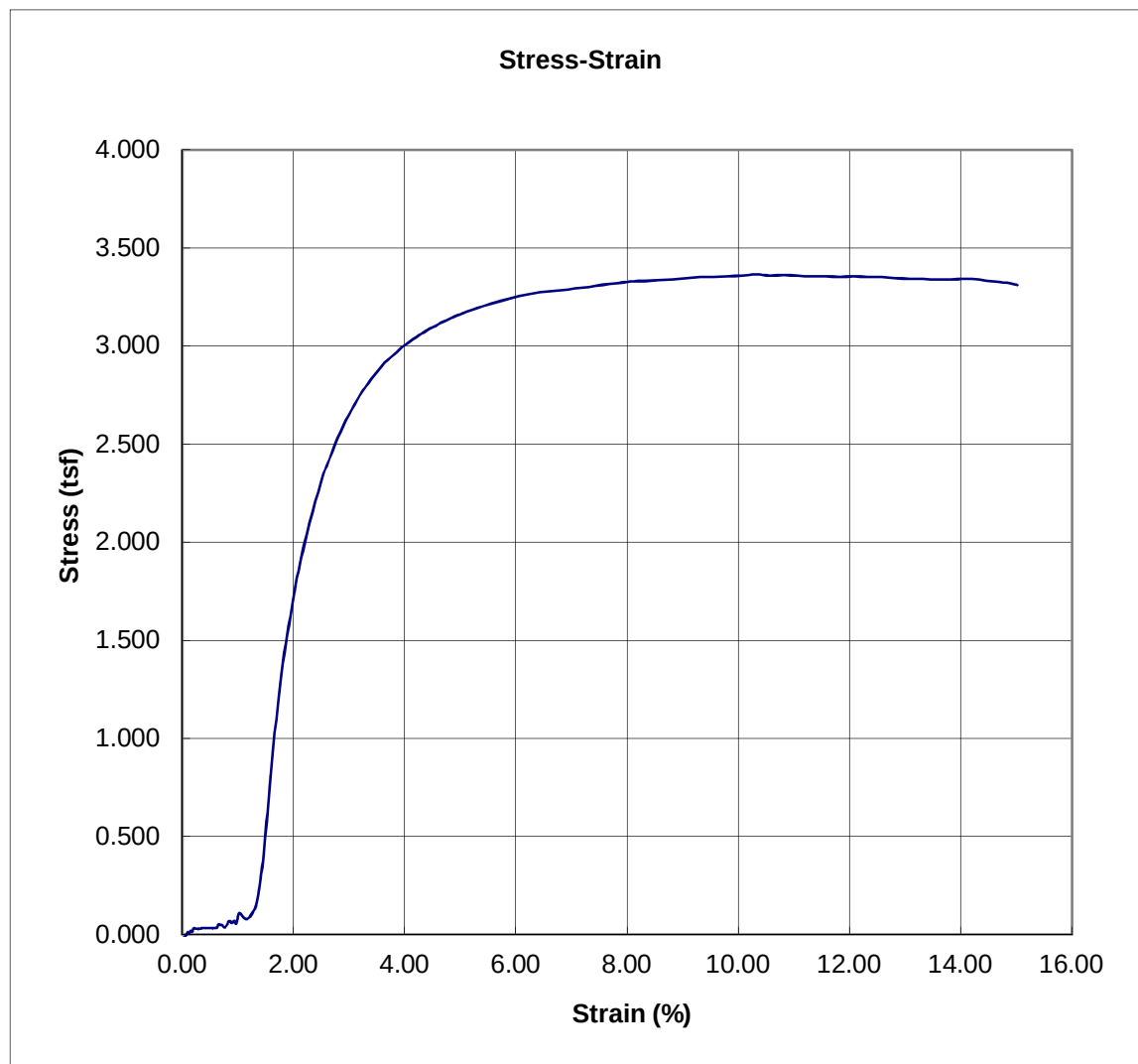
Peak Point	1.05	0.834
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-316
Depth: 43'-45'



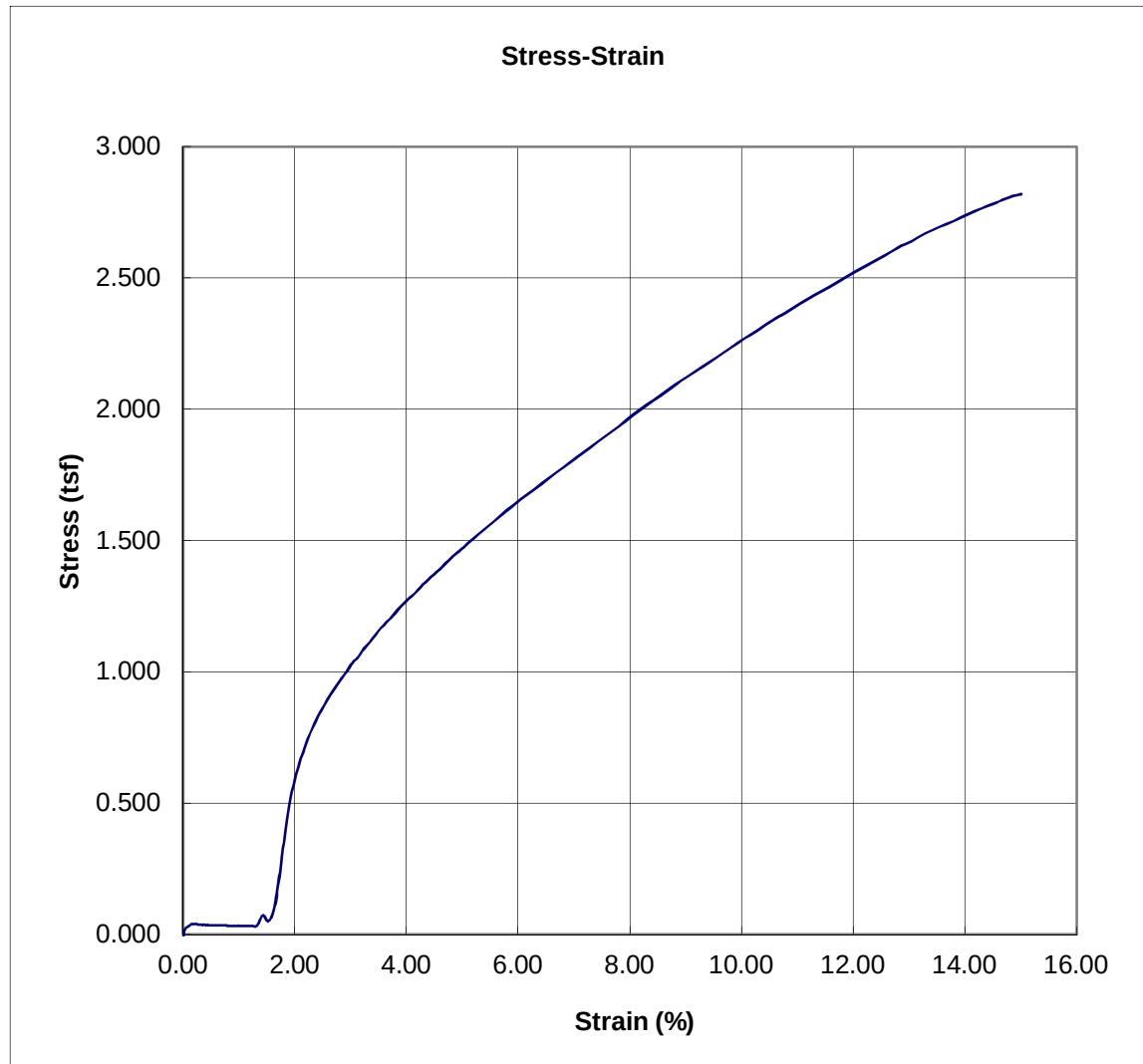
Peak Point	10.09	2.835
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-316
Depth: 53'-55'



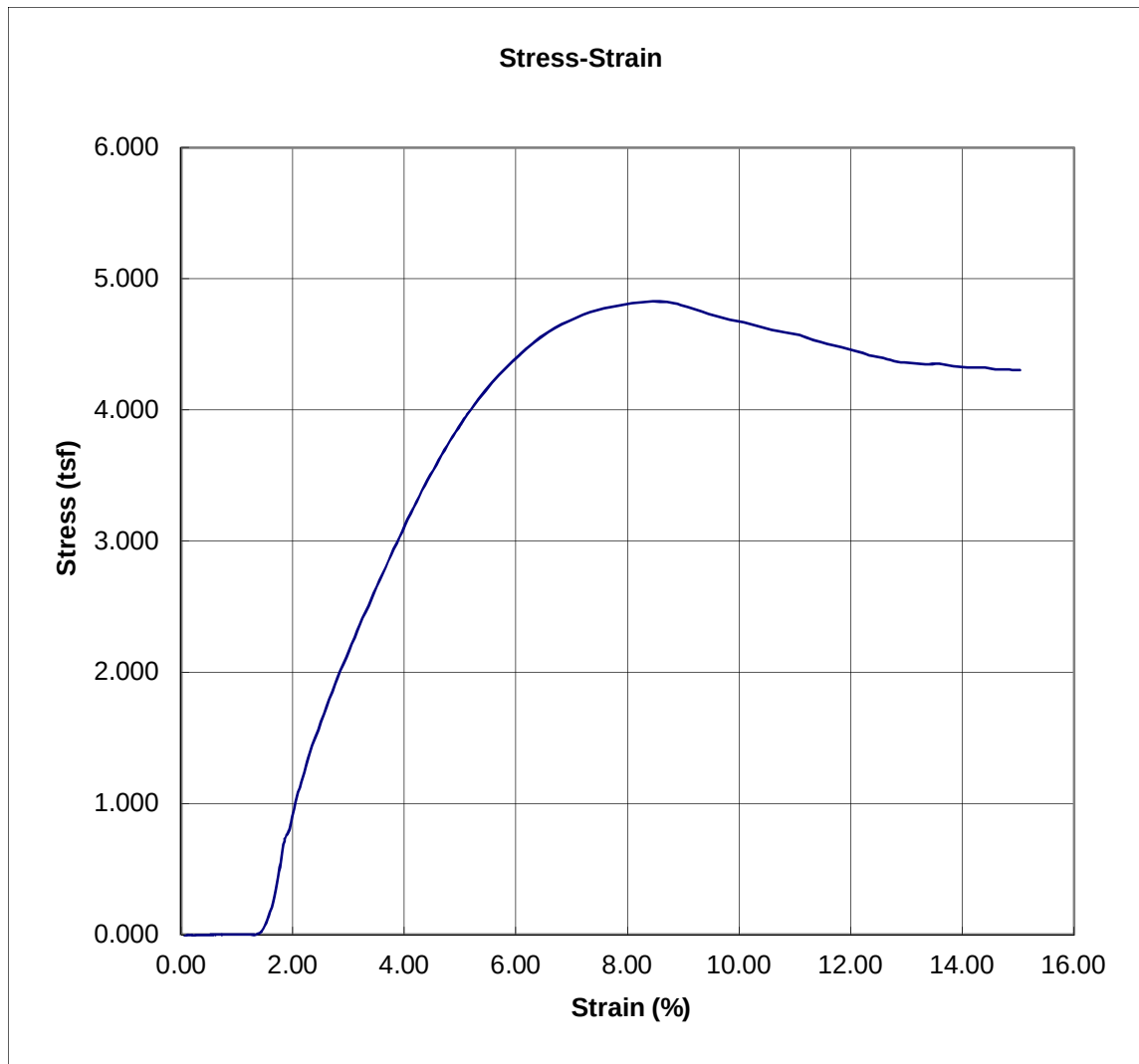
Peak Point	10.32	3.364
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-316
Depth: 73'-75'



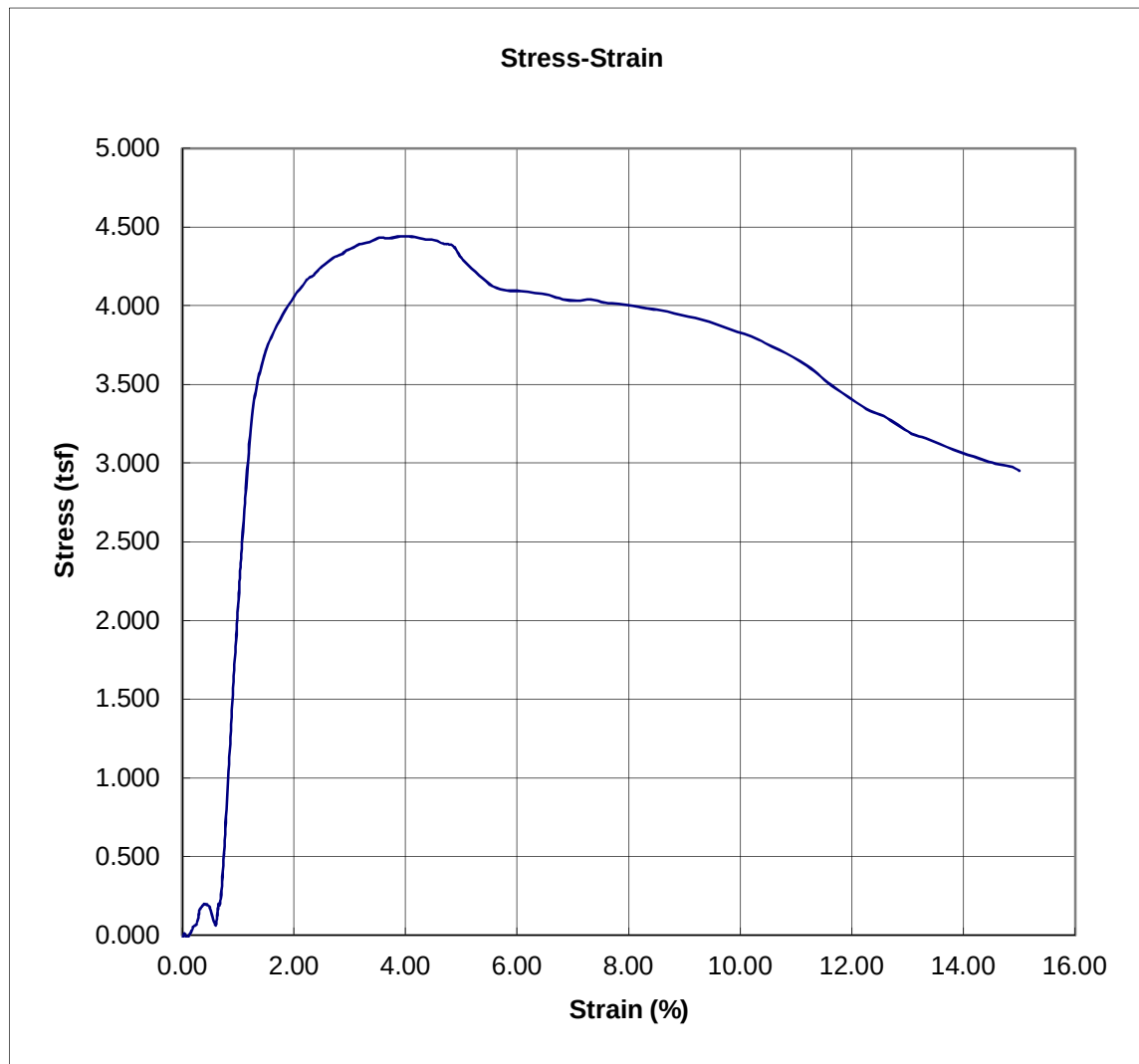
Peak Point	15.01	2.819
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-316
Depth: 83'-85'



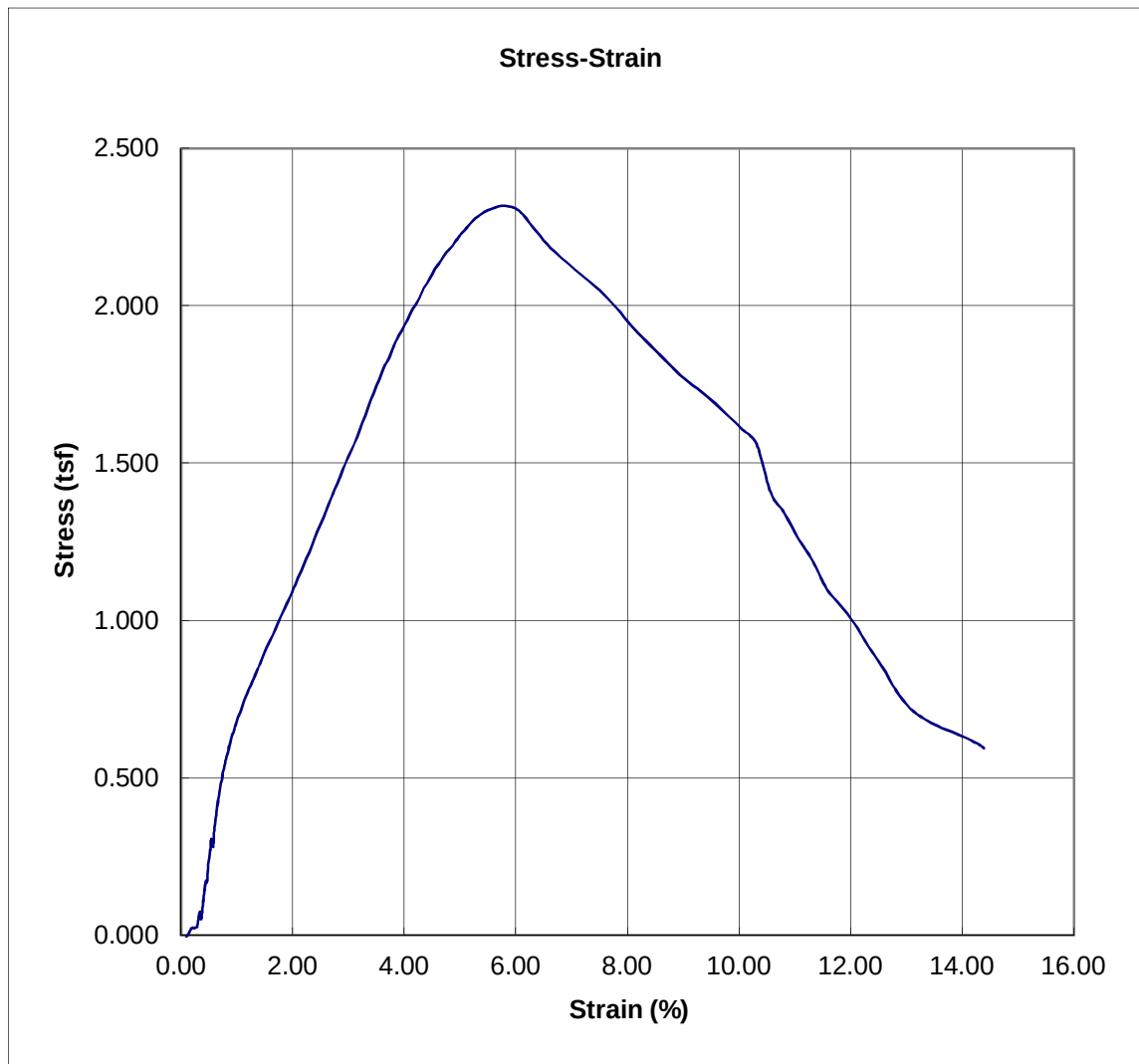
Peak Point	8.58	4.826
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-316
Depth: 93'-95'



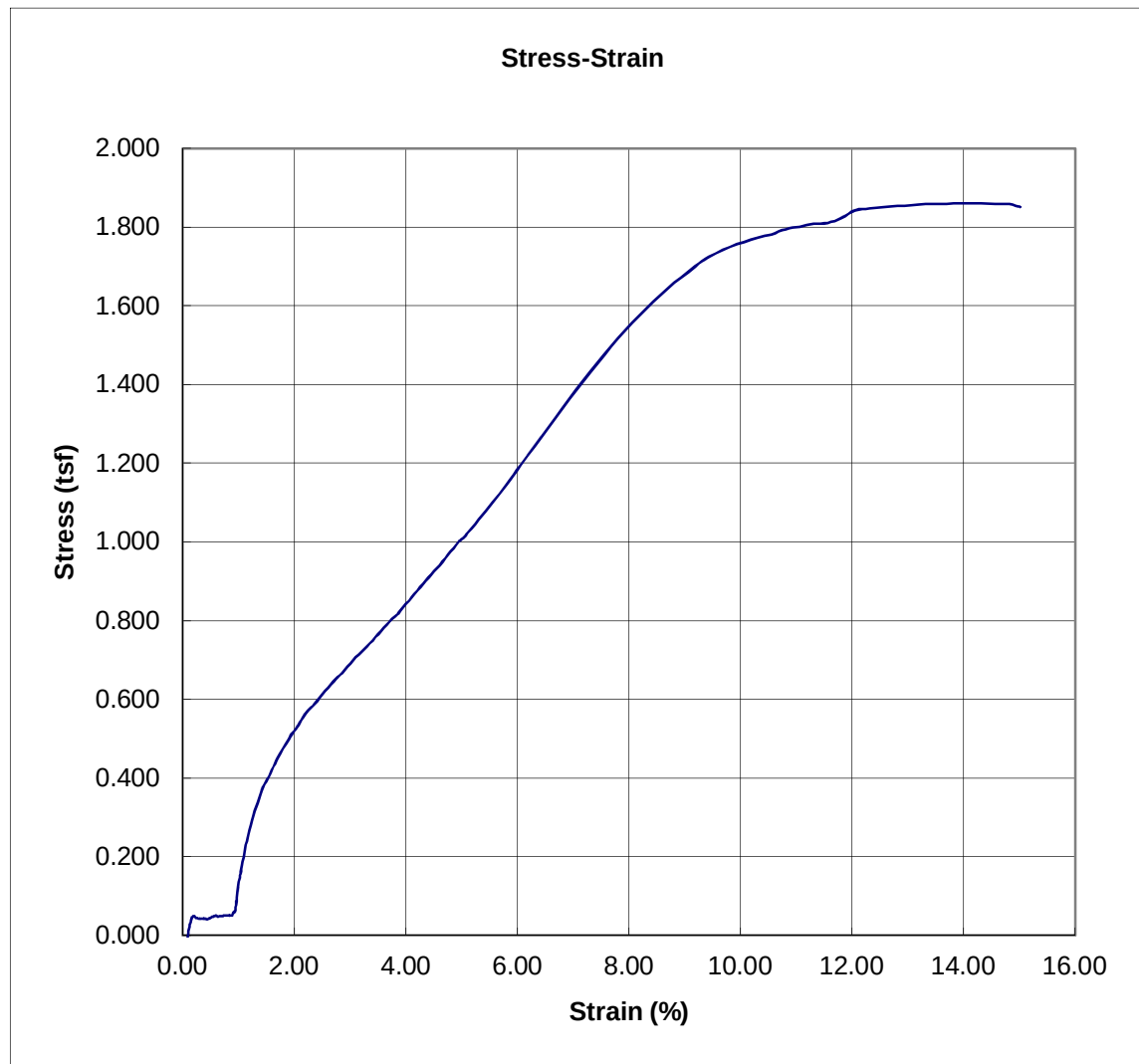
Peak Point	4.06	4.441
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-316
Depth: 108'-110'



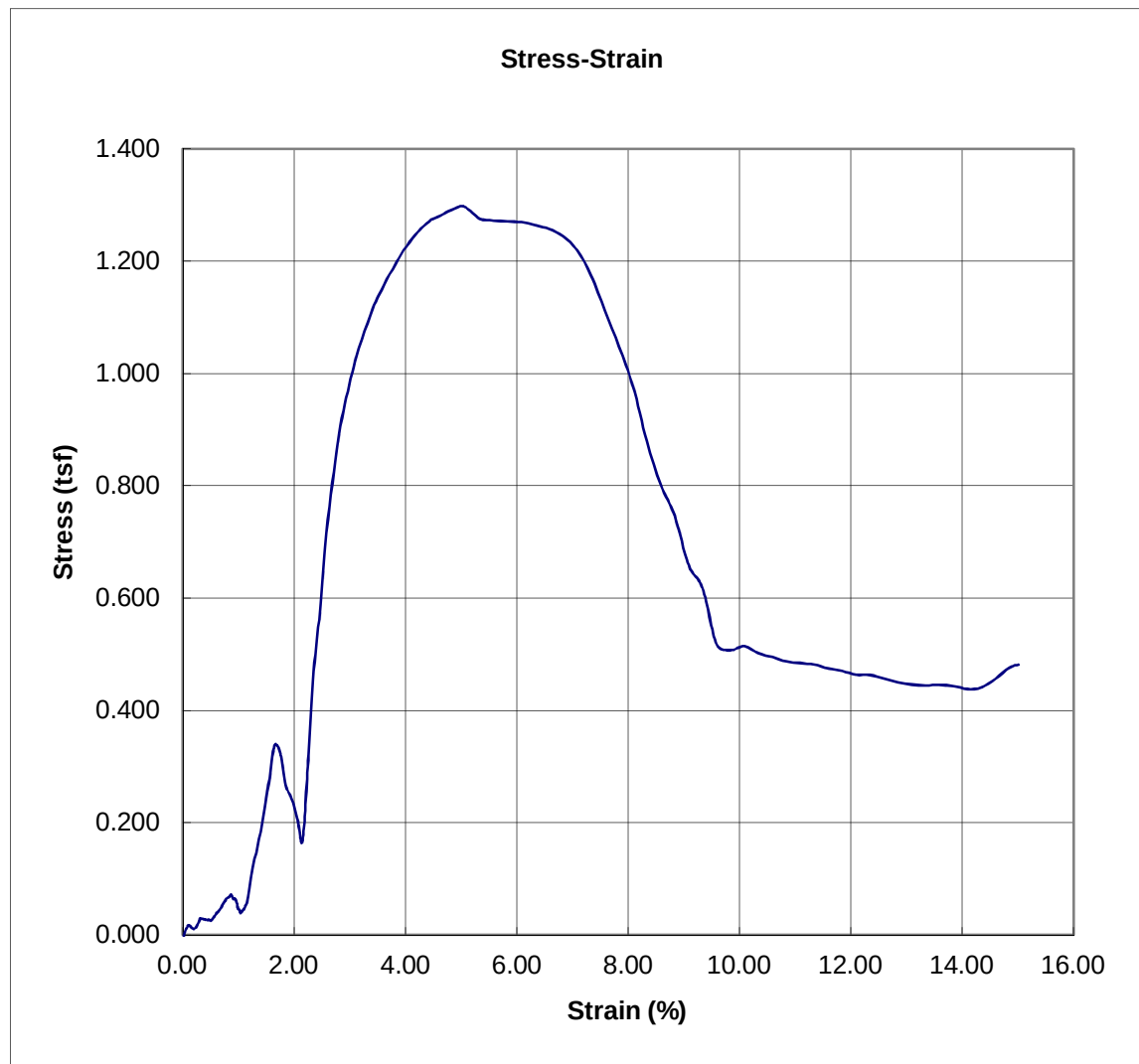
Peak Point	5.81	2.317
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-316
Depth: 118'-120'



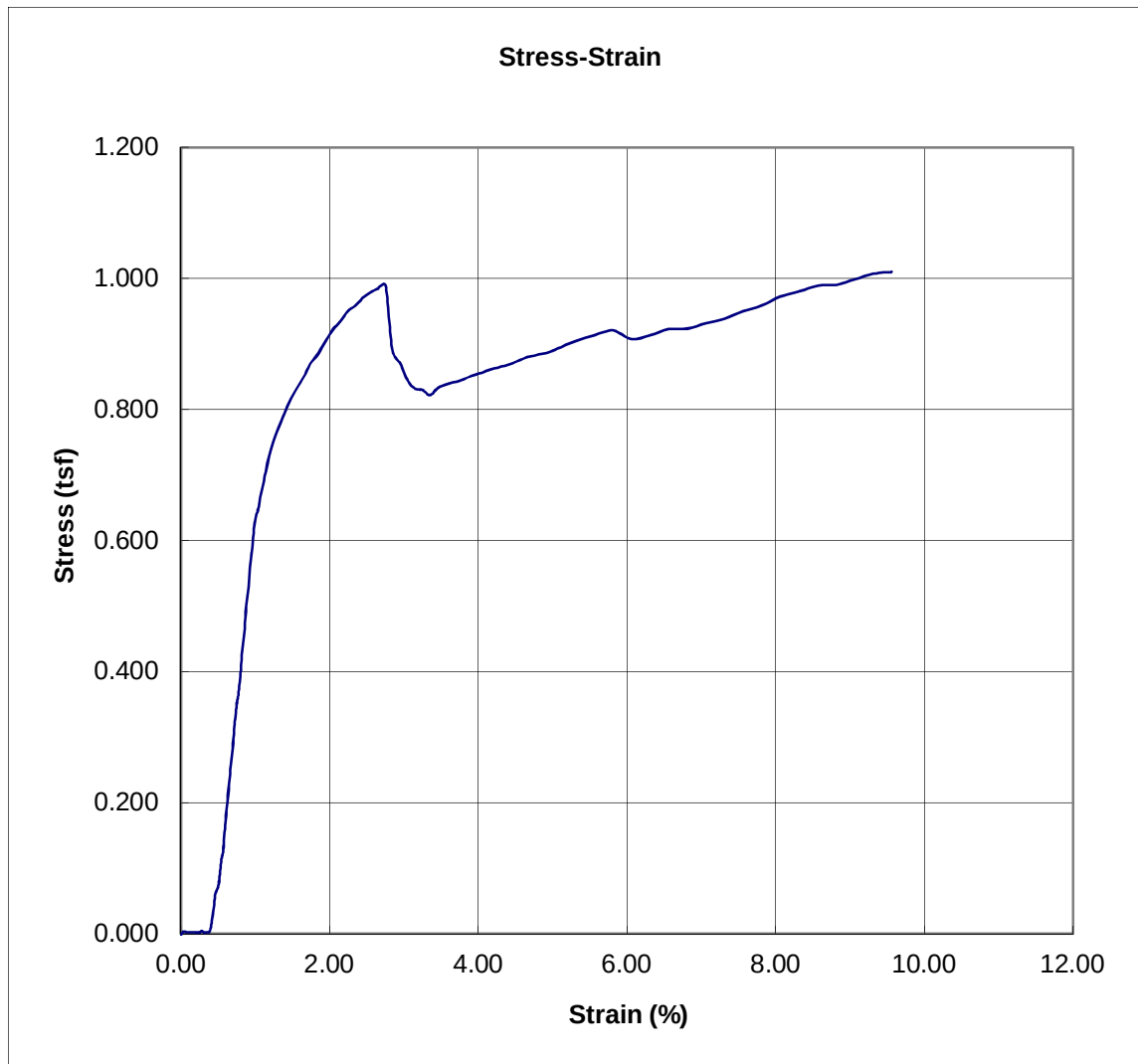
Peak Point	13.82	1.860
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-317
Depth: 33'-35'



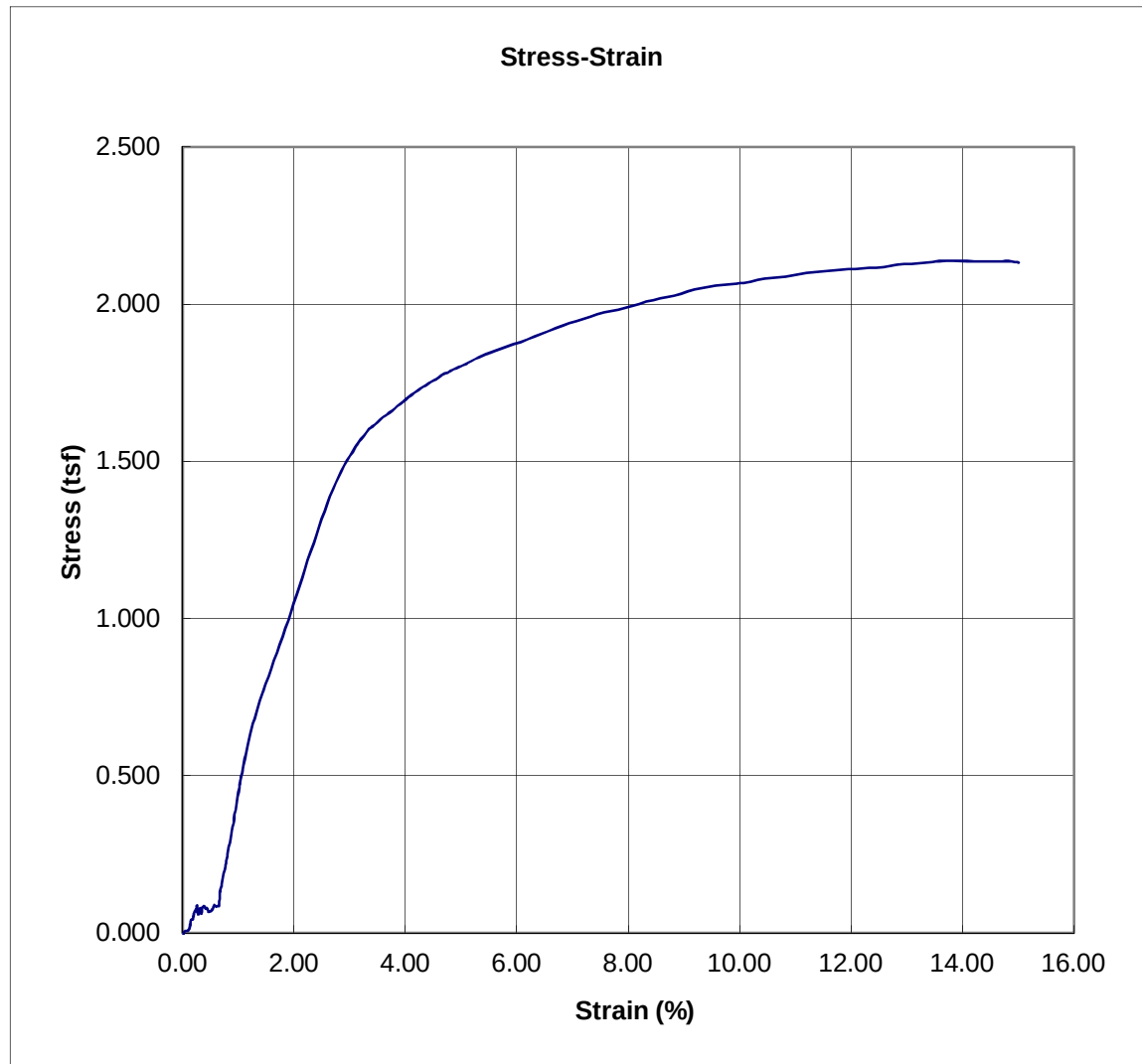
Peak Point	4.99	1.297
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-317
Depth: 38'-40'



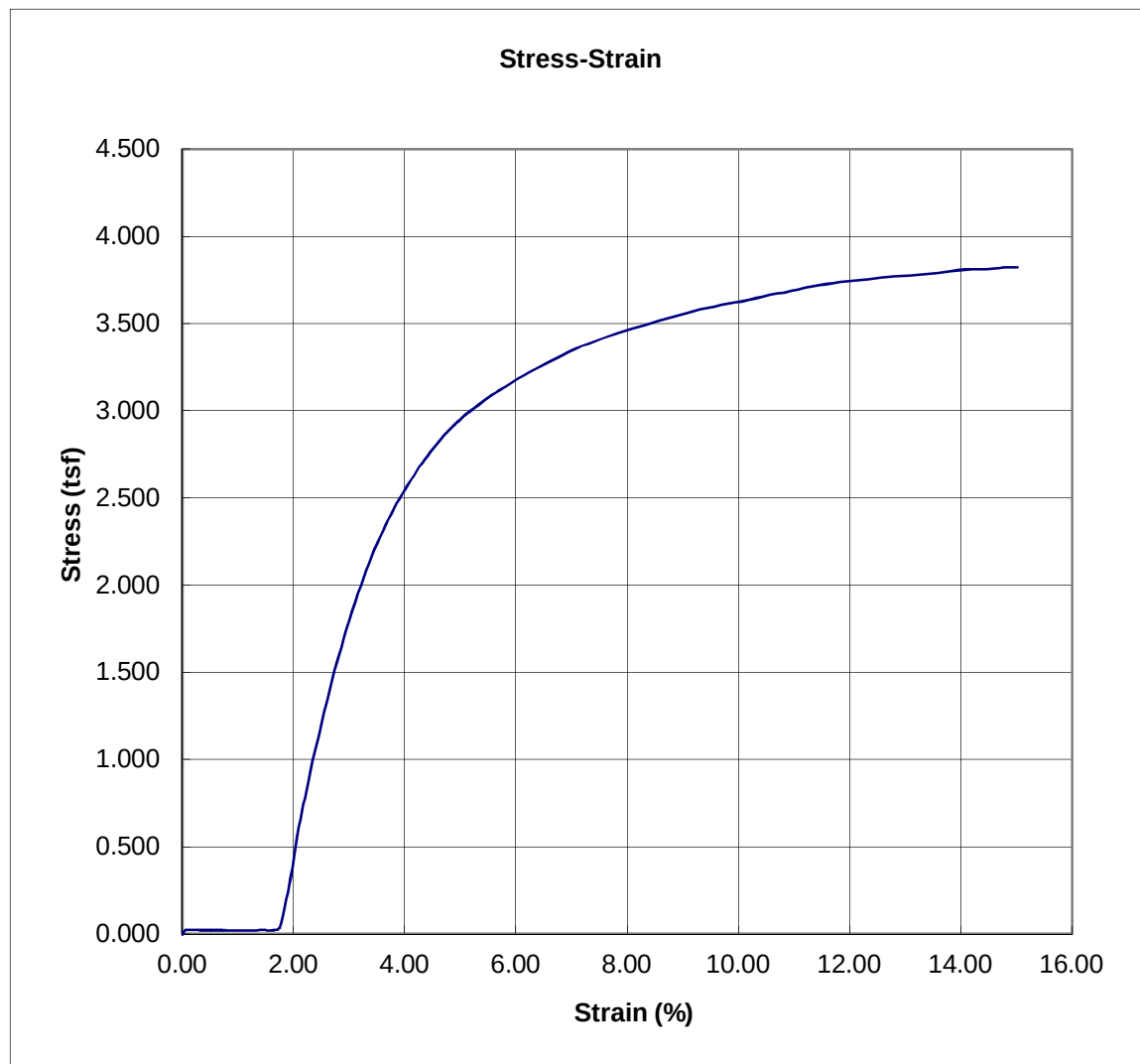
Peak Point	9.56	1.010
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-317
Depth: 43'-45'



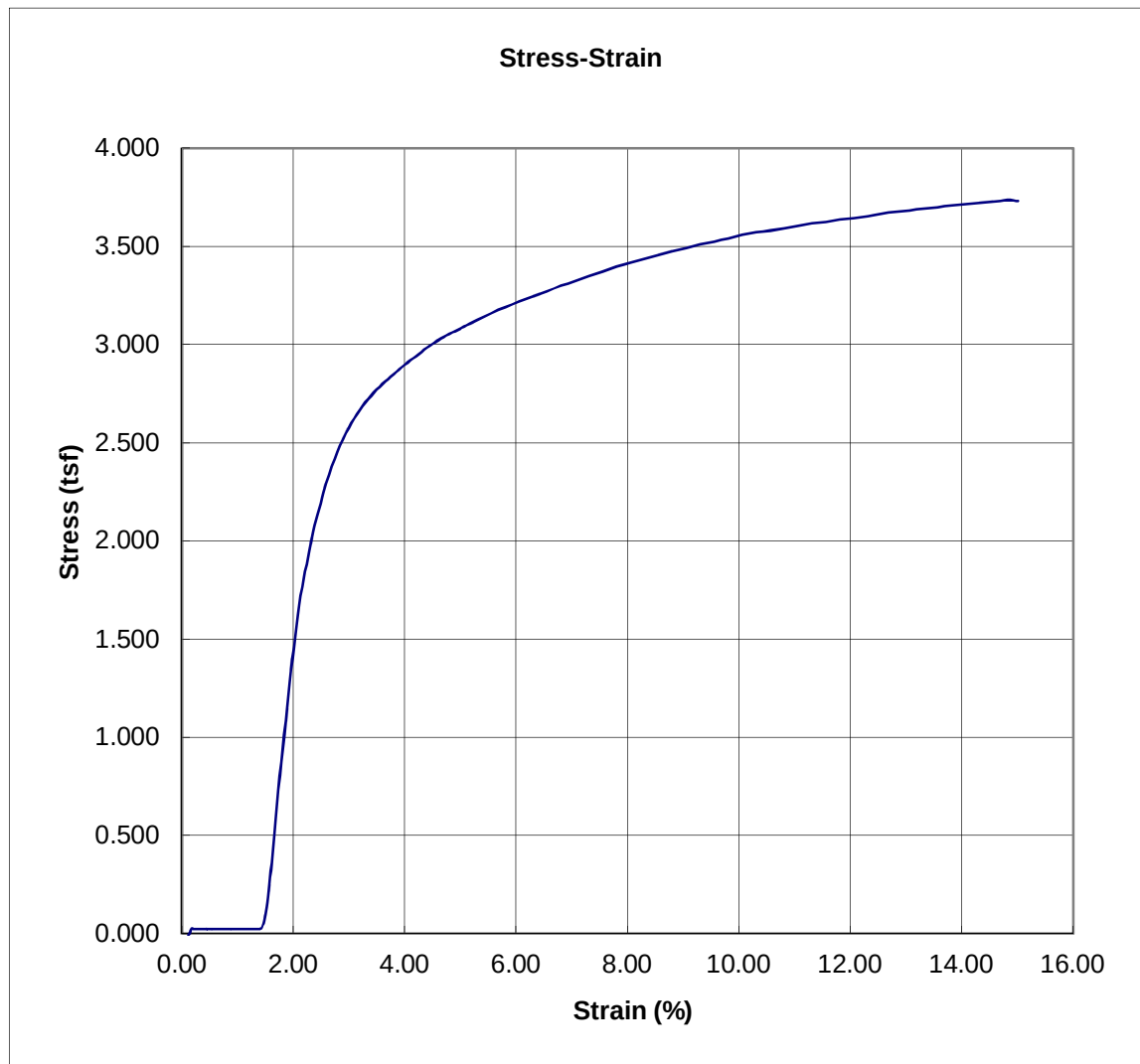
Peak Point	13.83	2.137
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-317
Depth: 58'-60'



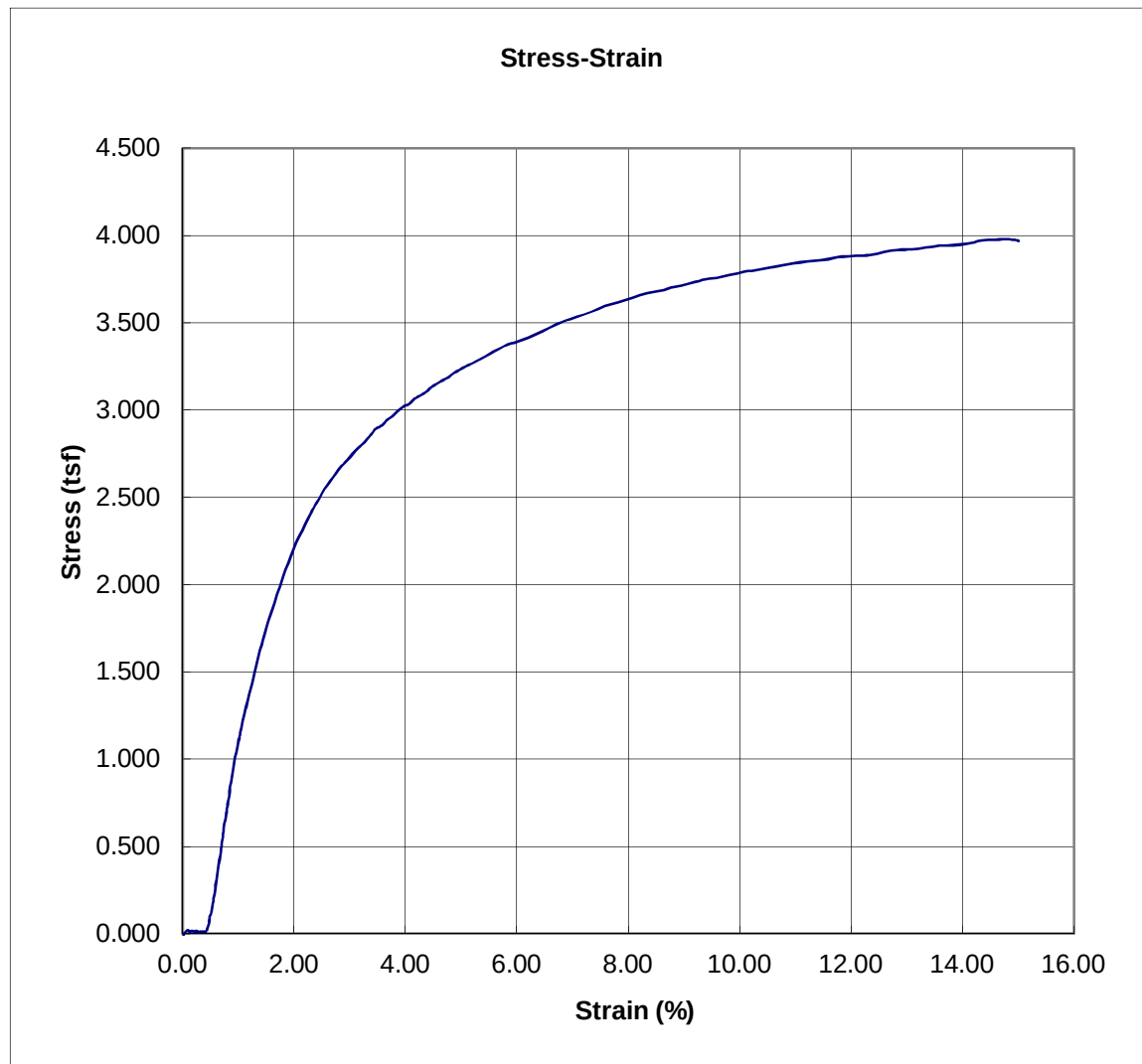
Peak Point	14.83	3.822
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-317
Depth: 73'-75'



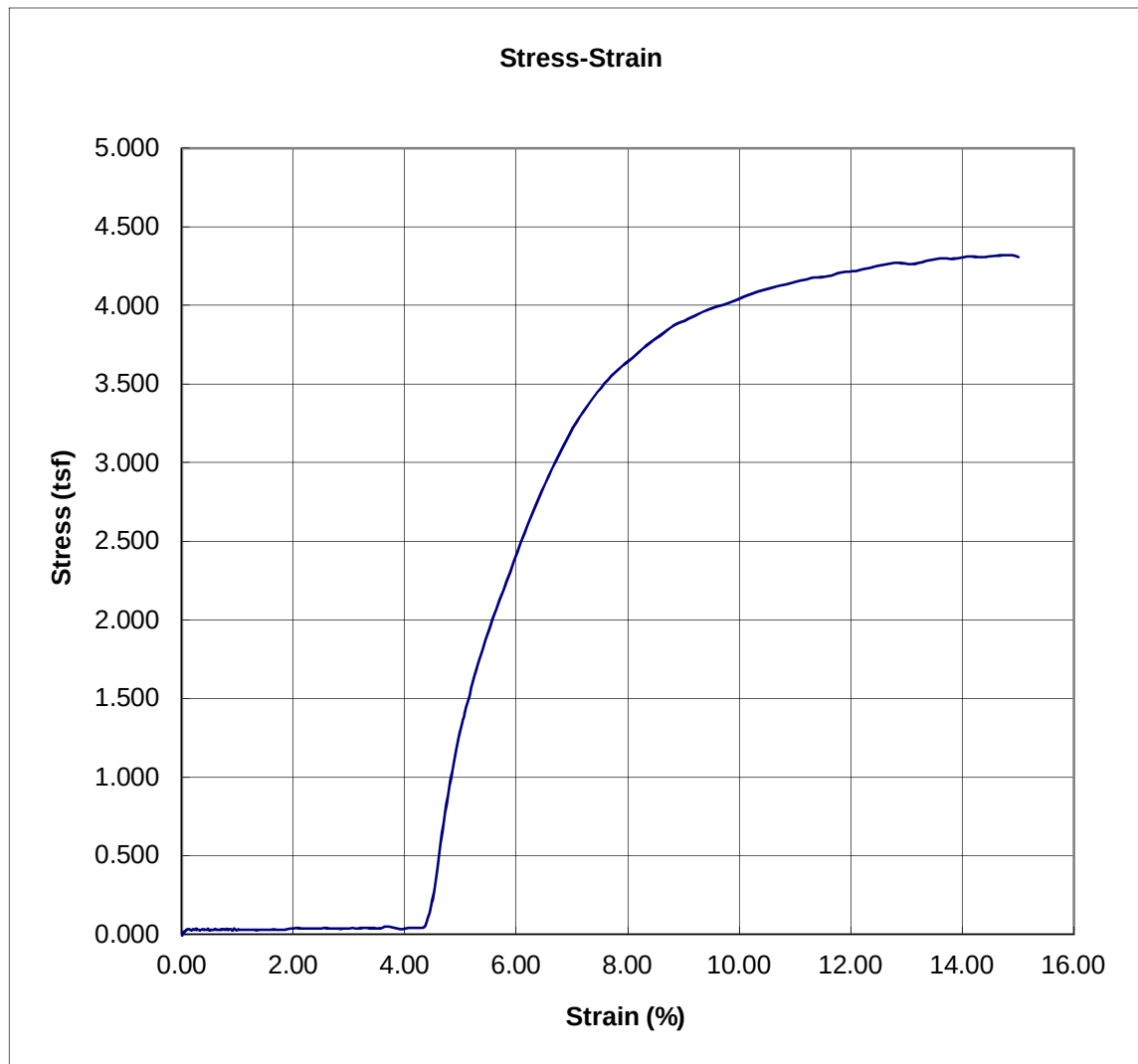
Peak Point	14.81	3.735
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-317
Depth: 78'-80'



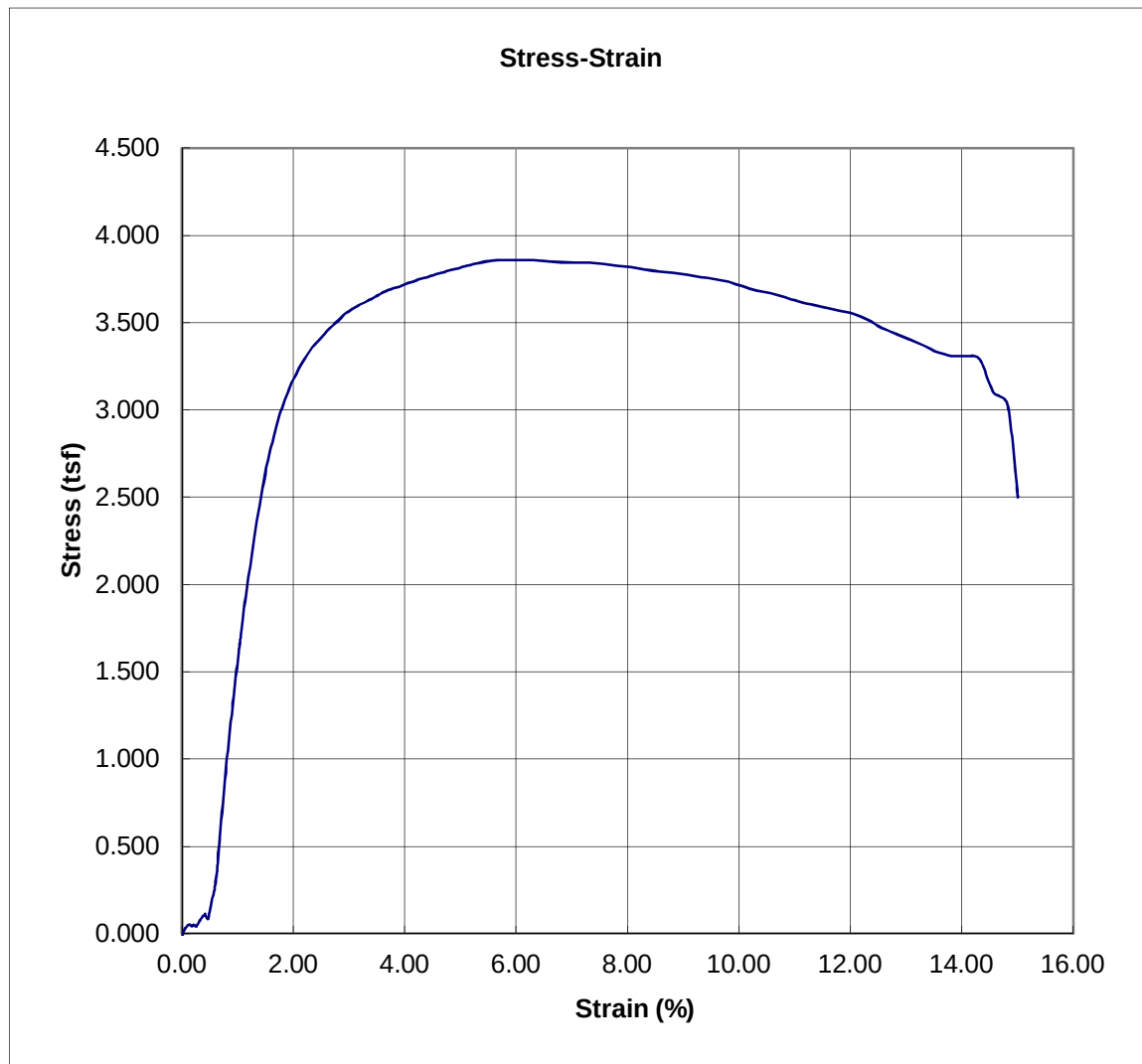
Peak Point	14.84	3.977
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-317
Depth: 88'-90'



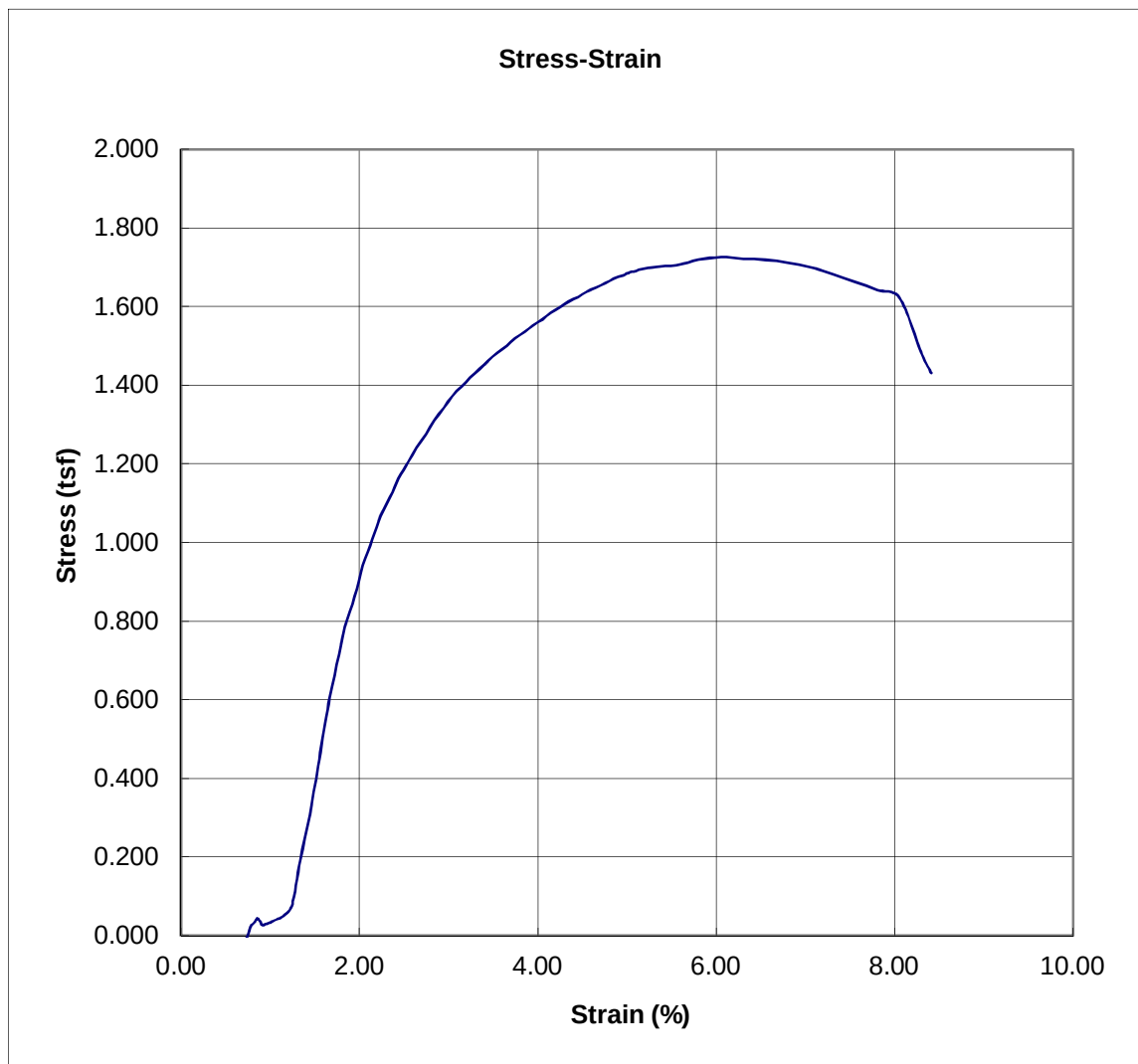
Peak Point	14.85	4.319
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-317
Depth: 93'-95'



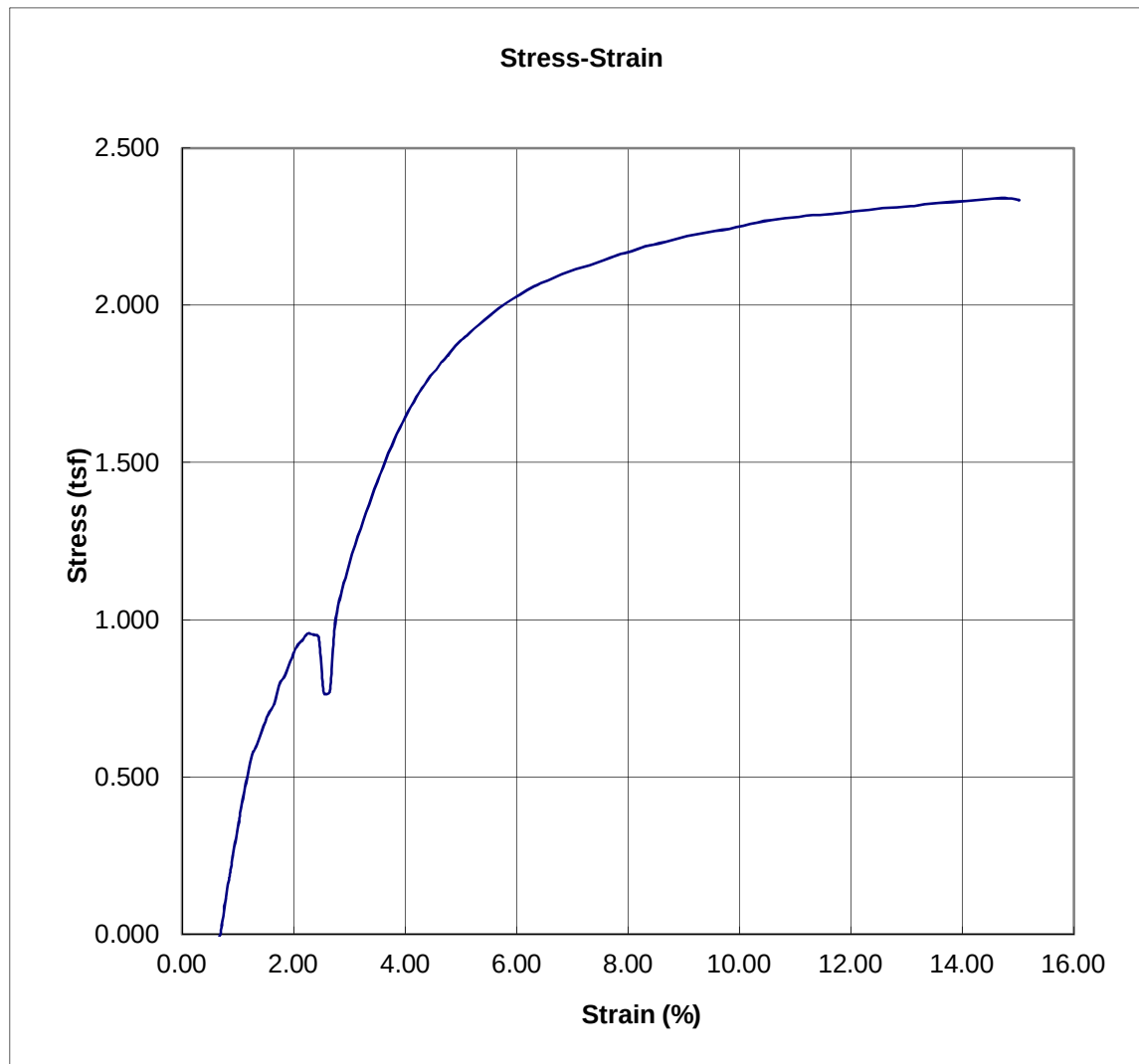
Peak Point	5.81	3.859
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-318
Depth: 33'-35'



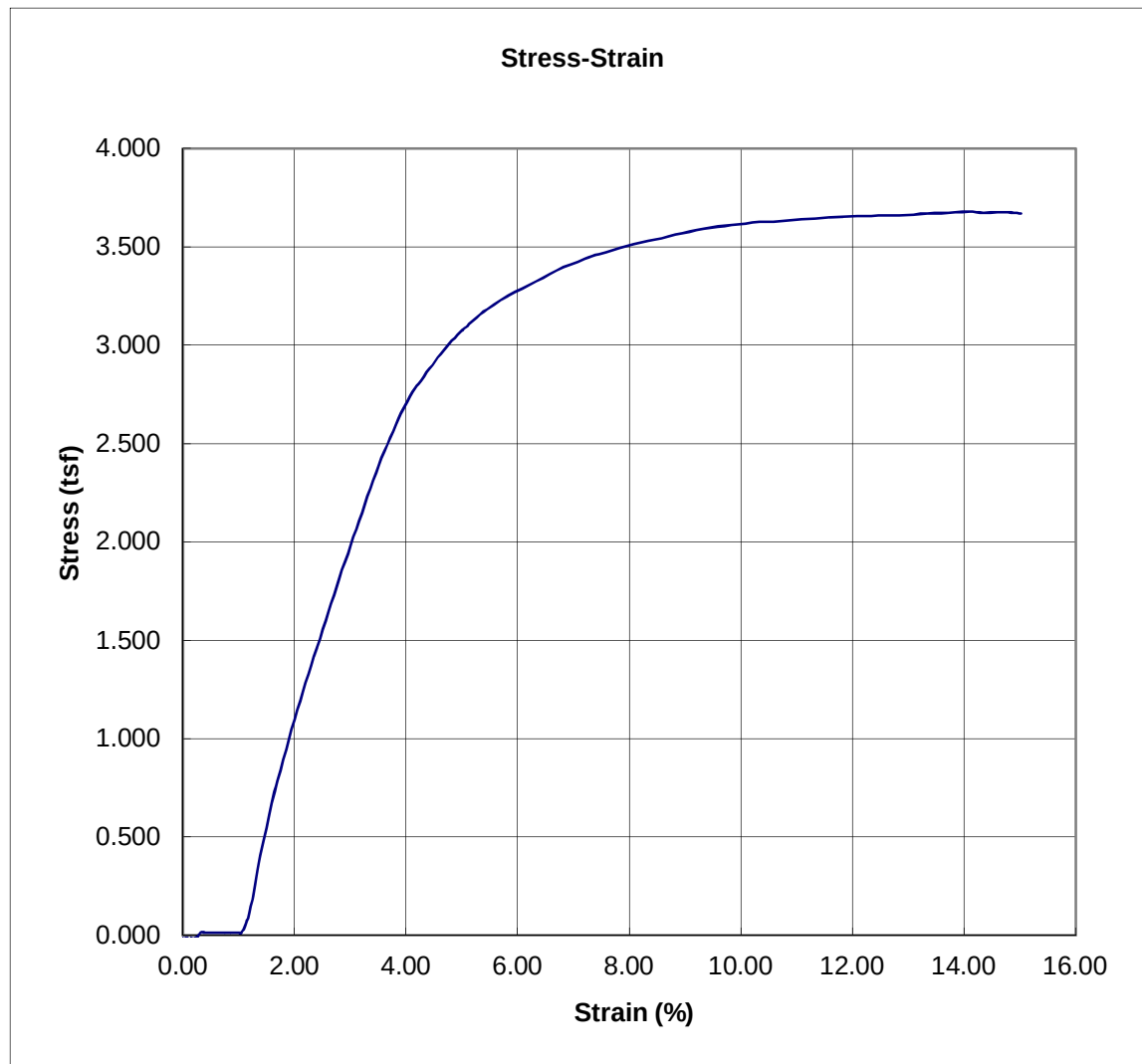
Peak Point	6.05	1.726
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-318
Depth: 53'-55'



Peak Point	14.83	2.340
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-318
Depth: 63'-65'



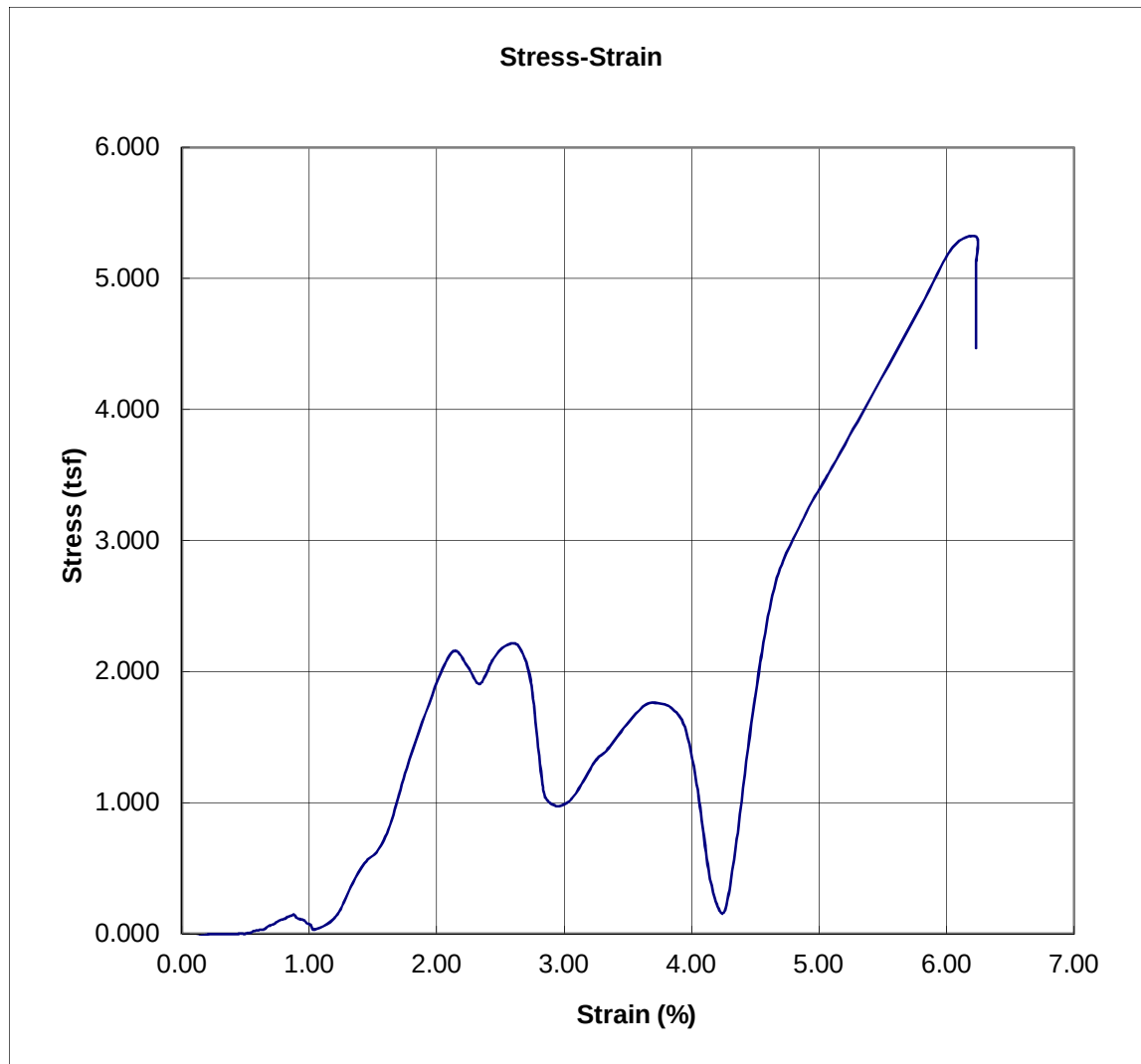
Peak Point	14.09	3.678
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-318
Depth: 78'-80'



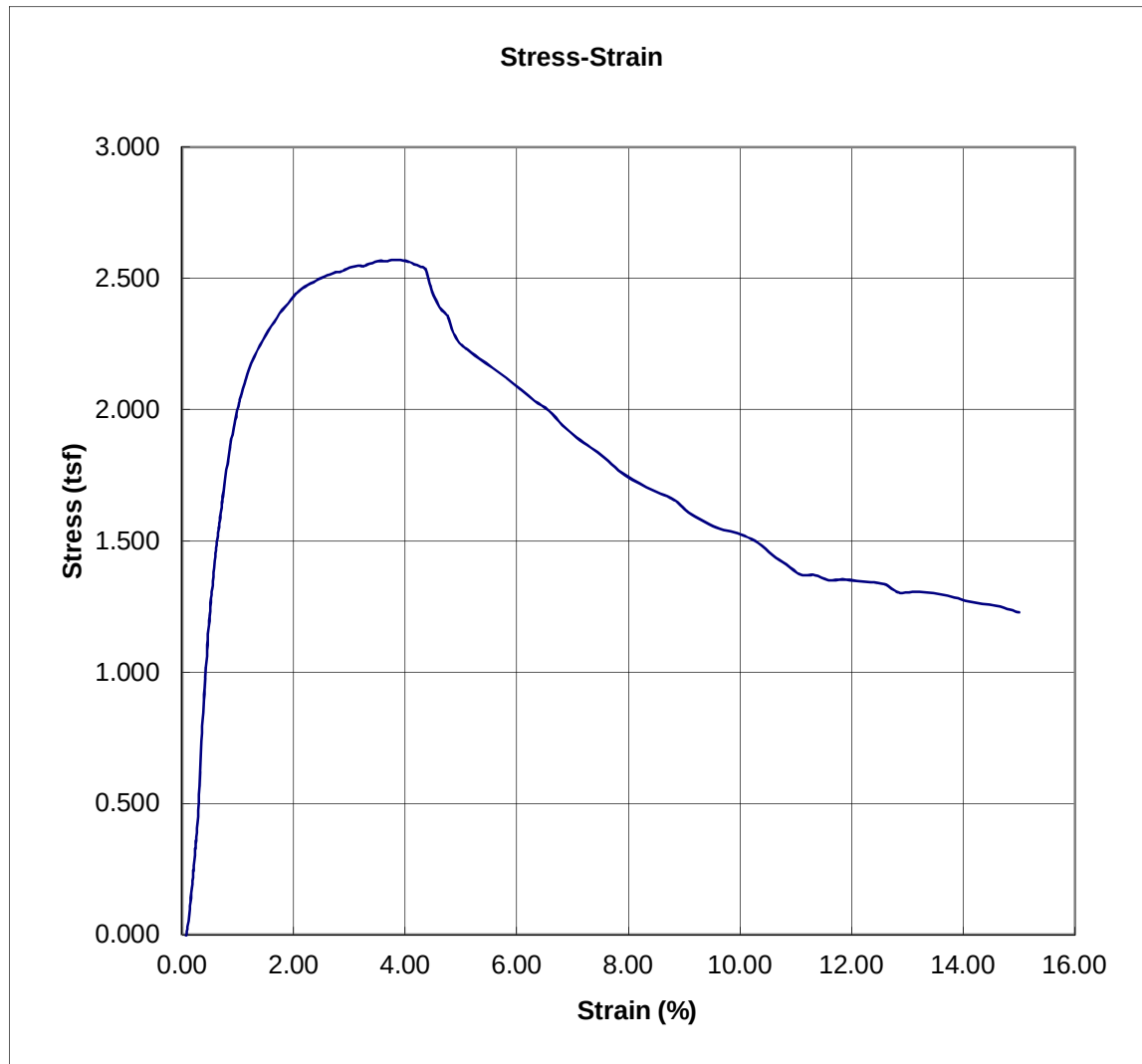
Peak Point	14.83	5.404
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-318
Depth: 93'-95'



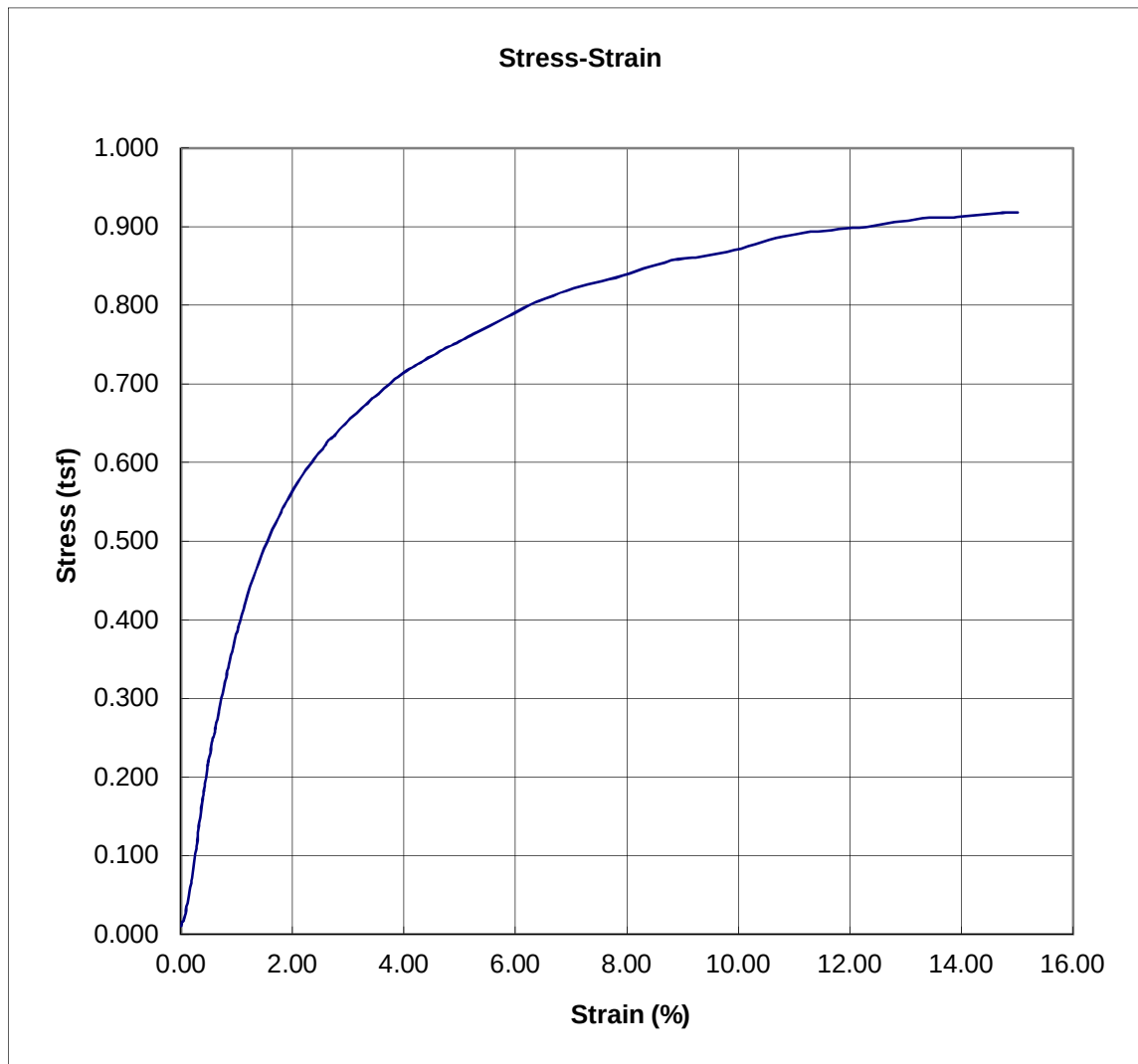
Peak Point	6.23	5.319
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-318
Depth: 143'-145'



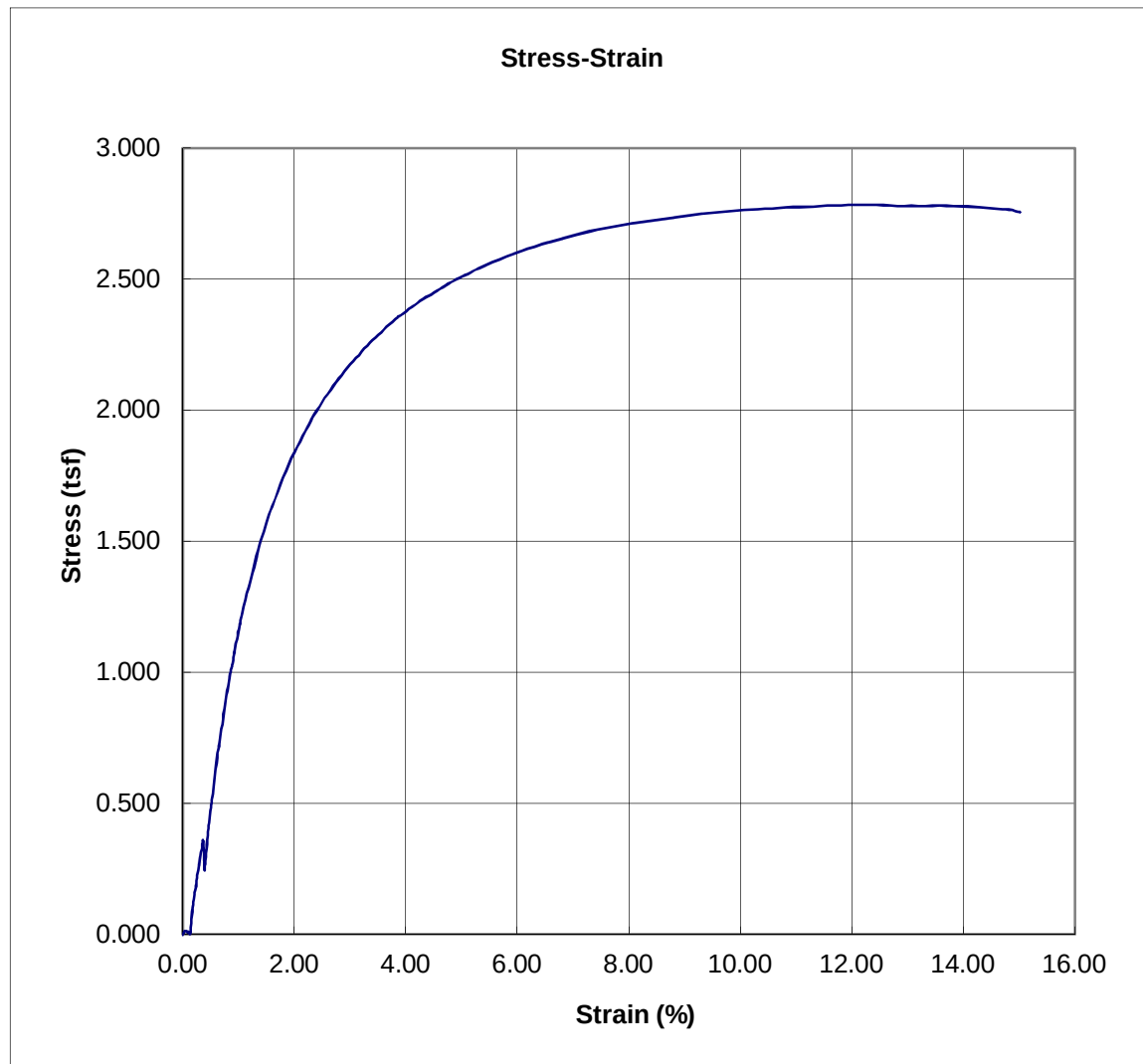
Peak Point	3.86	2.571
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-319
Depth: 33'-35'



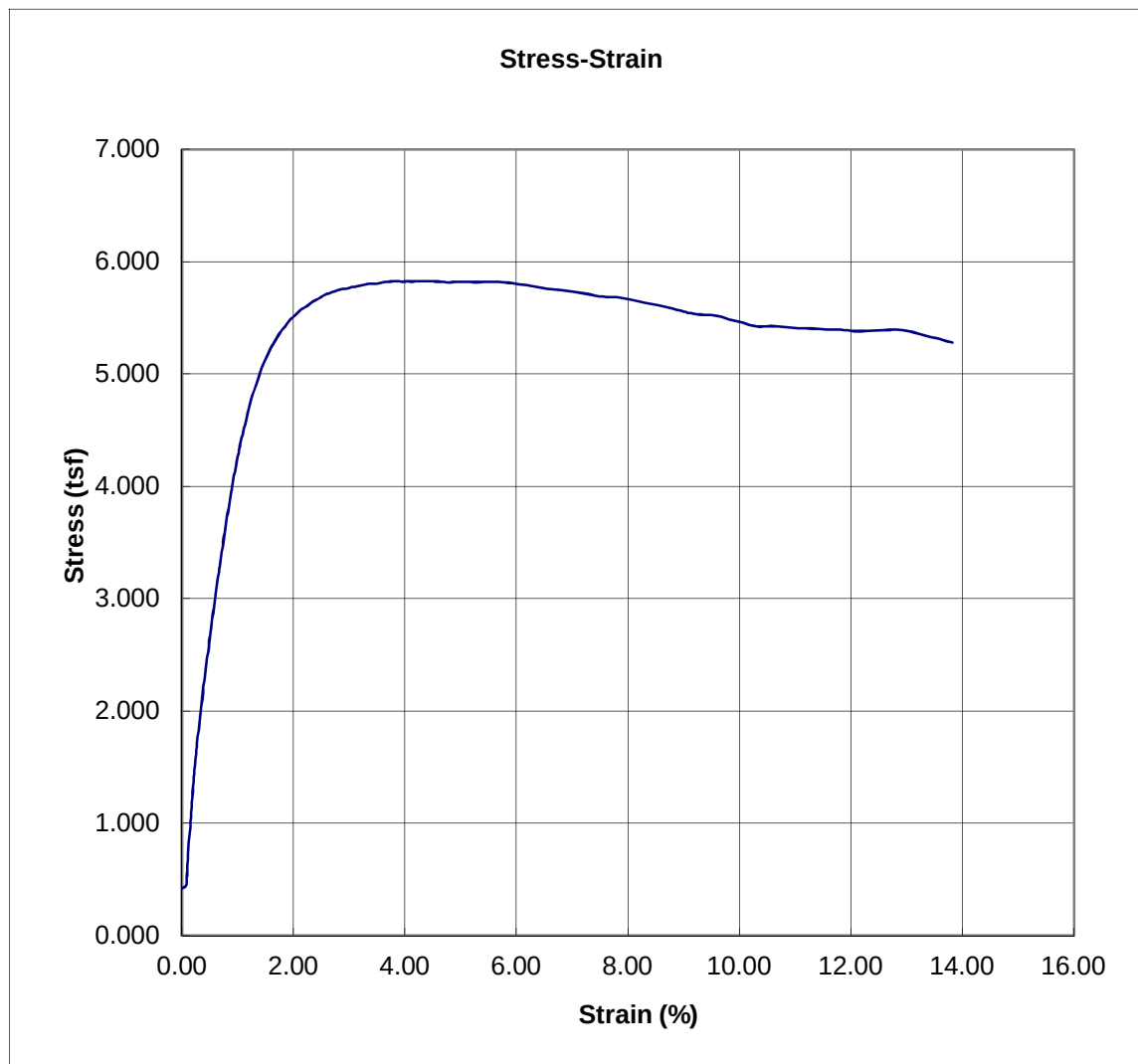
Peak Point	15.01	0.918
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-319
Depth: 43'-45'



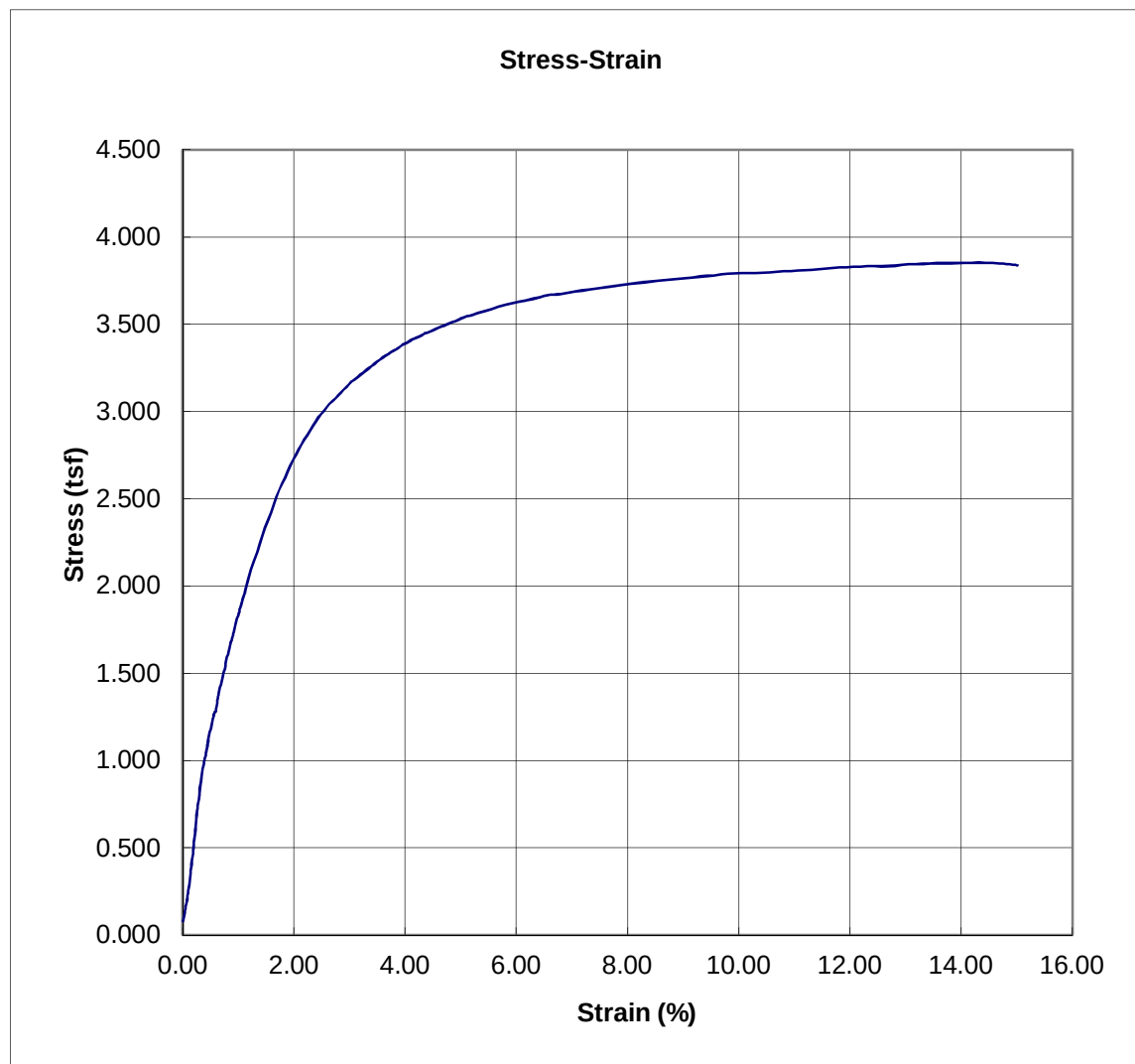
Peak Point	12.07	2.784
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-319
Depth: 58'-60'



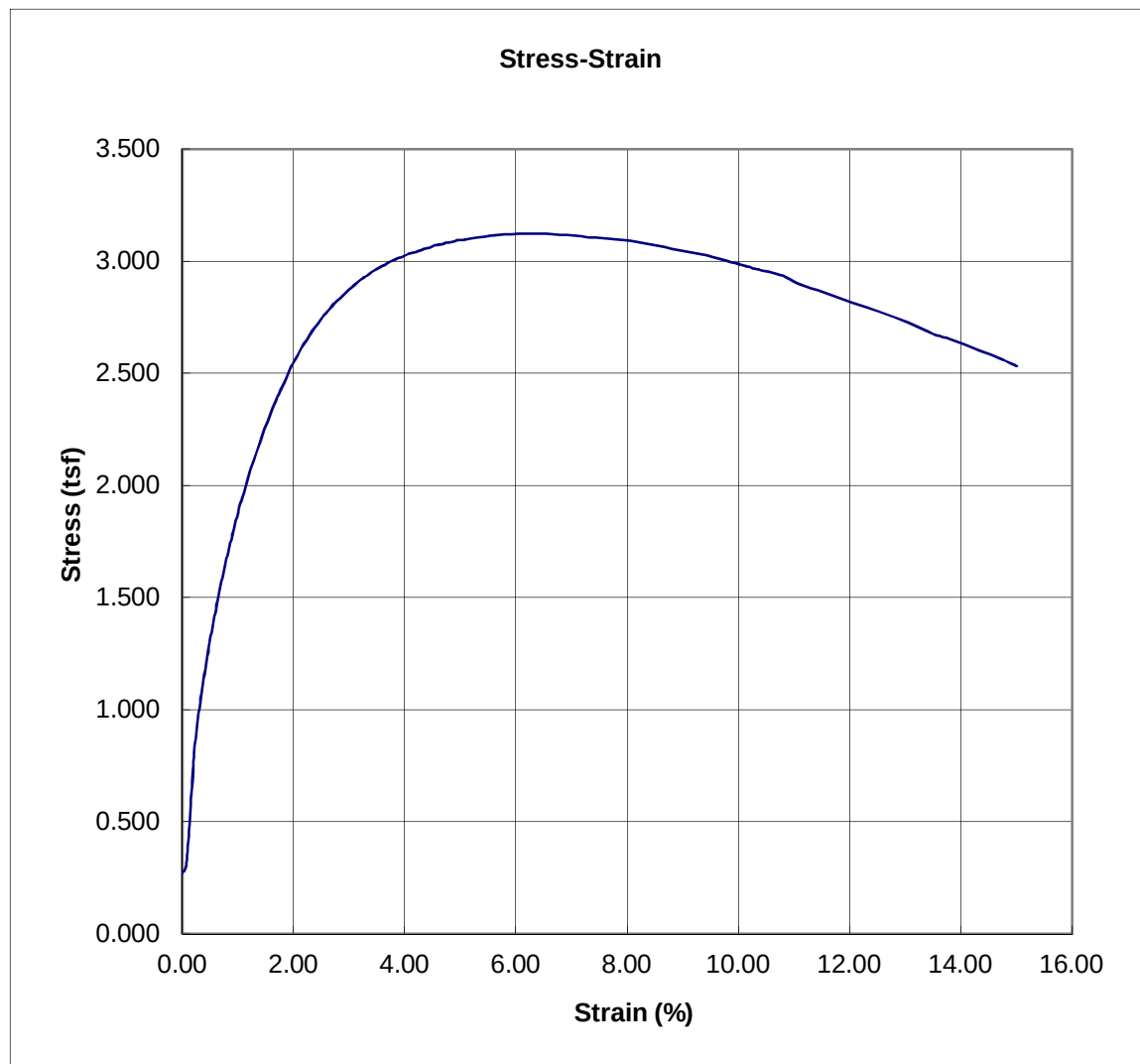
Peak Point	4.25	5.828
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-319
Depth: 63'-65'



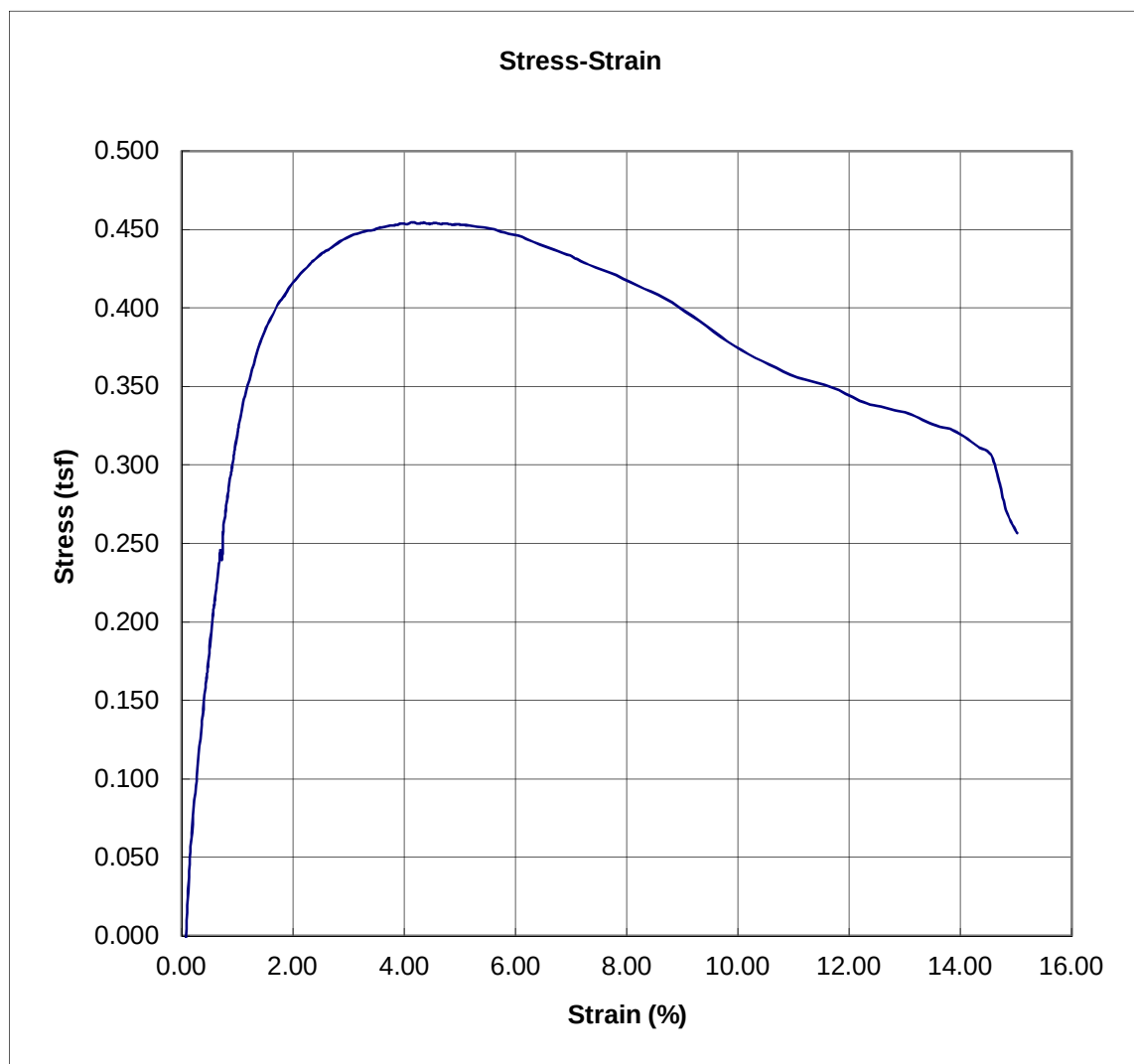
Peak Point	14.31	3.853
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-319
Depth: 78'-80'



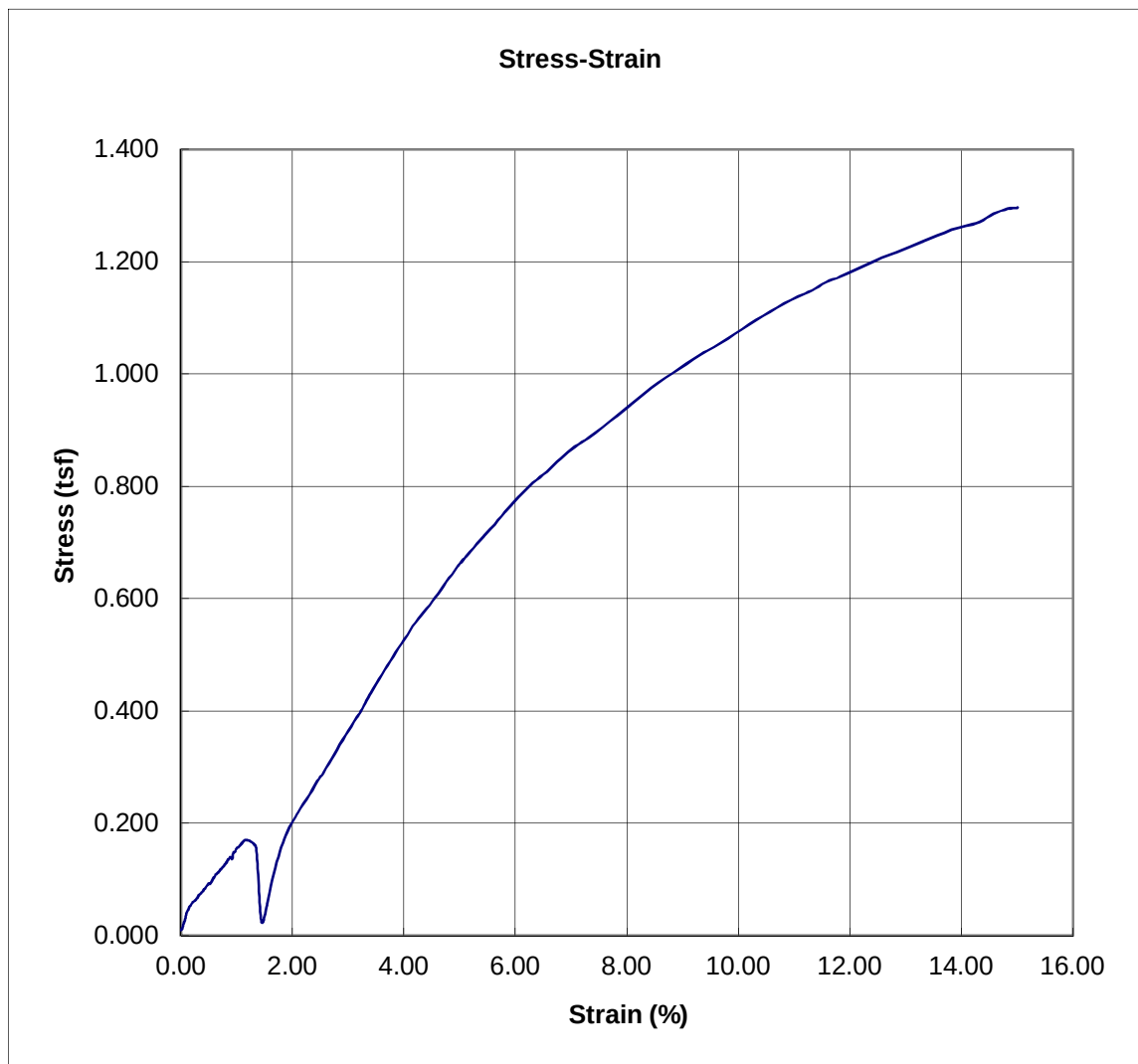
Peak Point	6.05	3.123
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-319
Depth: 98'-100'



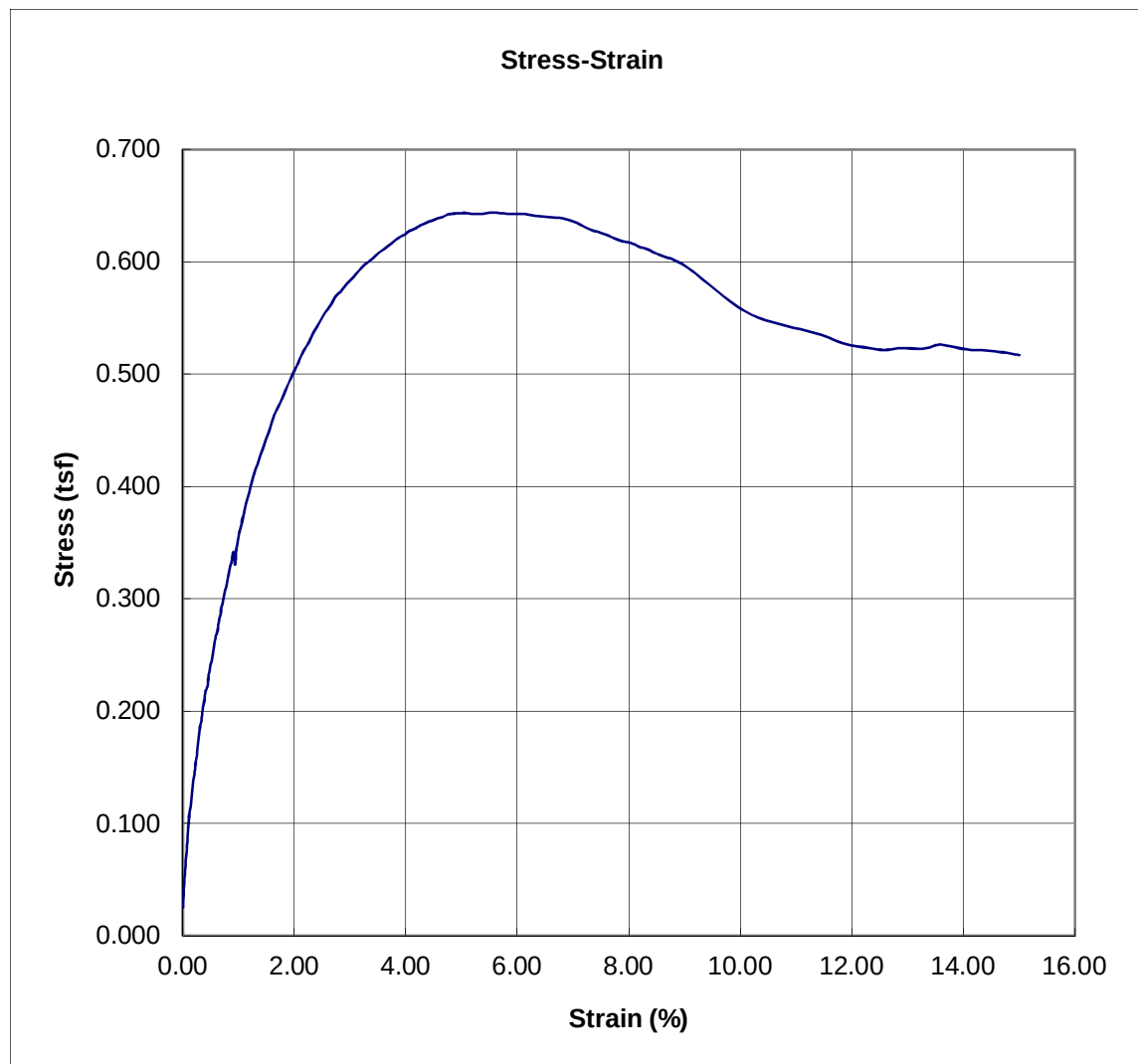
Peak Point	4.15	0.455
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-320
Depth: 58'-60'



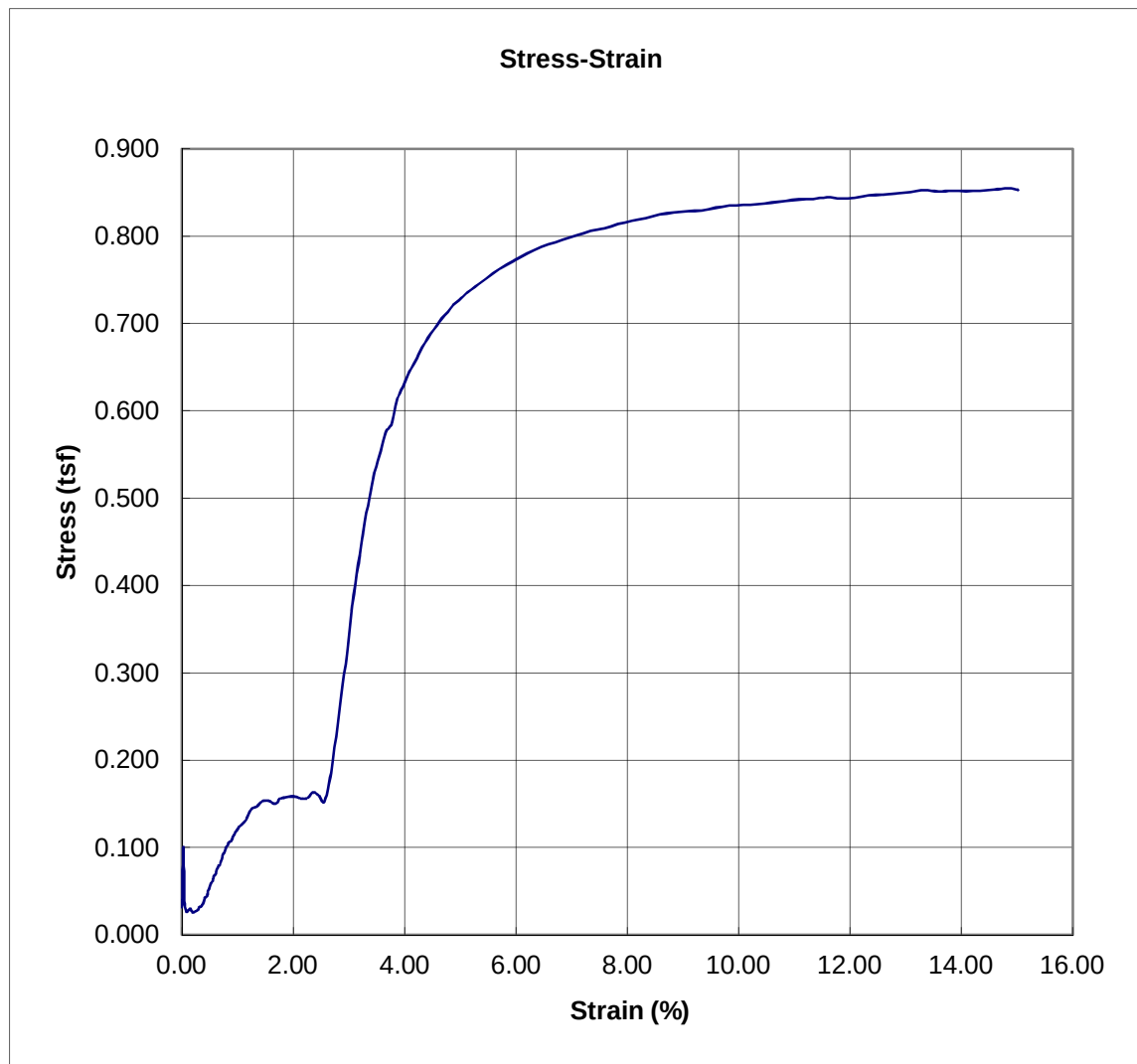
Peak Point	15.01	1.296
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-321
Depth: 38'-40'



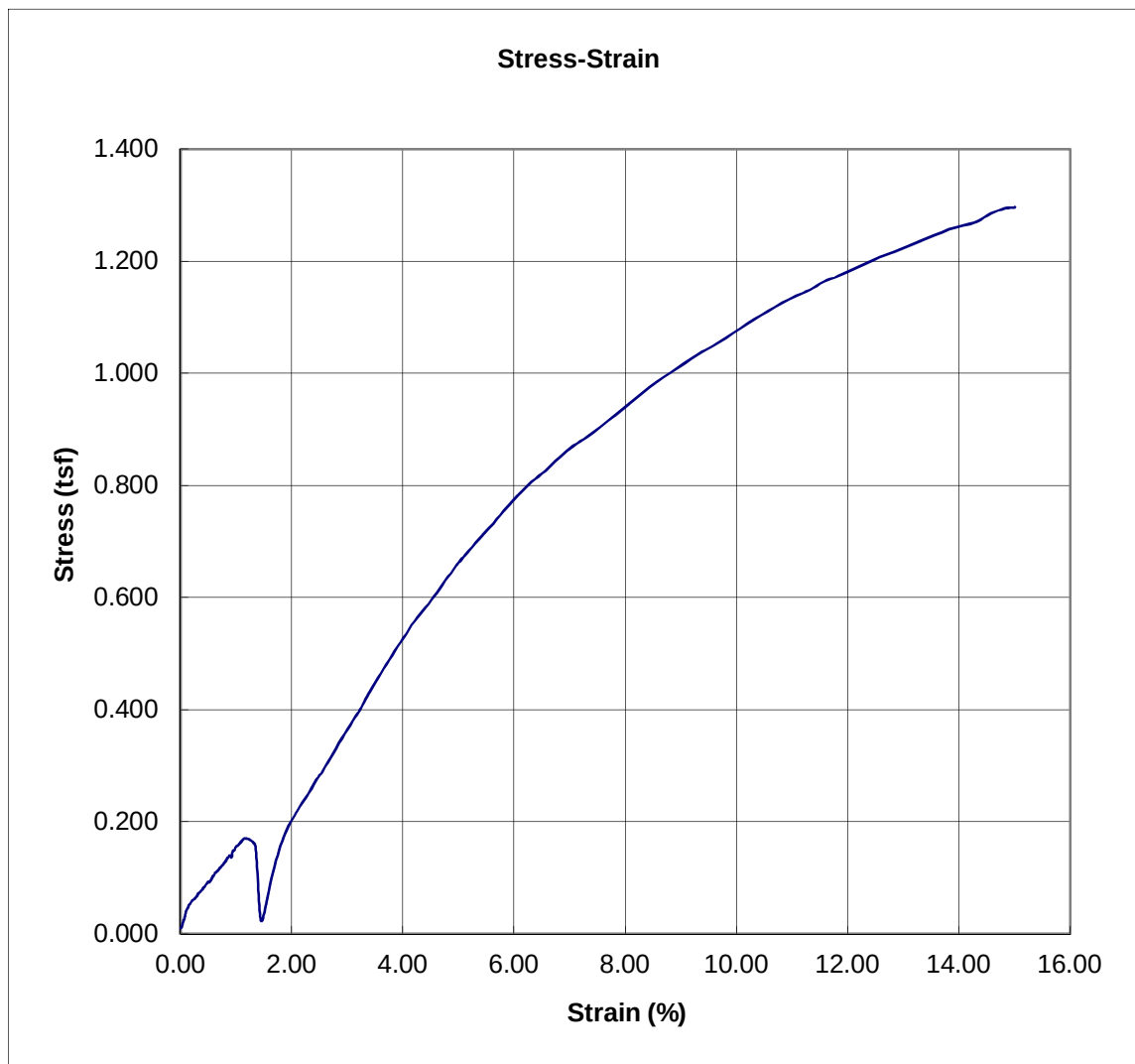
Peak Point	5.57	0.644
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-321
Depth: 48'-50'



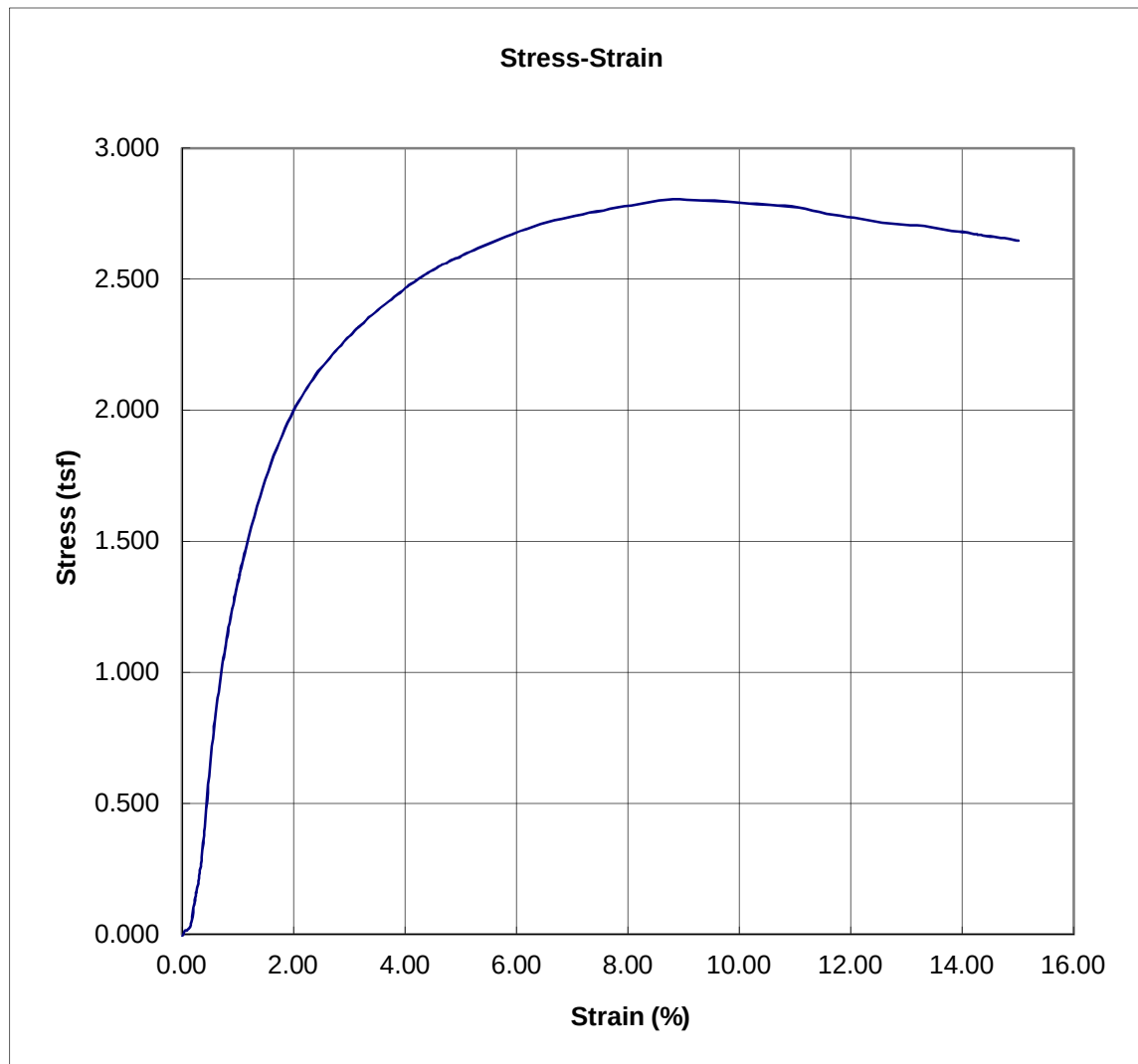
Peak Point	14.84	0.855
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-320
Depth: 58'-60'



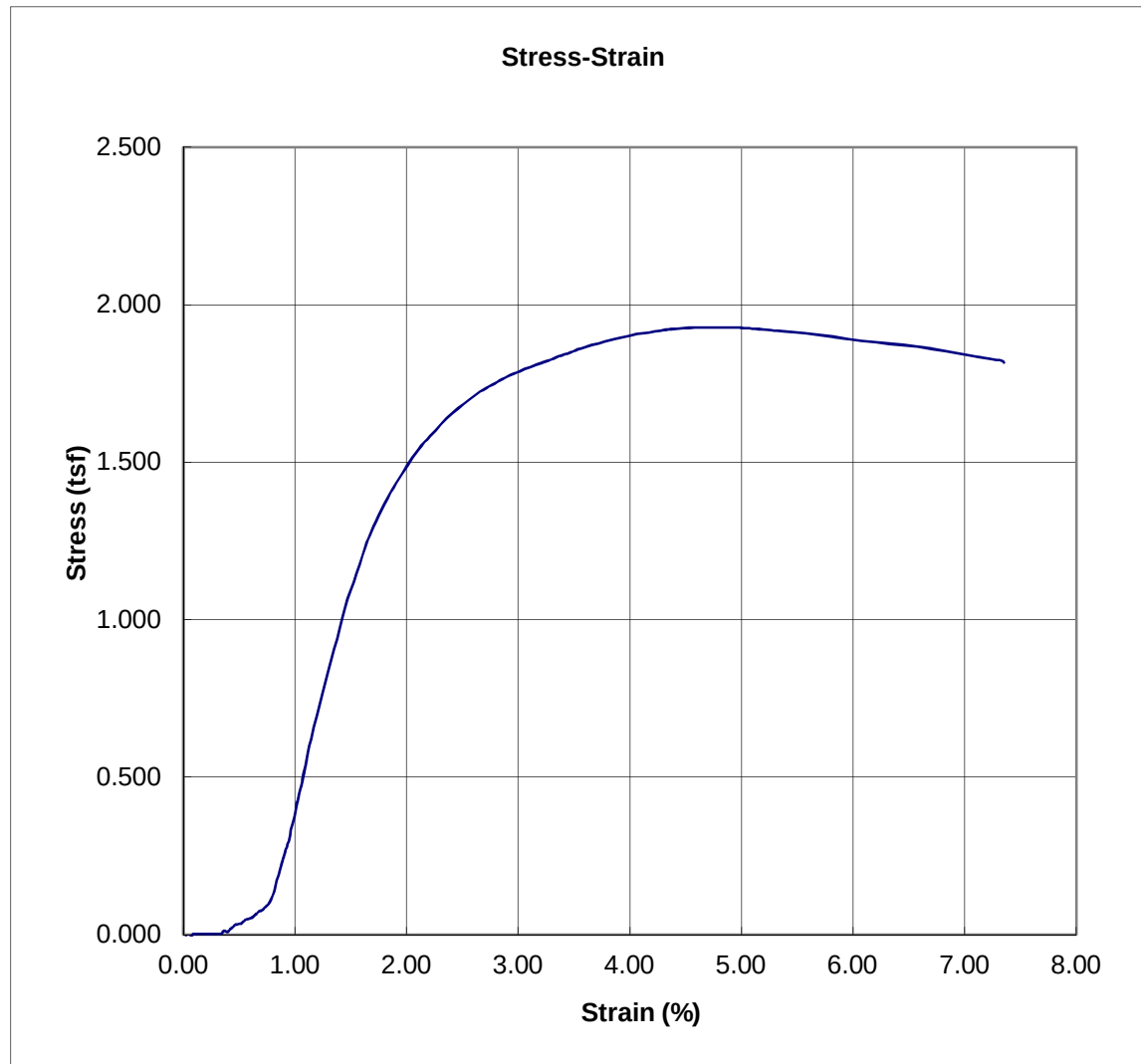
Peak Point	15.01	1.296
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-321
Depth: 93'-95'



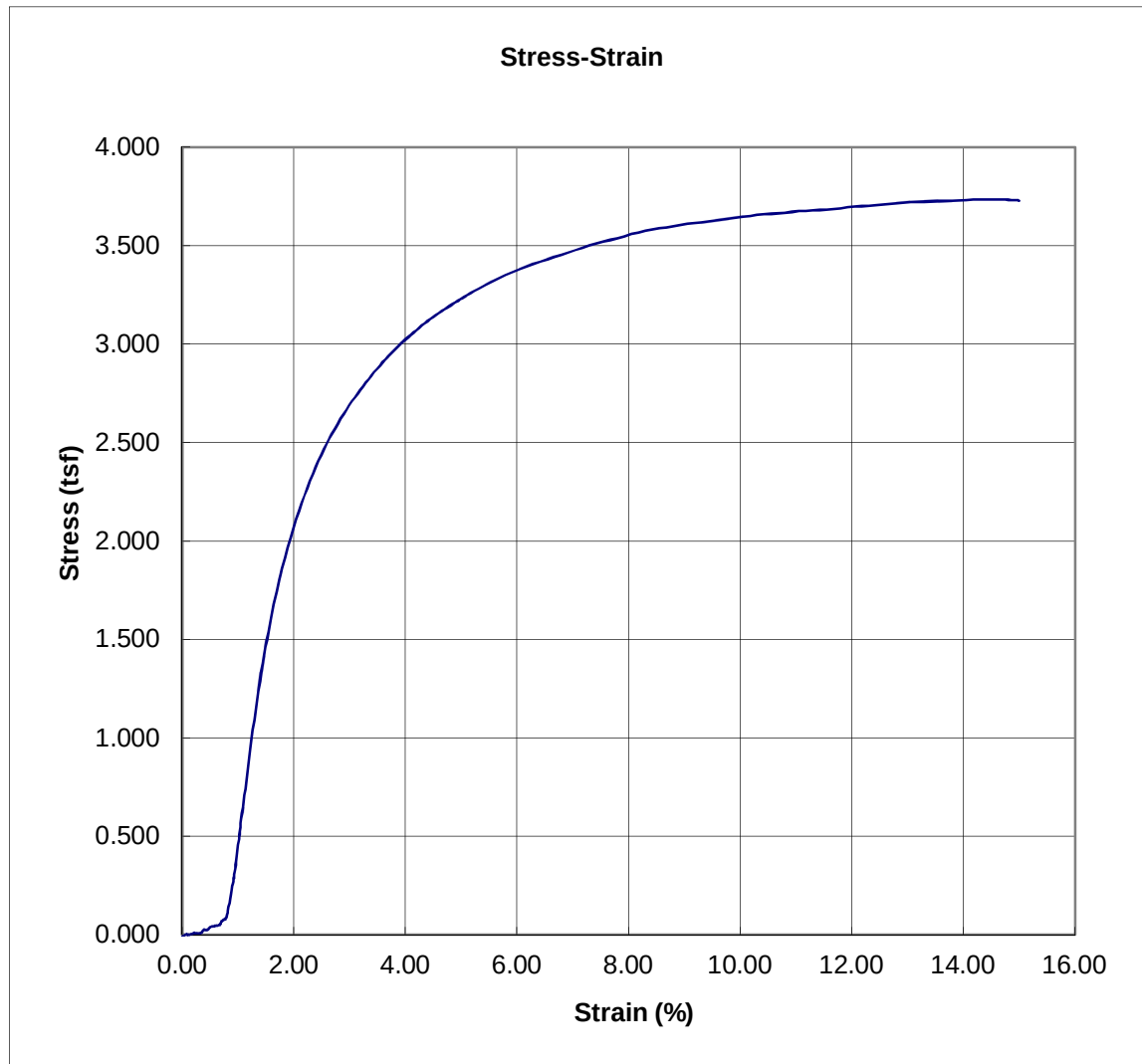
Peak Point	8.81	2.806
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2001
Depth: 23'-25'



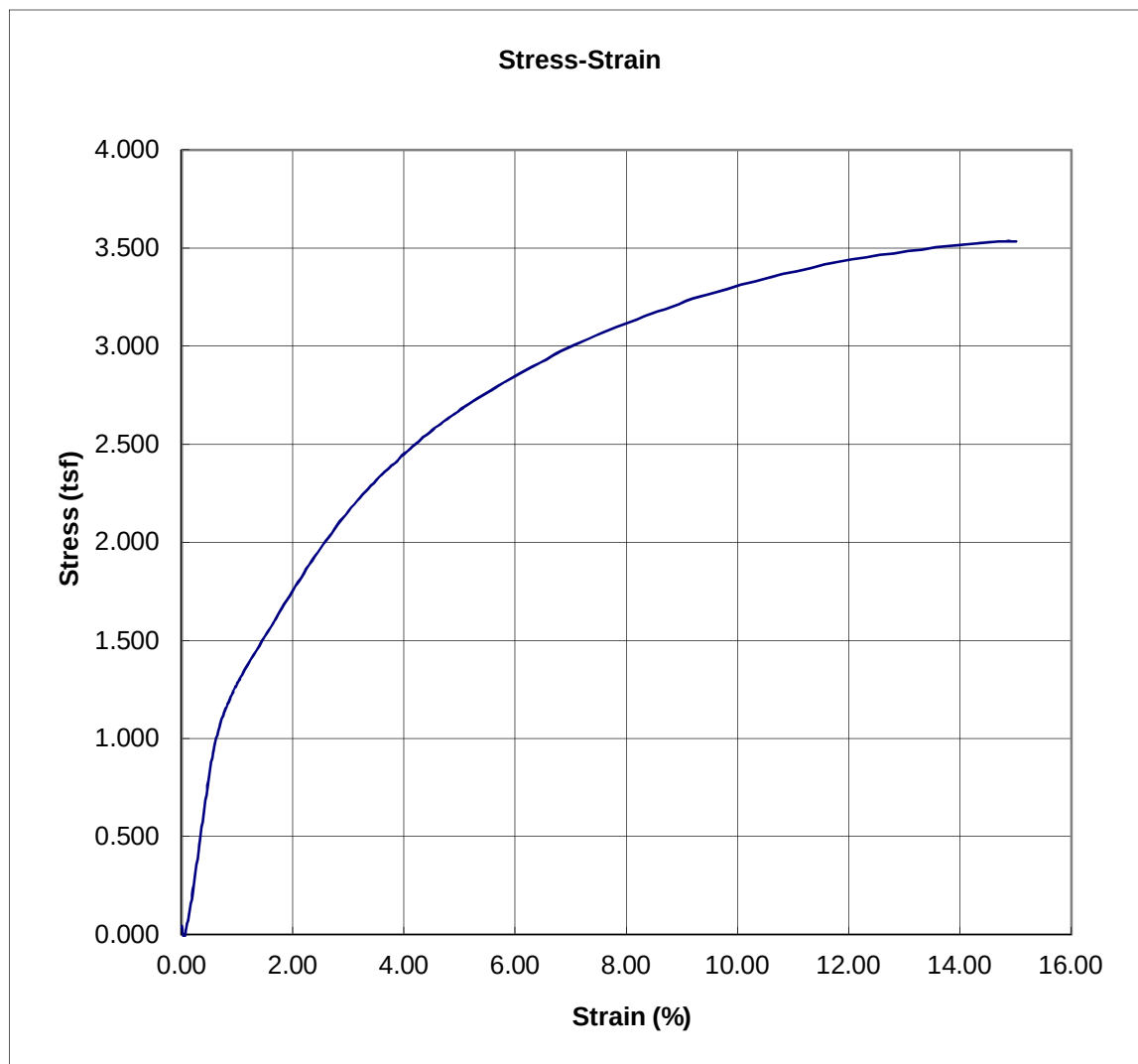
Peak Point	4.87	1.928
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2001
Depth: 33'-35'



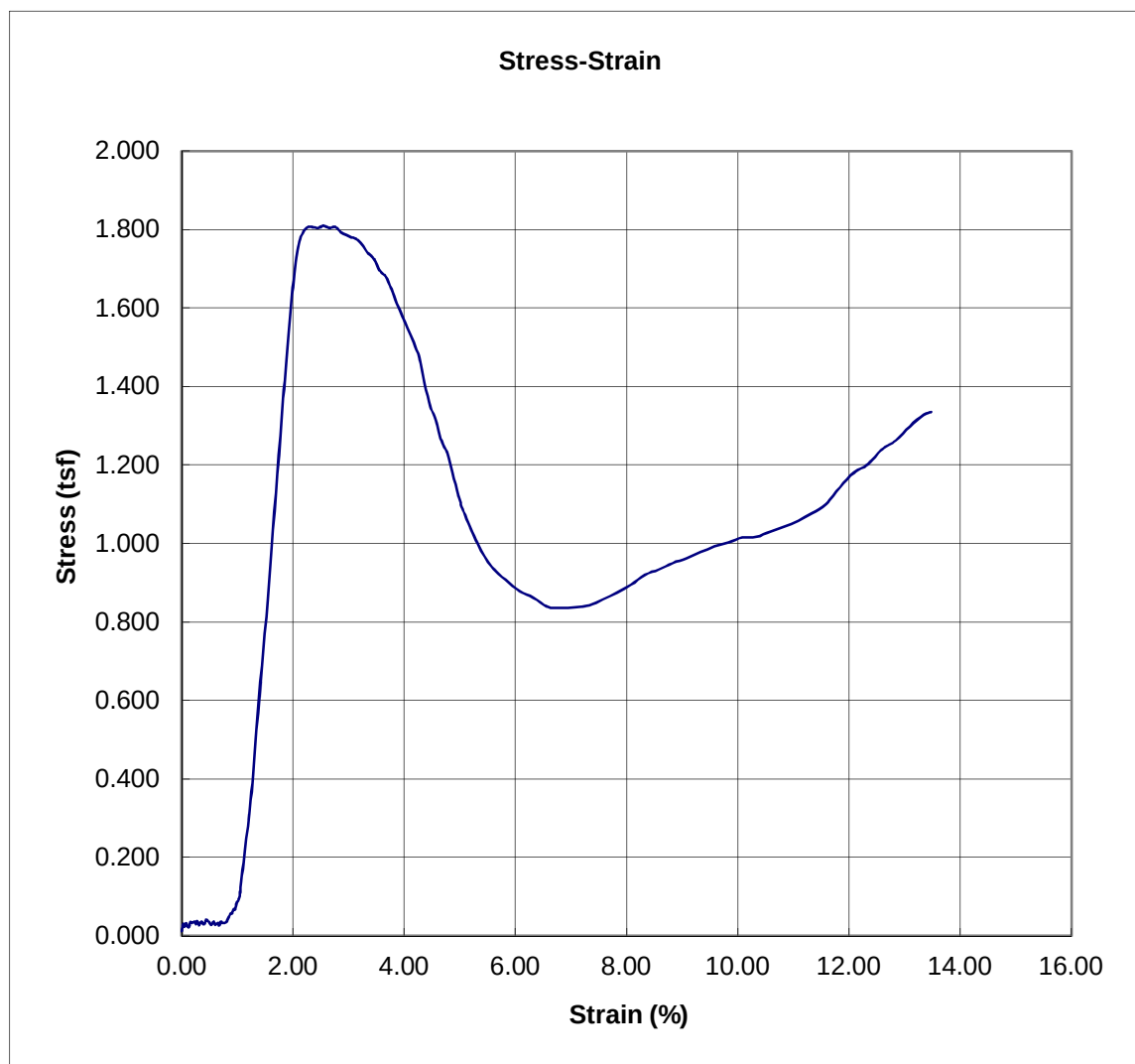
Peak Point	14.55	3.735
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2002
Depth: 18'-20'



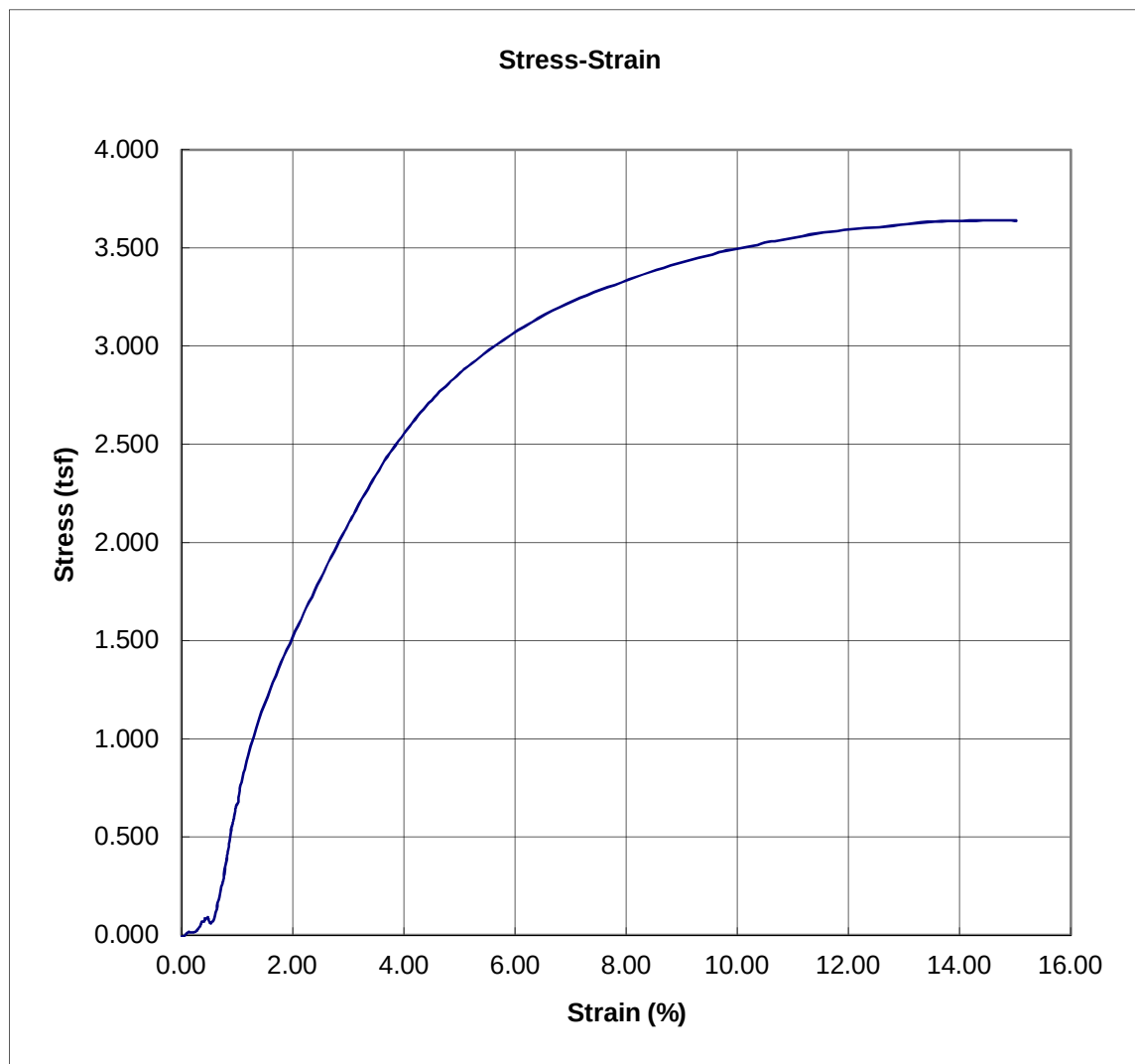
Peak Point	14.81	3.534
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2001
Depth: 23'-25'



Peak Point	2.55	1.810
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2002
Depth: 28'-30'



Peak Point	14.55	3.641
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Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
(512) 358-6048

Unconsolidated-Undrained Triaxial Compression Test

Client: HVJ Associates, Inc.

Beyond PN.: LT2001012

Type of Specimen: Shelby Tube

Project: HSC ECIP
(PN: HG1910092.2.1)

Test Method: ASTM D2850

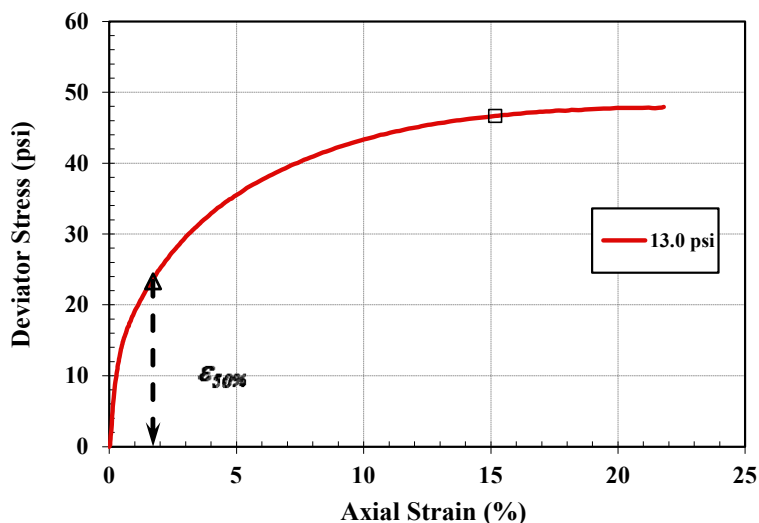
Strain Rate (%/min): 1 % / min

Test Date: 3/5/2020

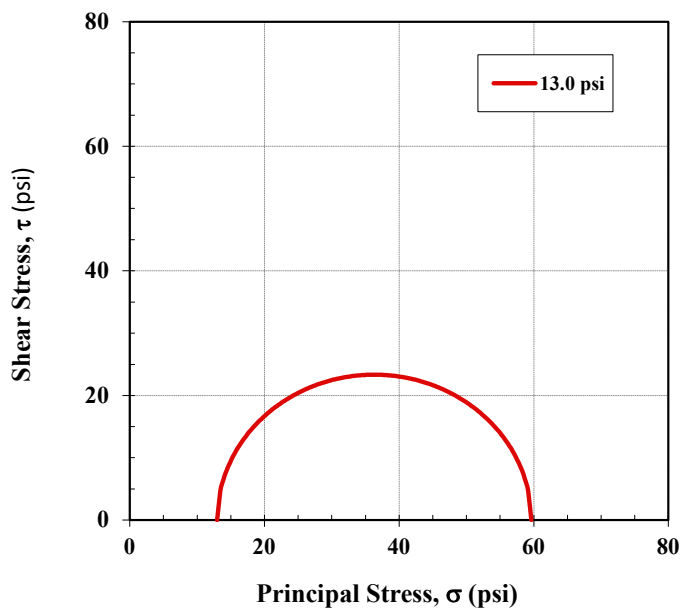
Type of Test: Q-Test

Sample No.: ECP-2003 (11Q/B) at 23-25 ft

Principal Stress Difference vs. Axial Strain



Mohr Circles (Total Stress) for Peak Stress at Failure



Initial Specimen Conditions		
Confining Pressure (psi)		13.0
Avg. Diameter (in)	D_o	2.78
Avg. Height (in)	H_o	5.68
In-situ Water Content (%)	w_o	16.9
Total Unit Weight (pcf)	γ_{total}	134.5
Dry Unit Weight (pcf)	γ_{dry}	115.1
Saturation (%)	S_r	98.1
Void Ratio	e_o	0.46
Specific Gravity (Assumed)	G_s	2.70

Stresses at Failure	
Maximum Deviator Stress (psi)	46.6
Axial Strain at Failure (%)	15.0
Axial Strain at 50% of q_u , ϵ_{50} (%)	1.7
Total Stresses at Failure	
Major Principal Stress Corrected, σ_{1C} (psi)	59.6
Minor Principal Stress, σ_3 (psi)	13.0

Test Results	
Unconsolidated-Undrained Compressive Strength at Failure, $\sigma_{1C} - \sigma_3$ (tsf)	3.36

Note: The test specimen was partially saturated. Failure was determined at the maximum deviator stress or deviator stress at 15 % axial strain, whichever is obtained first.

Olga Vasquez, 03/05/20

Analysis & Quality Review/Date
Specimen Prepared by: T.D.

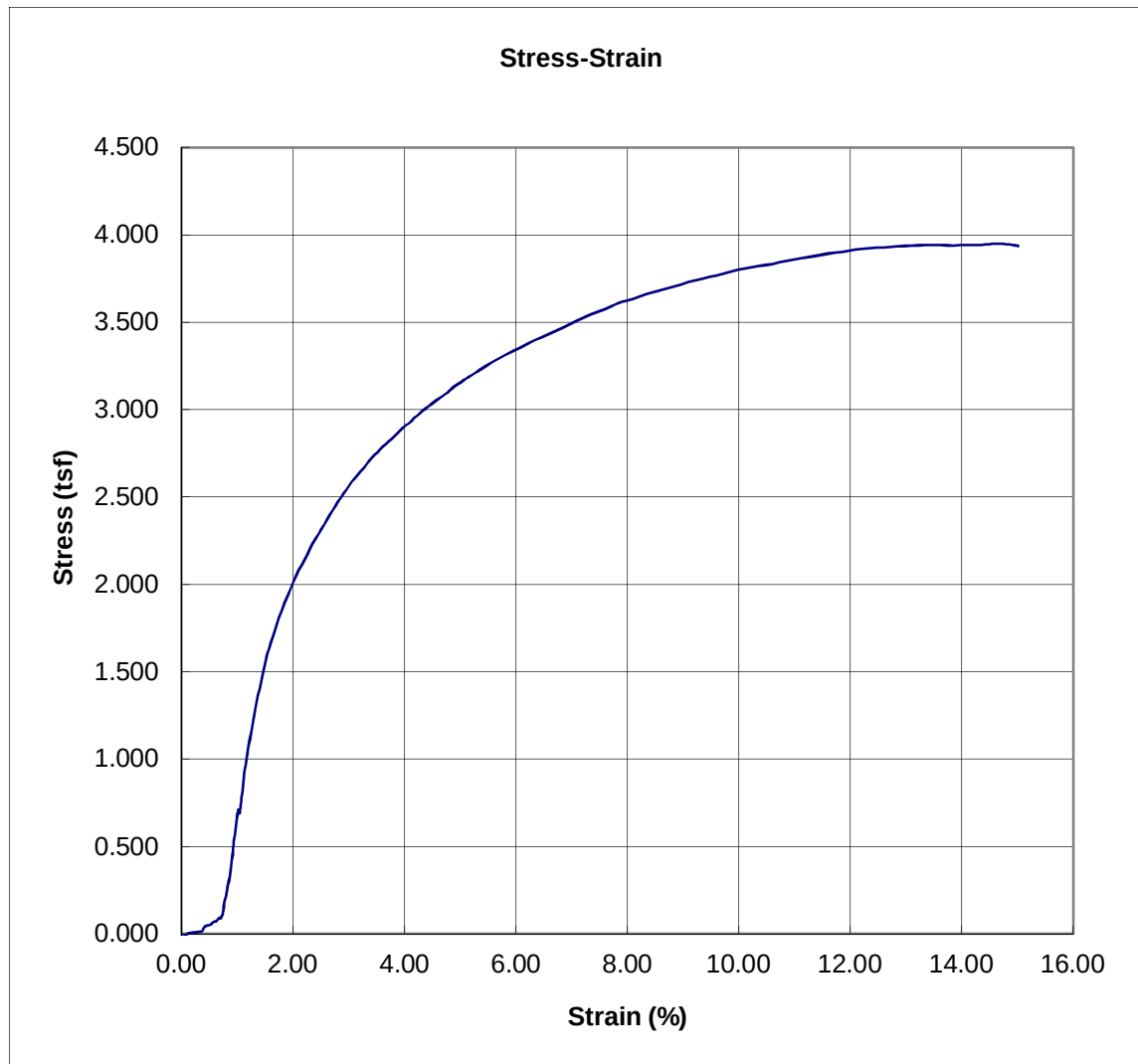
Unconsolidated-Undrained Triaxial Compression Test Appendix

Client: HVJ Associates, Inc.
Project: HSC ECIP
(PN: HG1910092.2.1)
Specimen: ECP-2003 (11Q/B) at 23-25 ft

Beyond PN.: LT2001012
Test Method: ASTM D2850
Test Date: 03/05/20

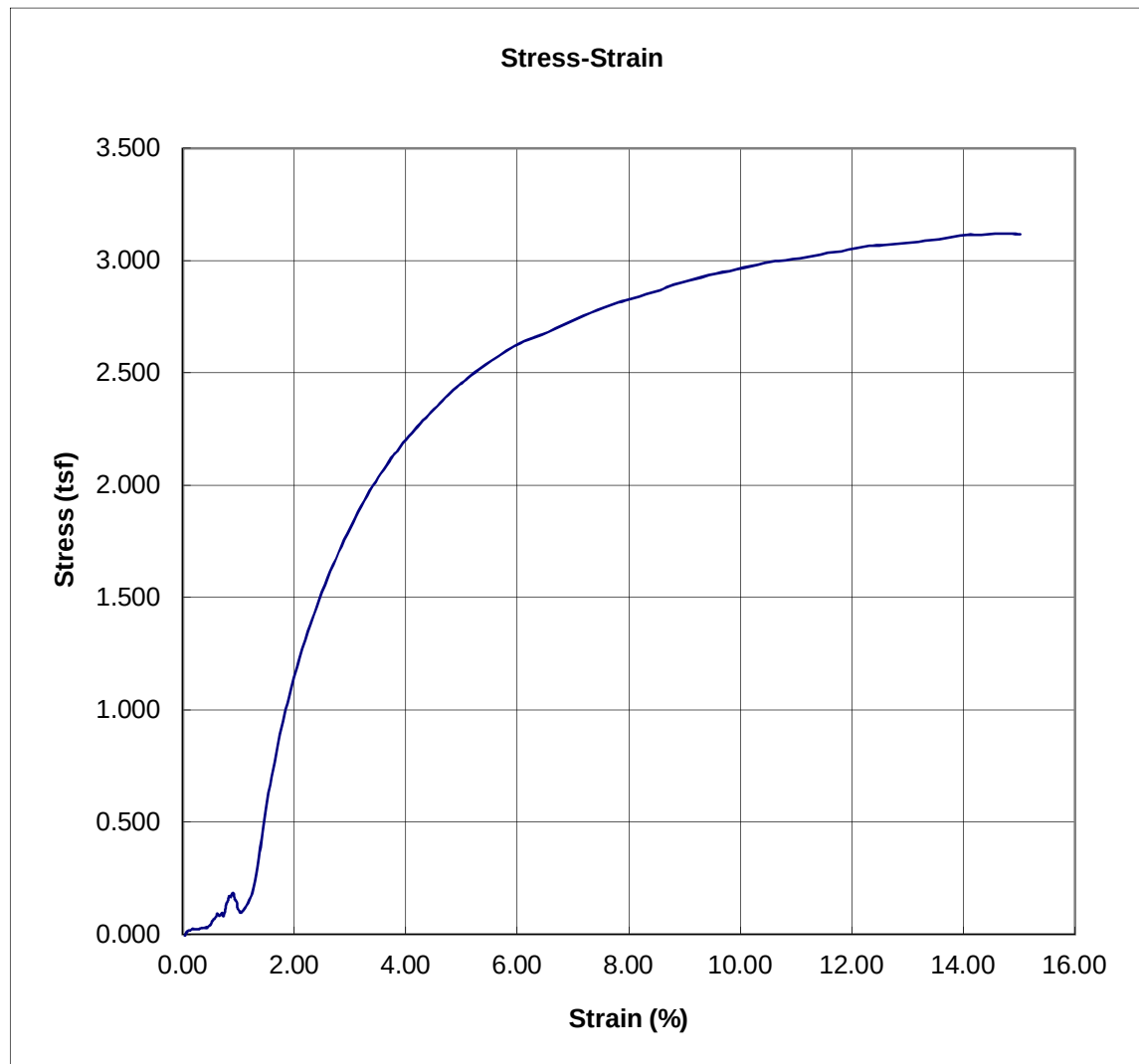


Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2003
Depth: 28'-30'



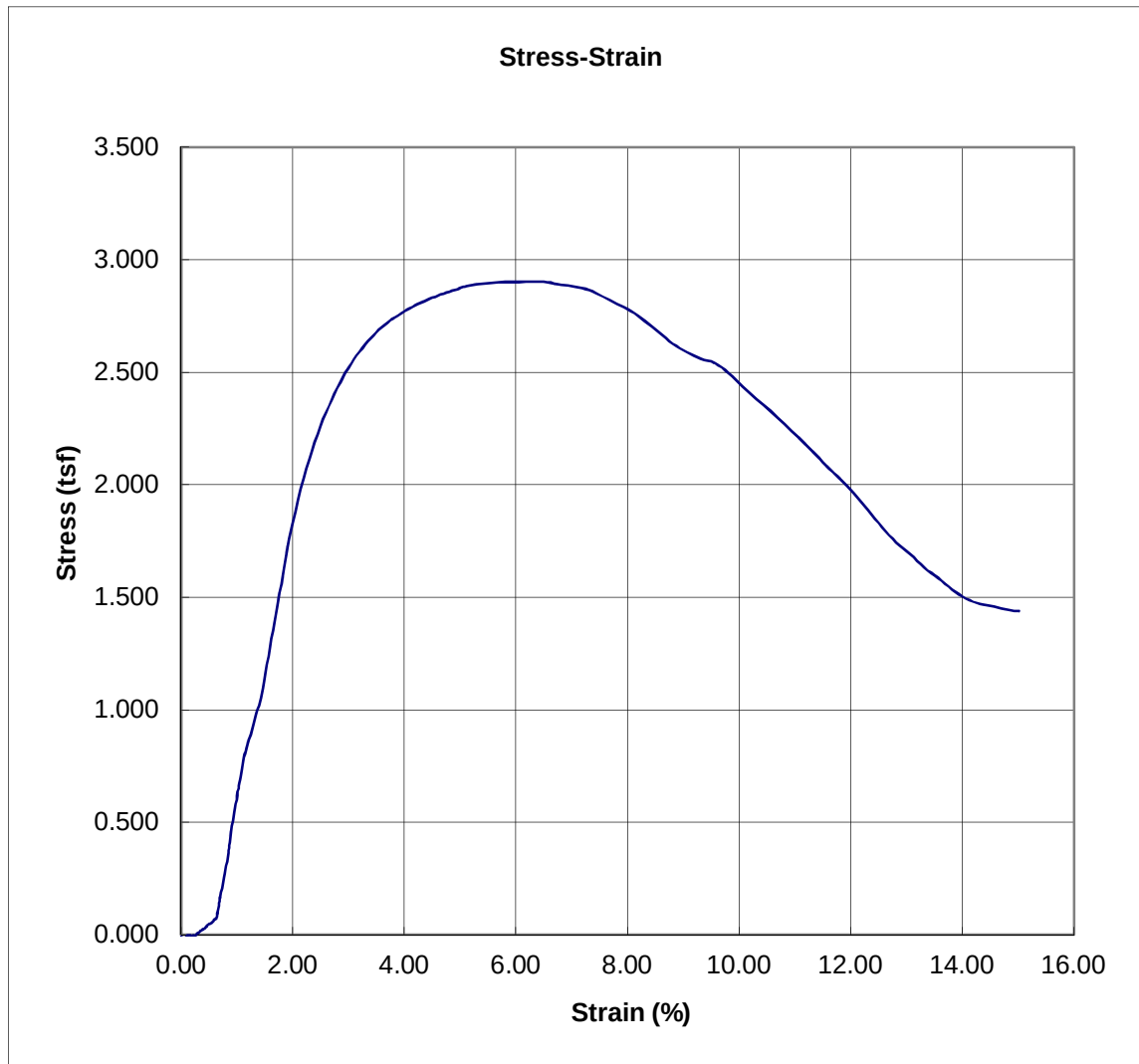
Peak Point	14.61	3.949
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2003
Depth: 48'-50'



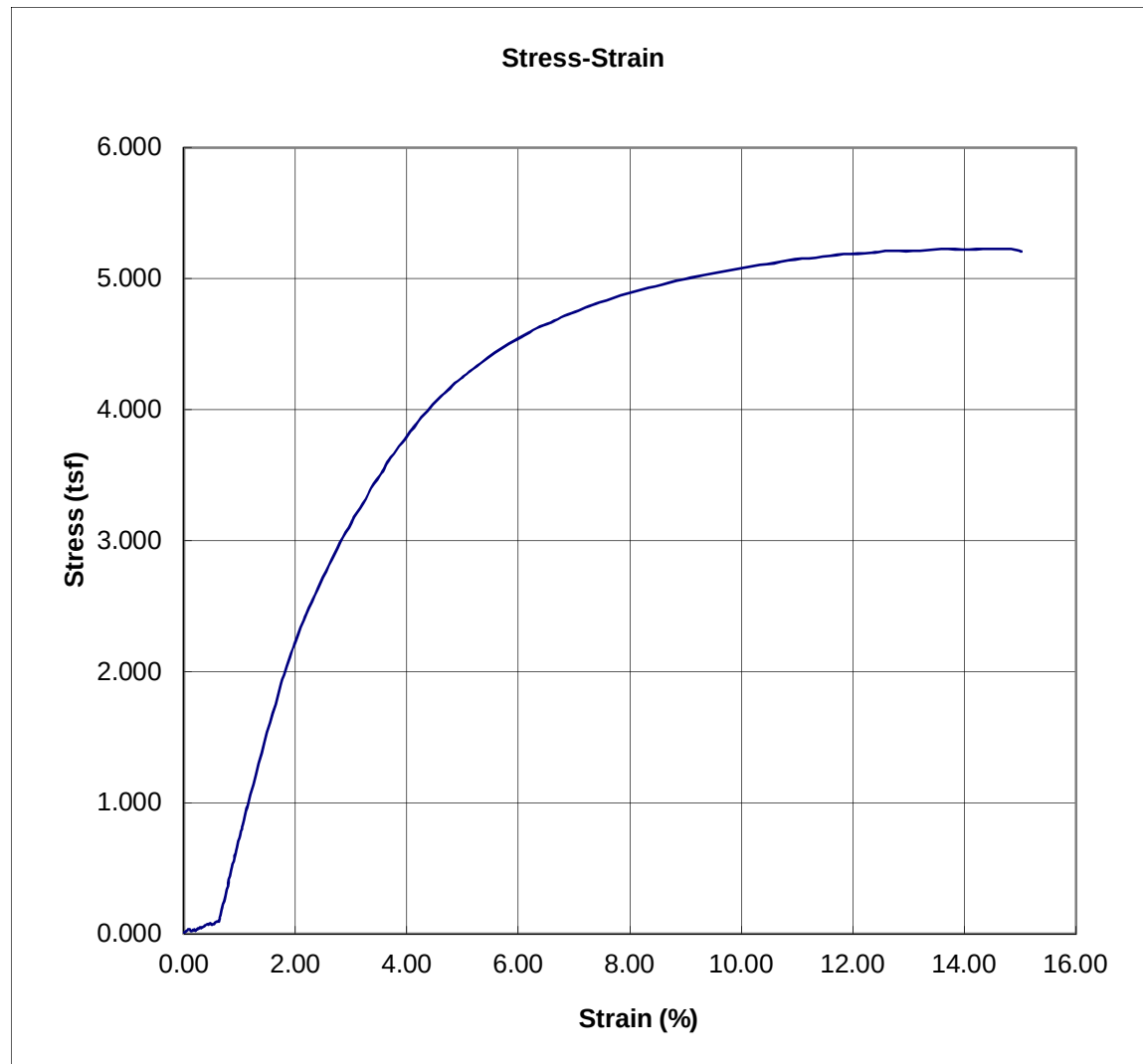
Peak Point	14.82	3.120
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2004
Depth: 16'-18'



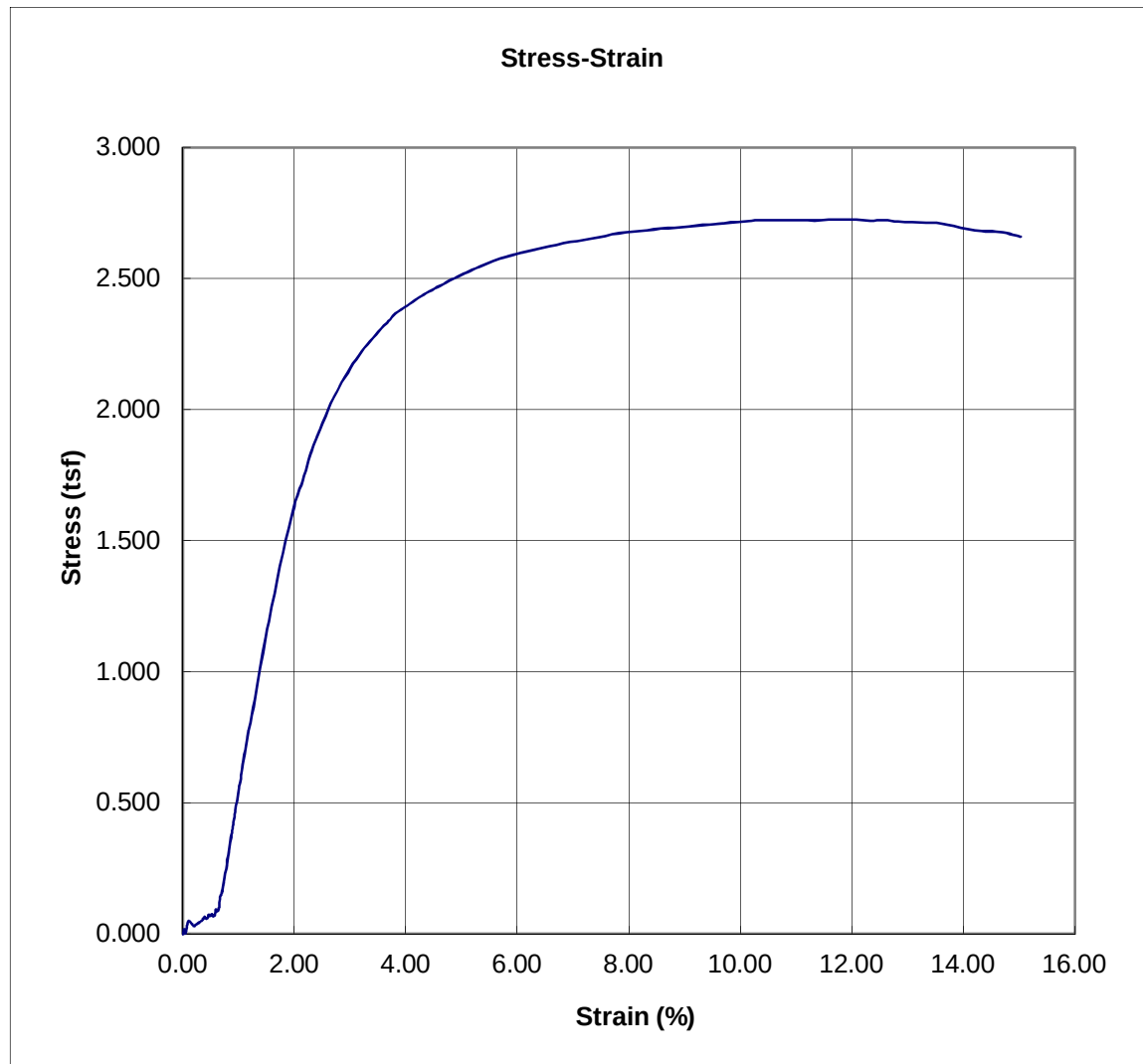
Peak Point	6.31	2.902
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2004
Depth: 28'-30'



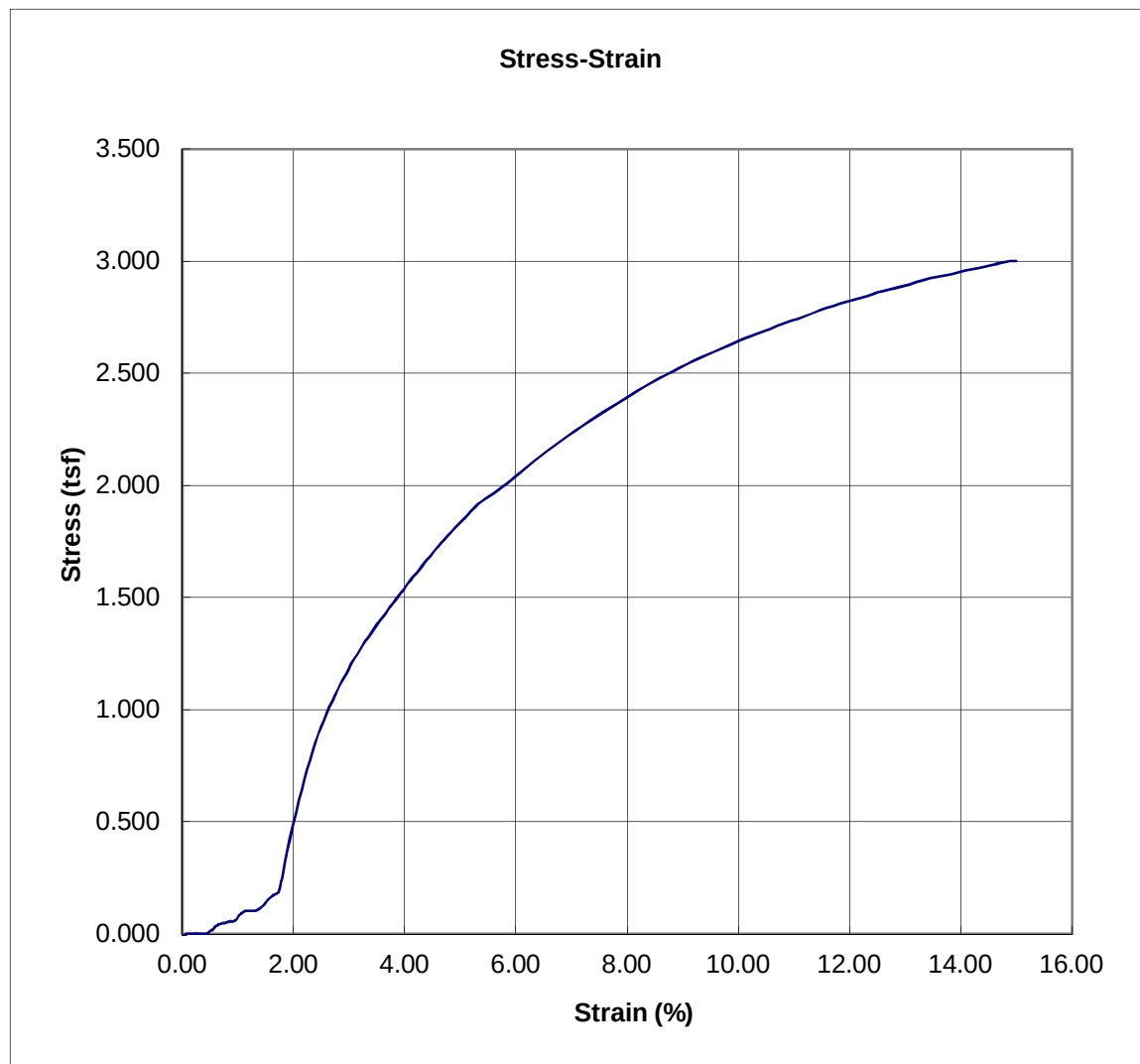
Peak Point	14.59	5.227
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2005
Depth: 16'-18'



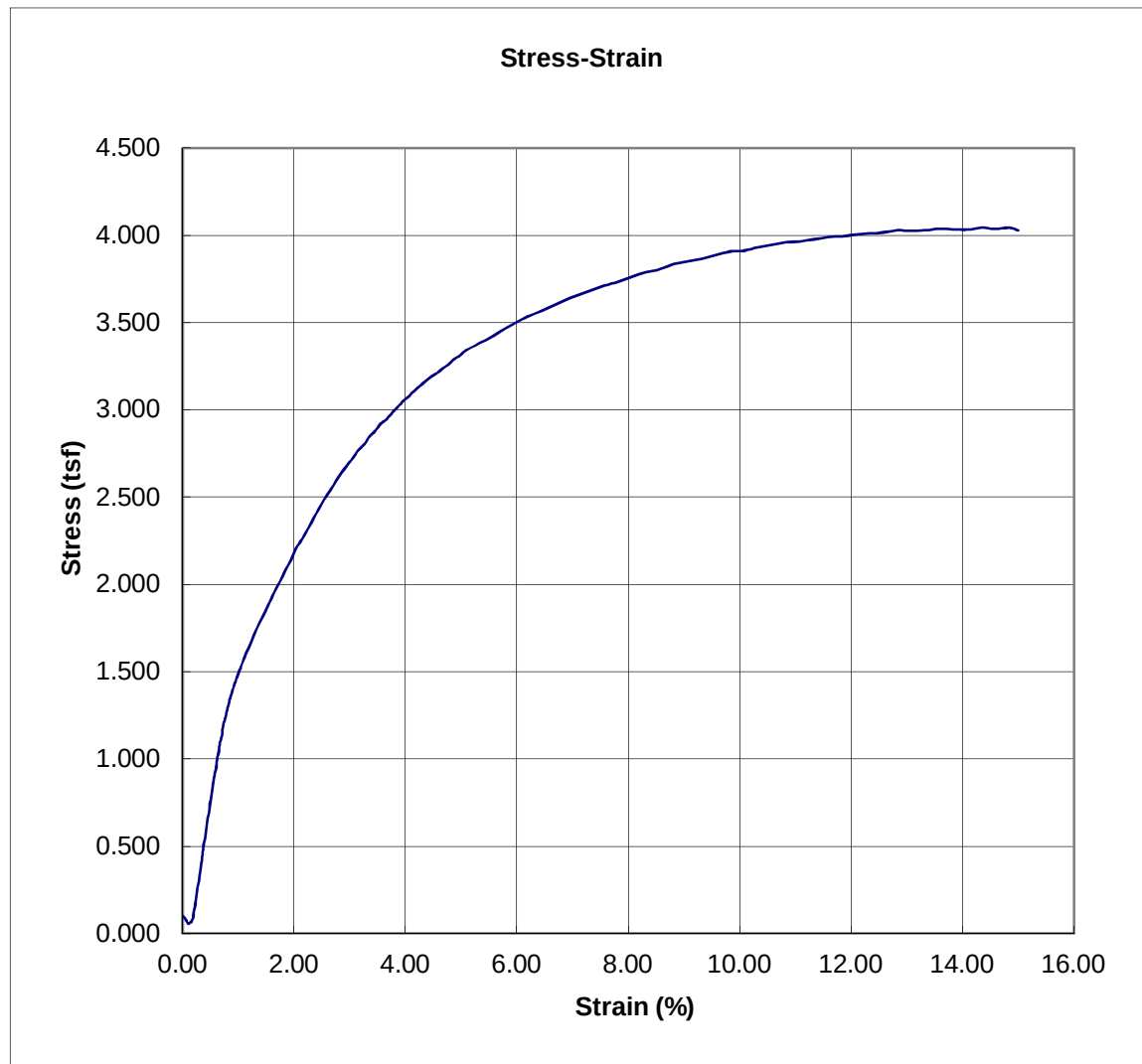
Peak Point	11.83	2.725
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2005
Depth: 23'-25'



Peak Point	15.00	3.001
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2005
Depth: 28'-30'



Peak Point	14.33	4.043
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Beyond Engineering & Testing, LLC
3801 Doris Lane, Suite B
Round Rock, TX 78664
(512) 358-6048

Unconsolidated-Undrained Triaxial Compression Test

Client: HVJ Associates, Inc.

Beyond PN.: LT2001012

Type of Specimen: Shelby Tube

Project: HSC ECIP
(PN: HG1910092.2.1)

Test Method: ASTM D2850

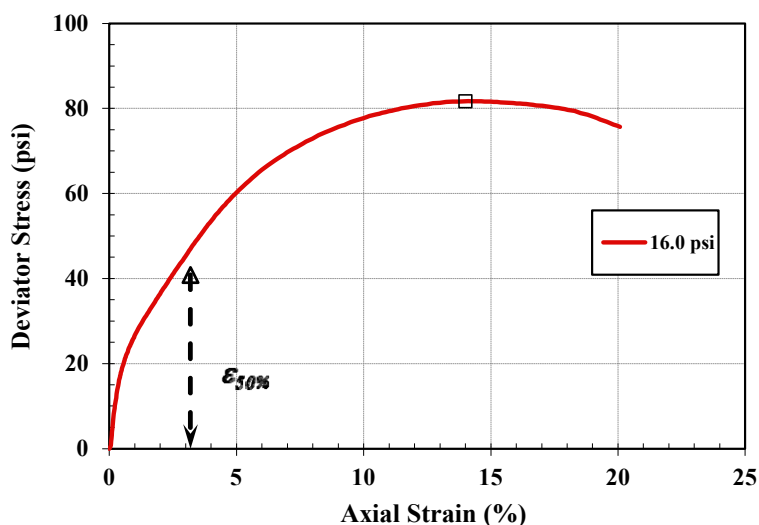
Strain Rate (%/min): 1 % / min

Test Date: 3/5/2020

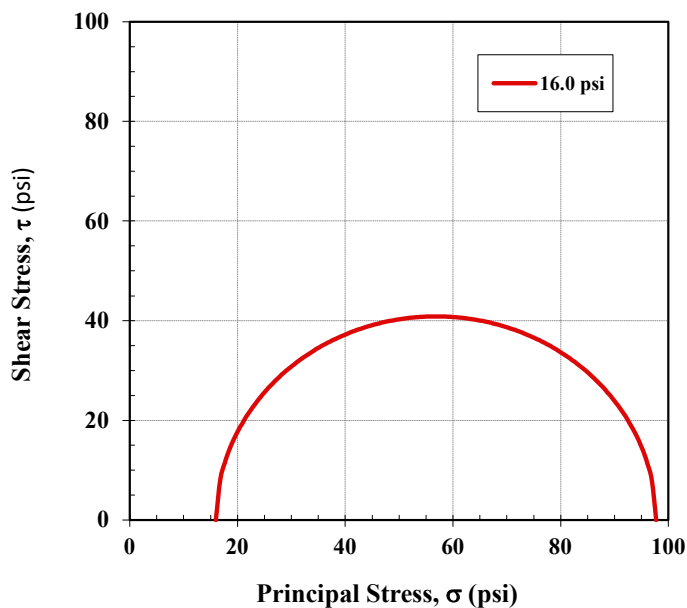
Type of Test: Q-Test

Sample No.: ECP-2005 (13Q/B) at 33-35 ft

Principal Stress Difference vs. Axial Strain



Mohr Circles (Total Stress) for Peak Stress at Failure



Initial Specimen Conditions		
Confining Pressure (psi)		16.0
Avg. Diameter (in)	D _o	2.79
Avg. Height (in)	H _o	5.58
In-situ Water Content (%)	w _o	15.5
Total Unit Weight (pcf)	γ _{total}	136.1
Dry Unit Weight (pcf)	γ _{dry}	117.8
Saturation (%)	S _r	97.0
Void Ratio	e _o	0.43
Specific Gravity (Assumed)	G _s	2.70

Stresses at Failure	
Maximum Deviator Stress (psi)	81.7
Axial Strain at Failure (%)	14.0
Axial Strain at 50% of q _u , ε ₅₀ (%)	3.2
Total Stresses at Failure	
Major Principal Stress Corrected, σ _{1C} (psi)	97.7
Minor Principal Stress, σ ₃ (psi)	16.0

Test Results	
Unconsolidated-Undrained Compressive Strength at Failure, σ _{1C} - σ ₃ (tsf)	5.88

Note: The test specimen was partially saturated. Failure was determined at the maximum deviator stress or deviator stress at 15 % axial strain, whichever is obtained first.

Olga Vasquez, 03/05/20

Analysis & Quality Review/Date
Specimen Prepared by: T.D.

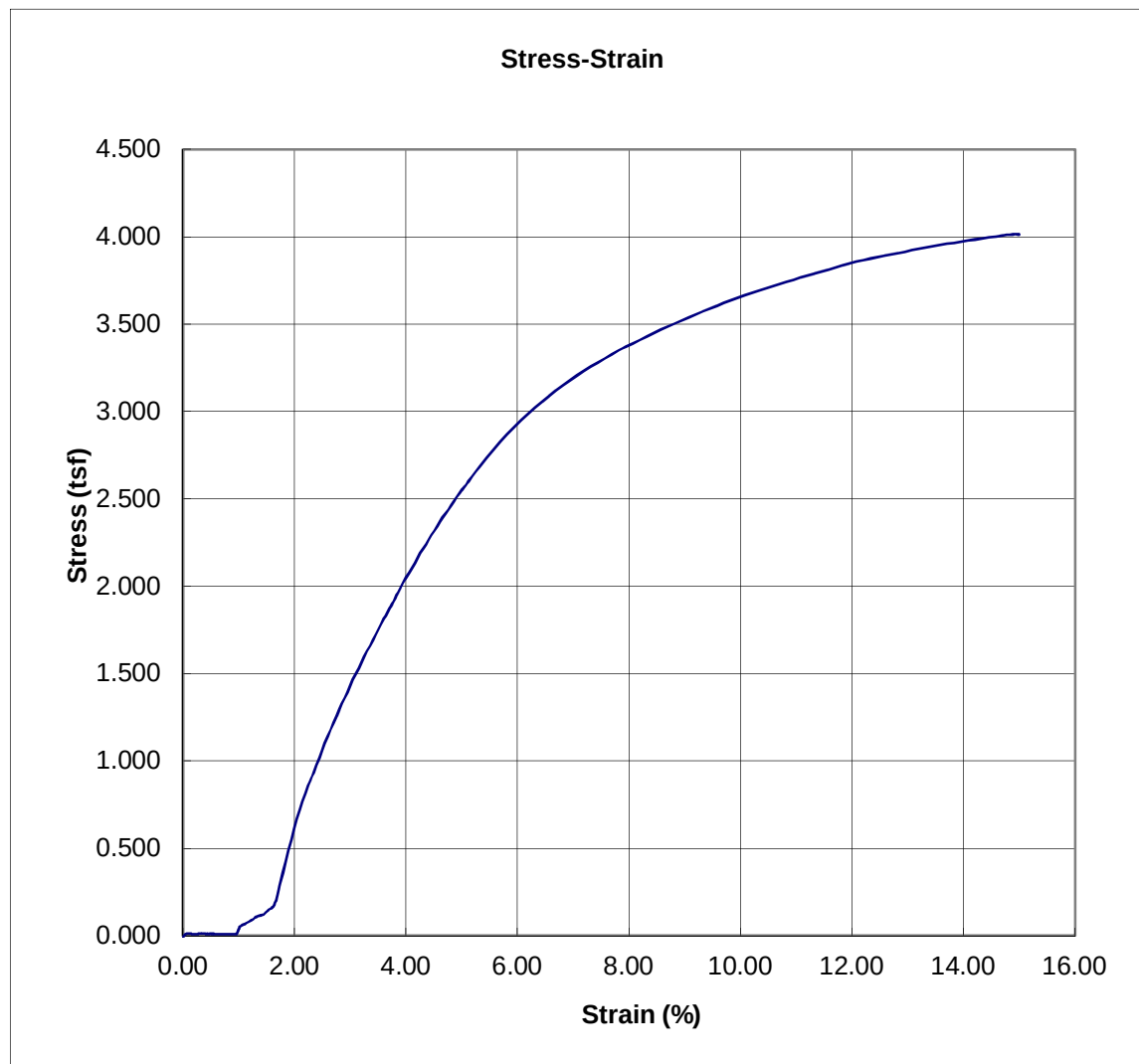
Unconsolidated-Undrained Triaxial Compression Test Appendix

Client: HVJ Associates, Inc.
Project: HSC ECIP
(PN: HG1910092.2.1)
Specimen: ECP-2005 (13Q/B) at 33-35 ft

Beyond PN.: LT2001012
Test Method: ASTM D2850
Test Date: 03/05/20

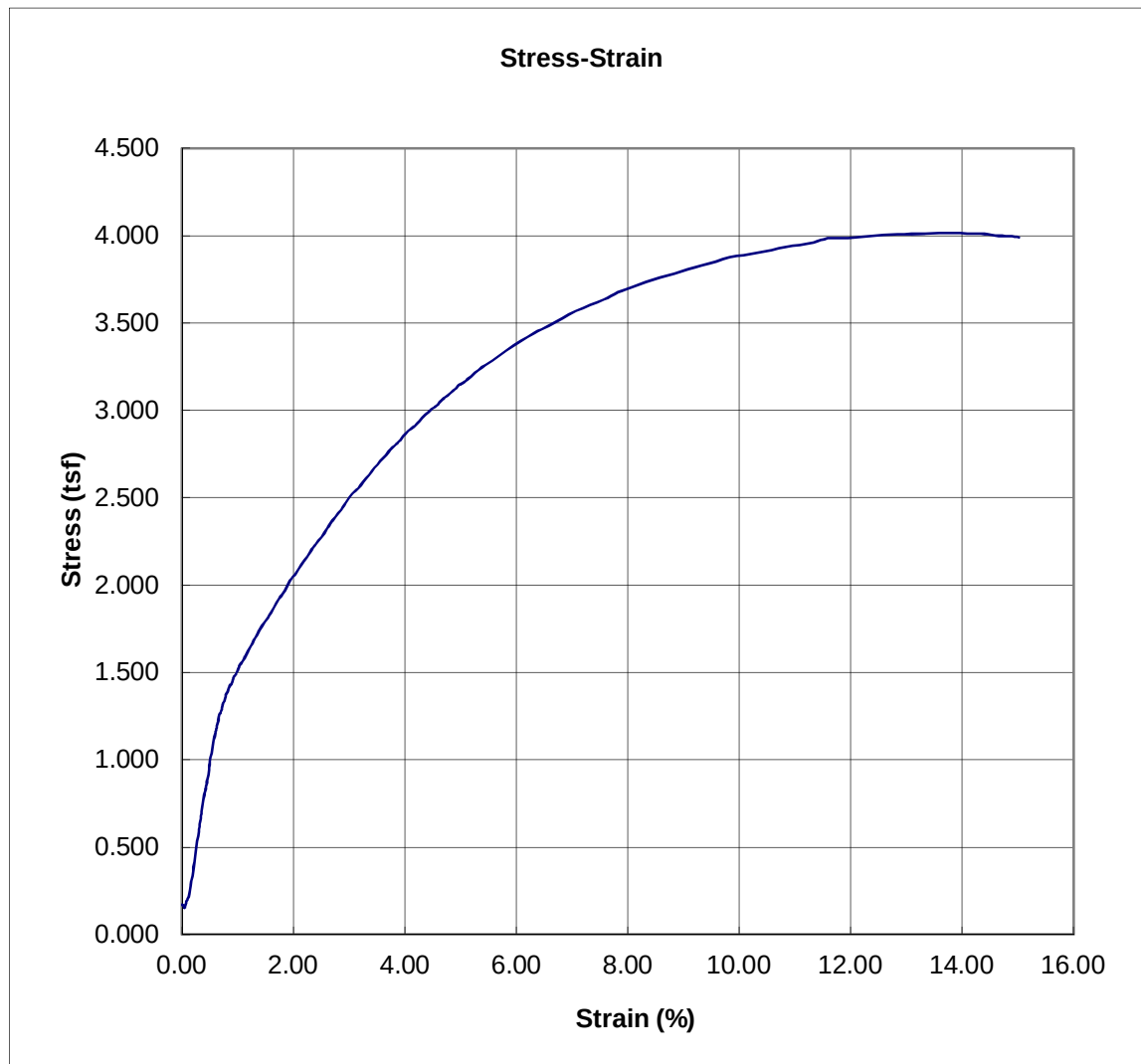


Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2006
Depth: 28'-30'



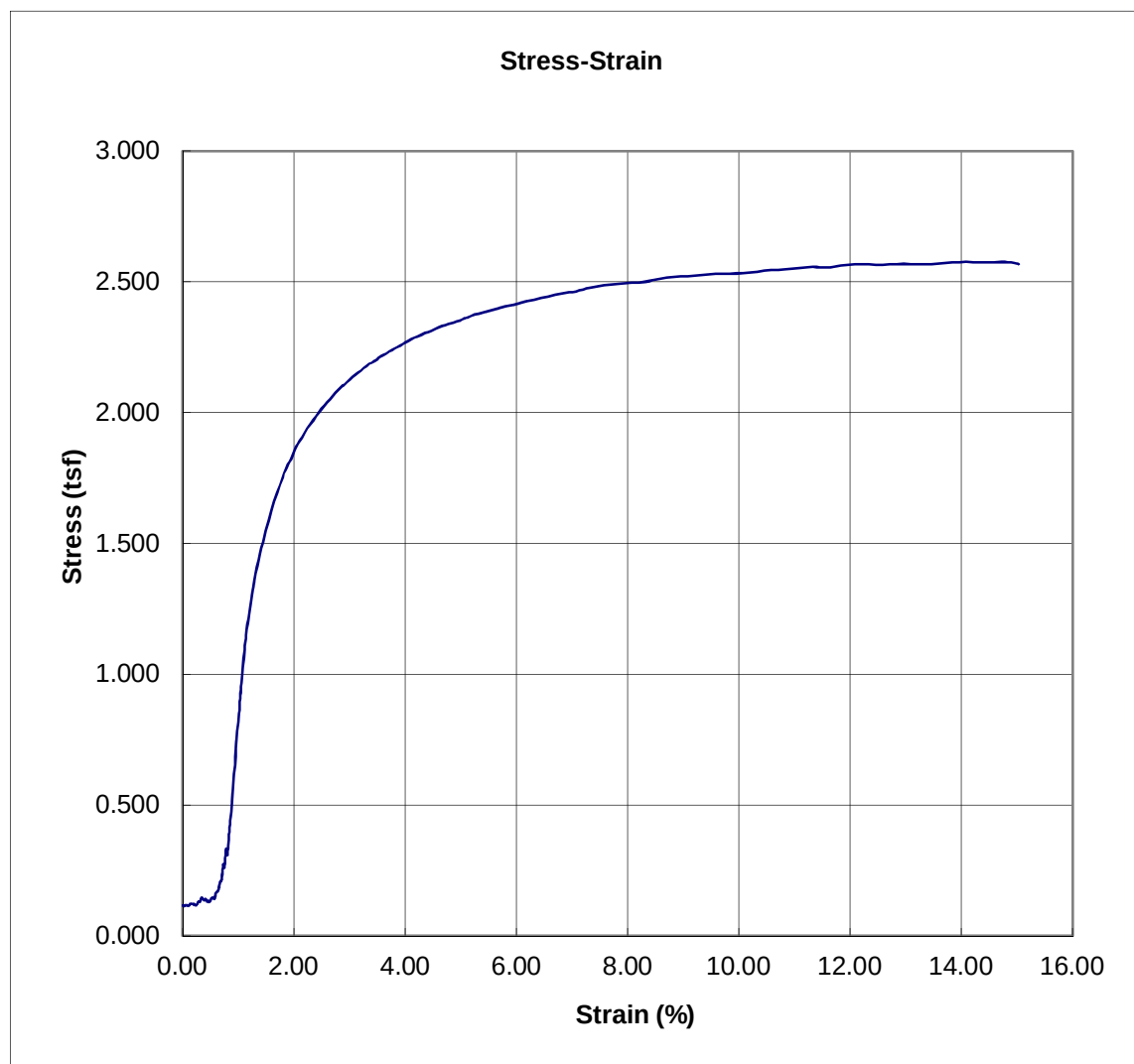
Peak Point	15.00	4.013
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2006
Depth: 33'-35'



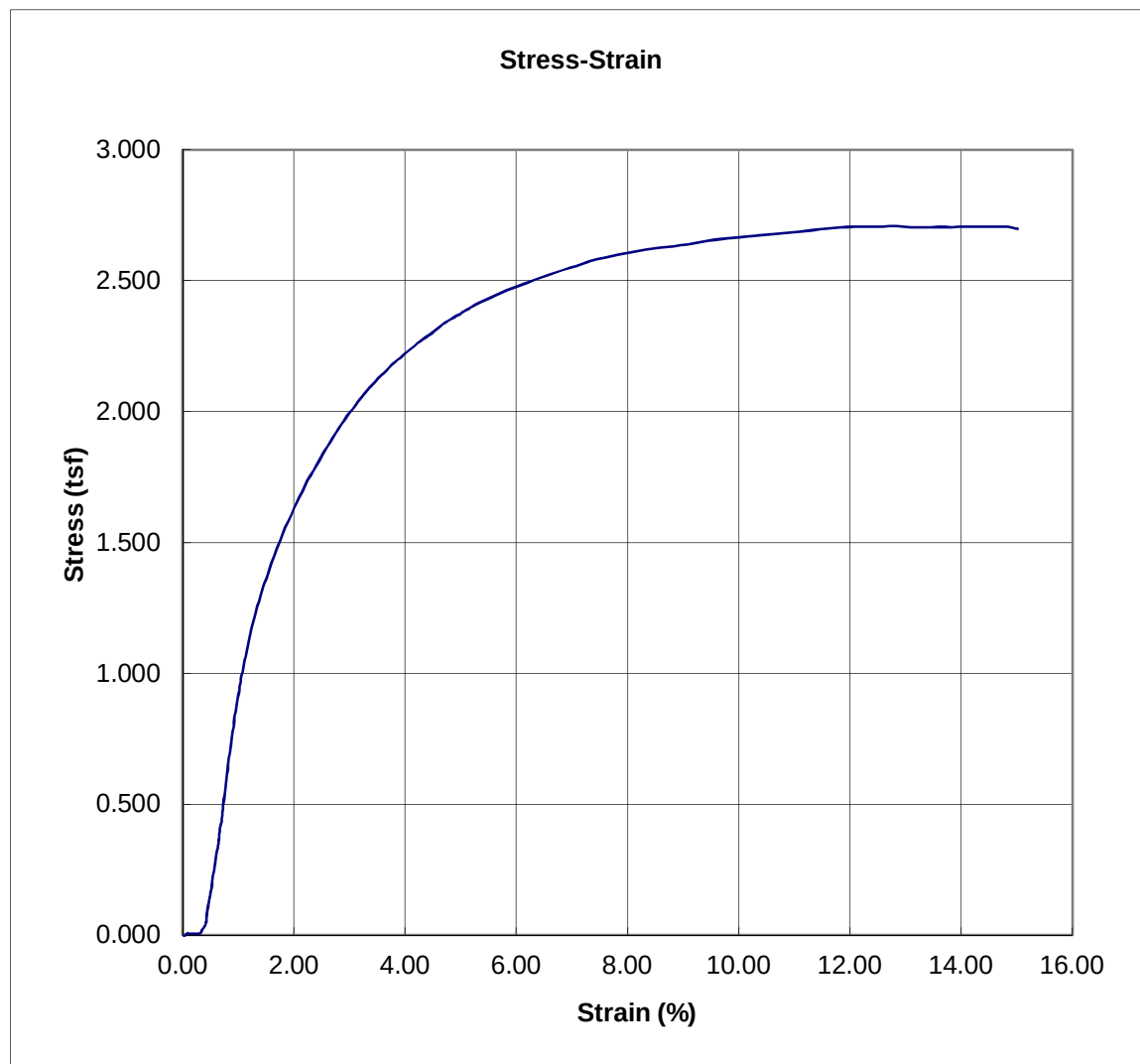
Peak Point	13.84	4.016
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2007
Depth: 16'-18'



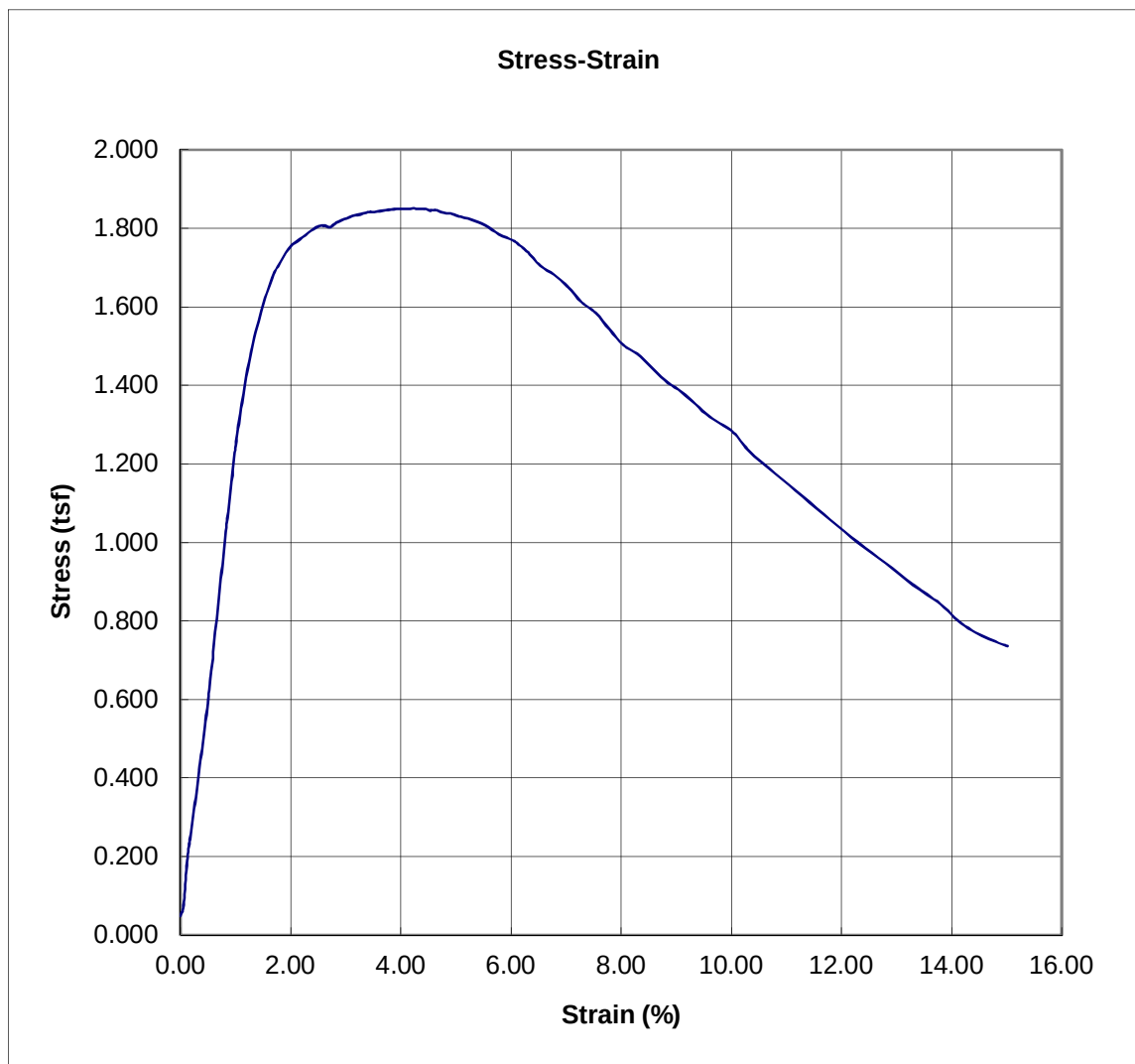
Peak Point	14.09	2.576
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2007
Depth: 33'-35'



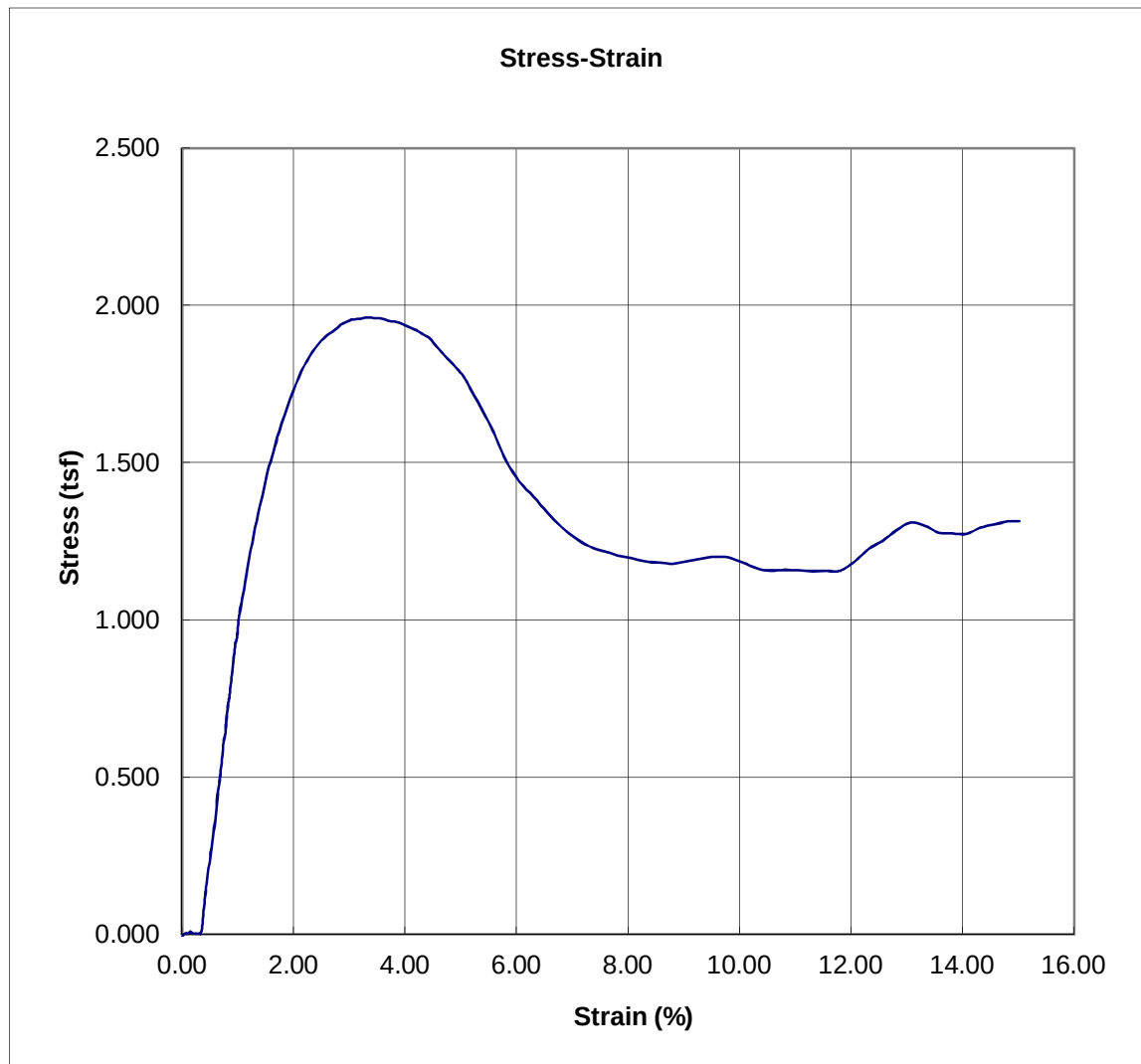
Peak Point	12.84	2.708
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2008
Depth: 12'-14'



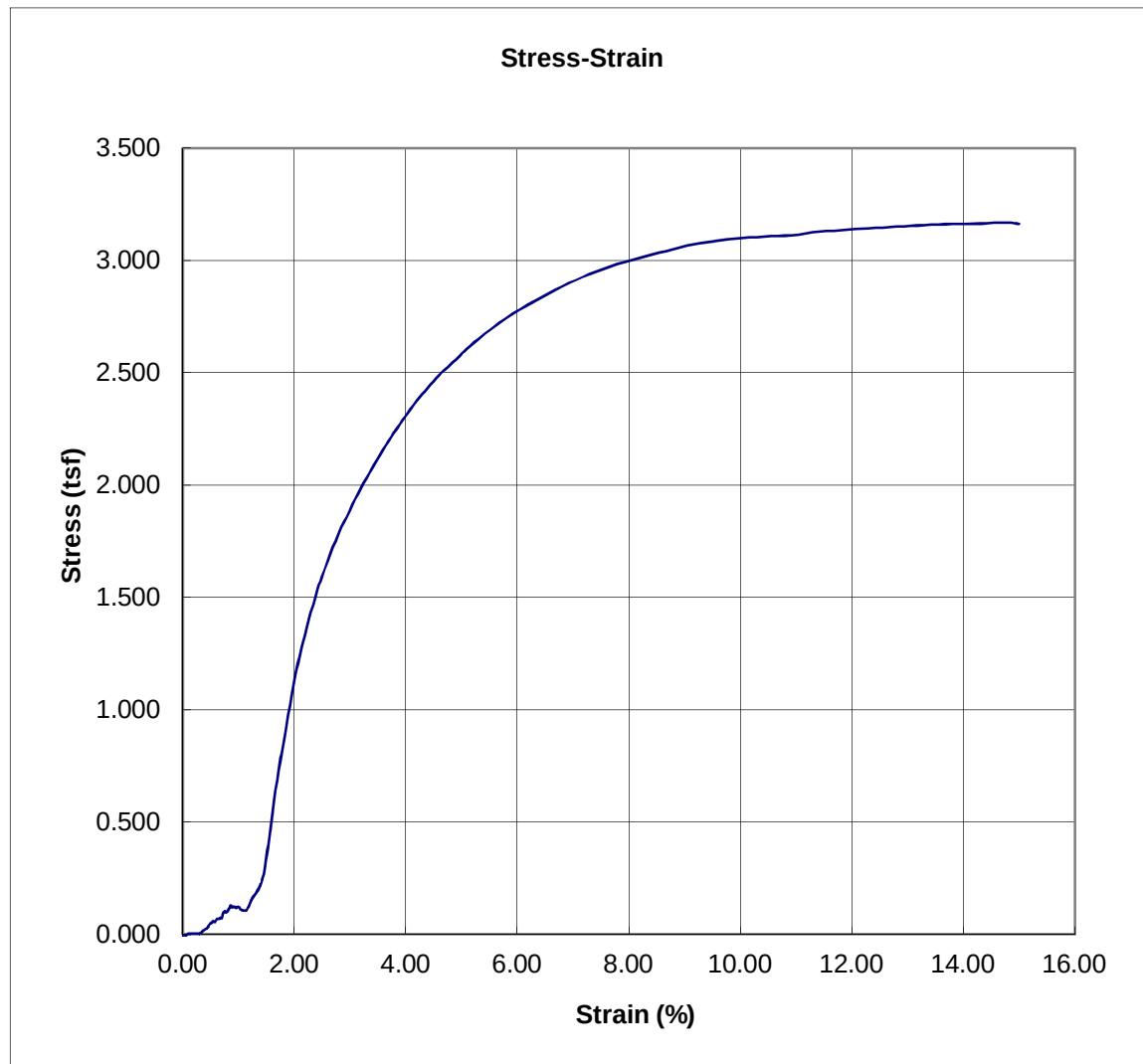
Peak Point	4.22	1.851
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2008
Depth: 18'-20'



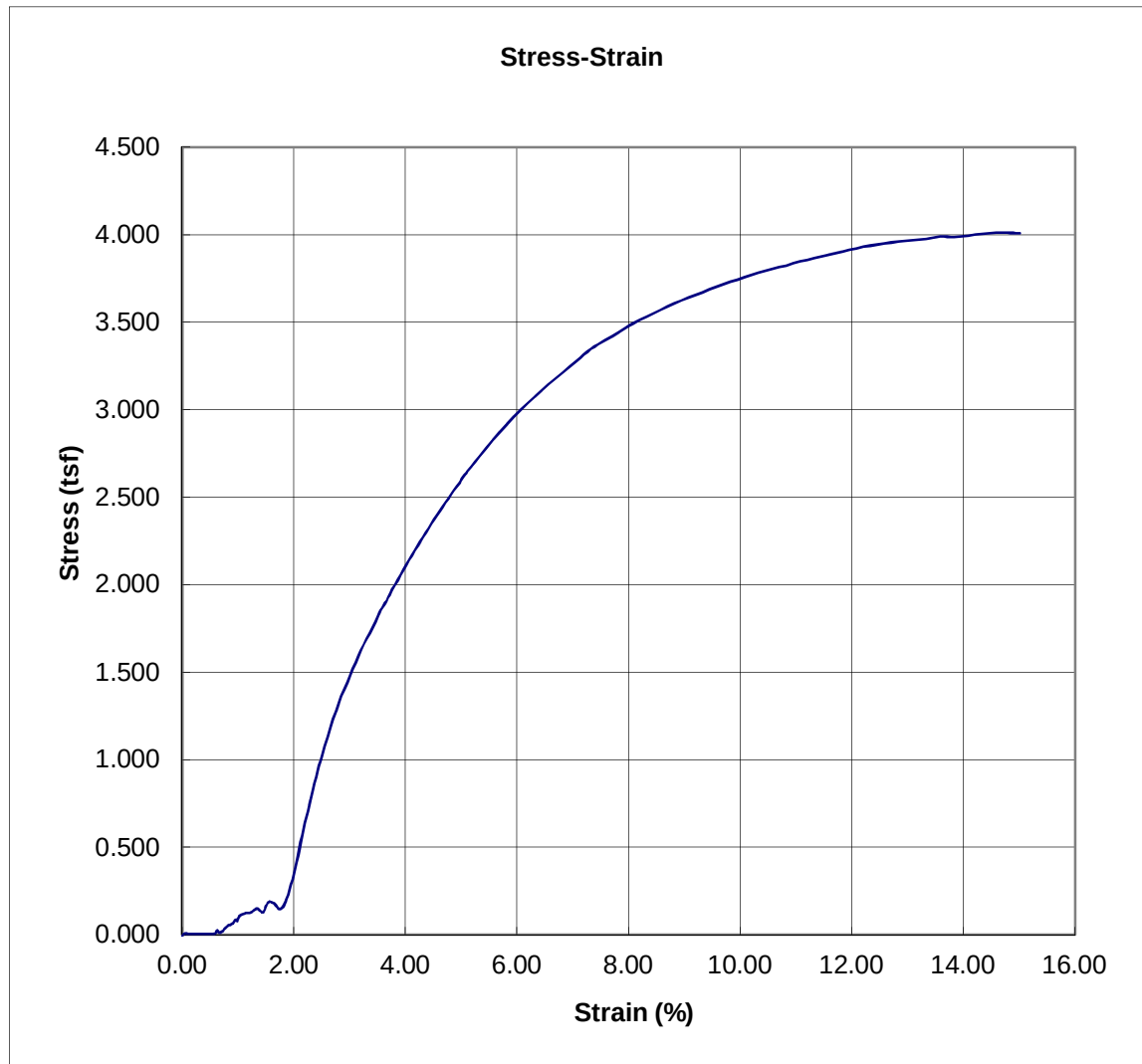
Peak Point	3.35	1.961
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2008
Depth: 28'-30'



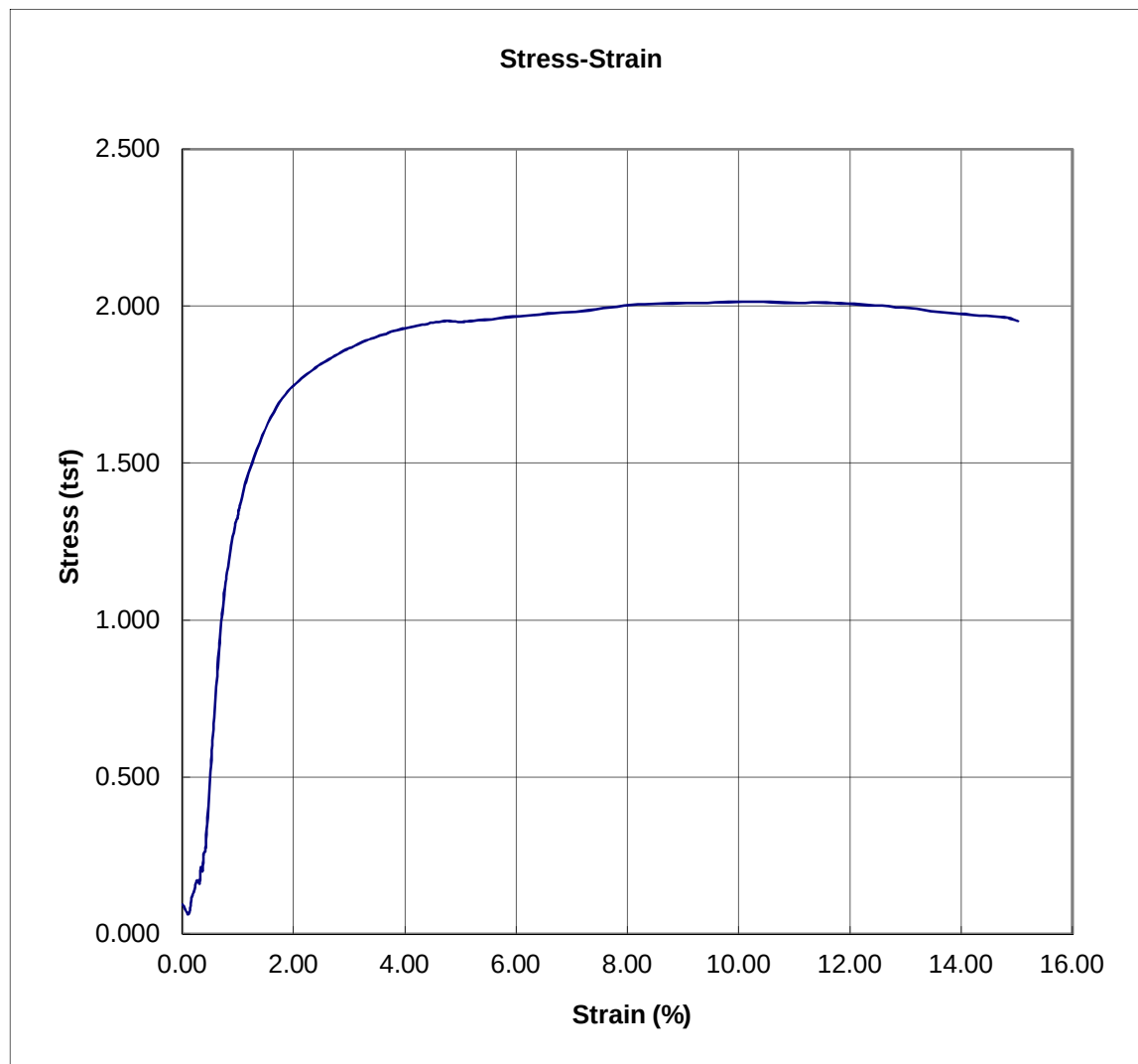
Peak Point	14.80	3.168
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2009
Depth: 28'-30'



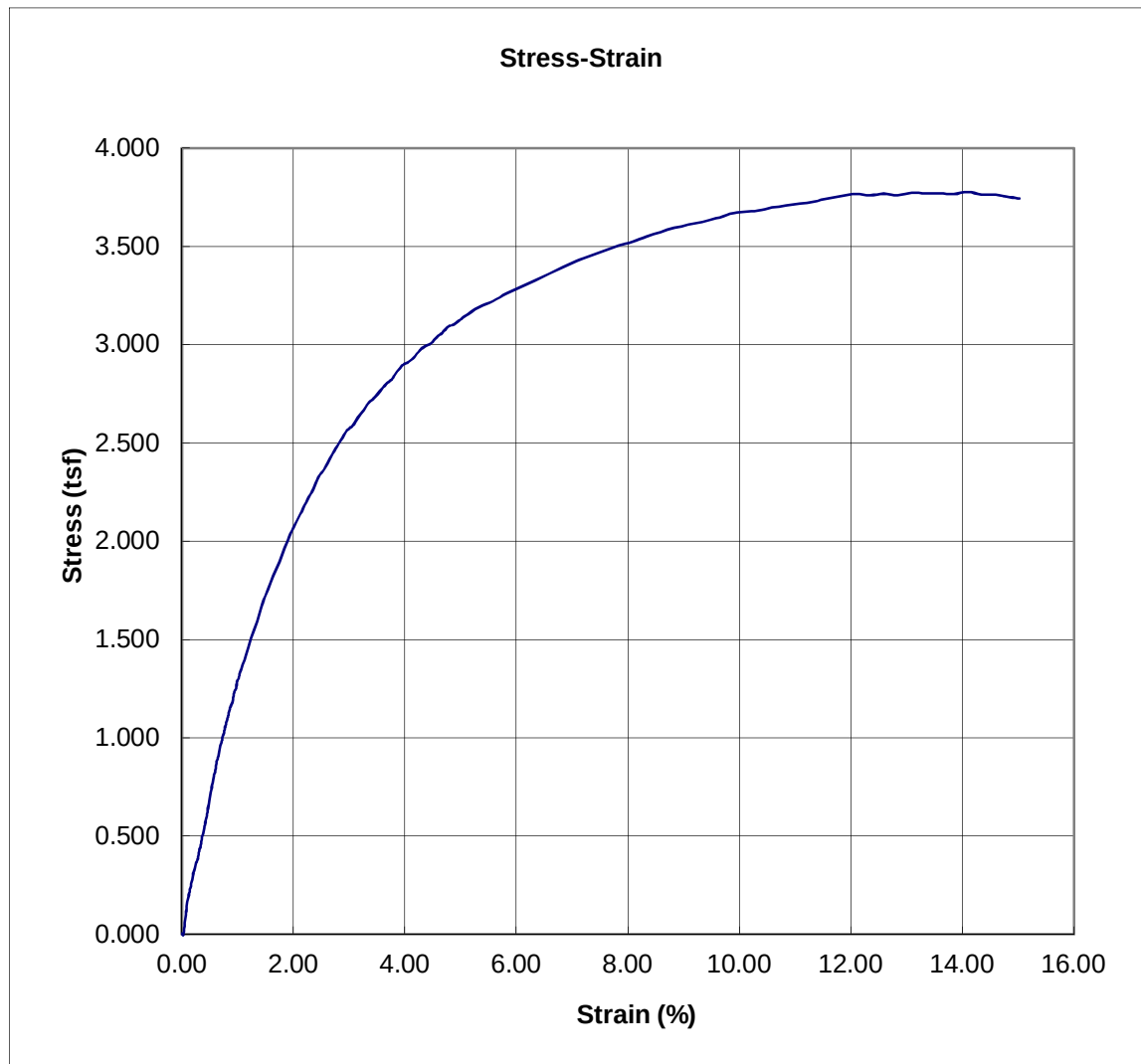
Peak Point	14.59	4.011
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2010
Depth: 14'-16'



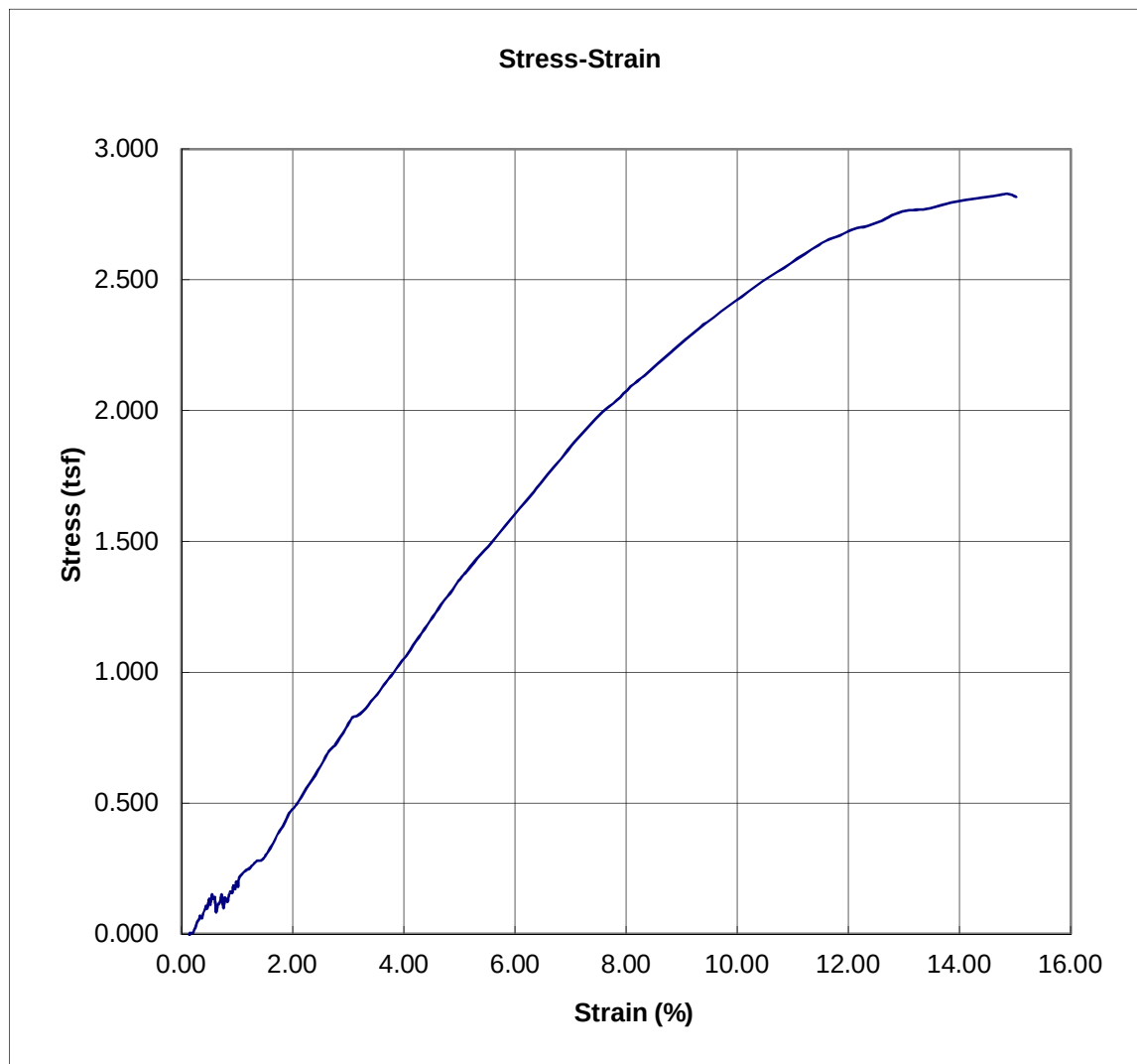
Peak Point	10.32	2.014
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2010
Depth: 28'-30'



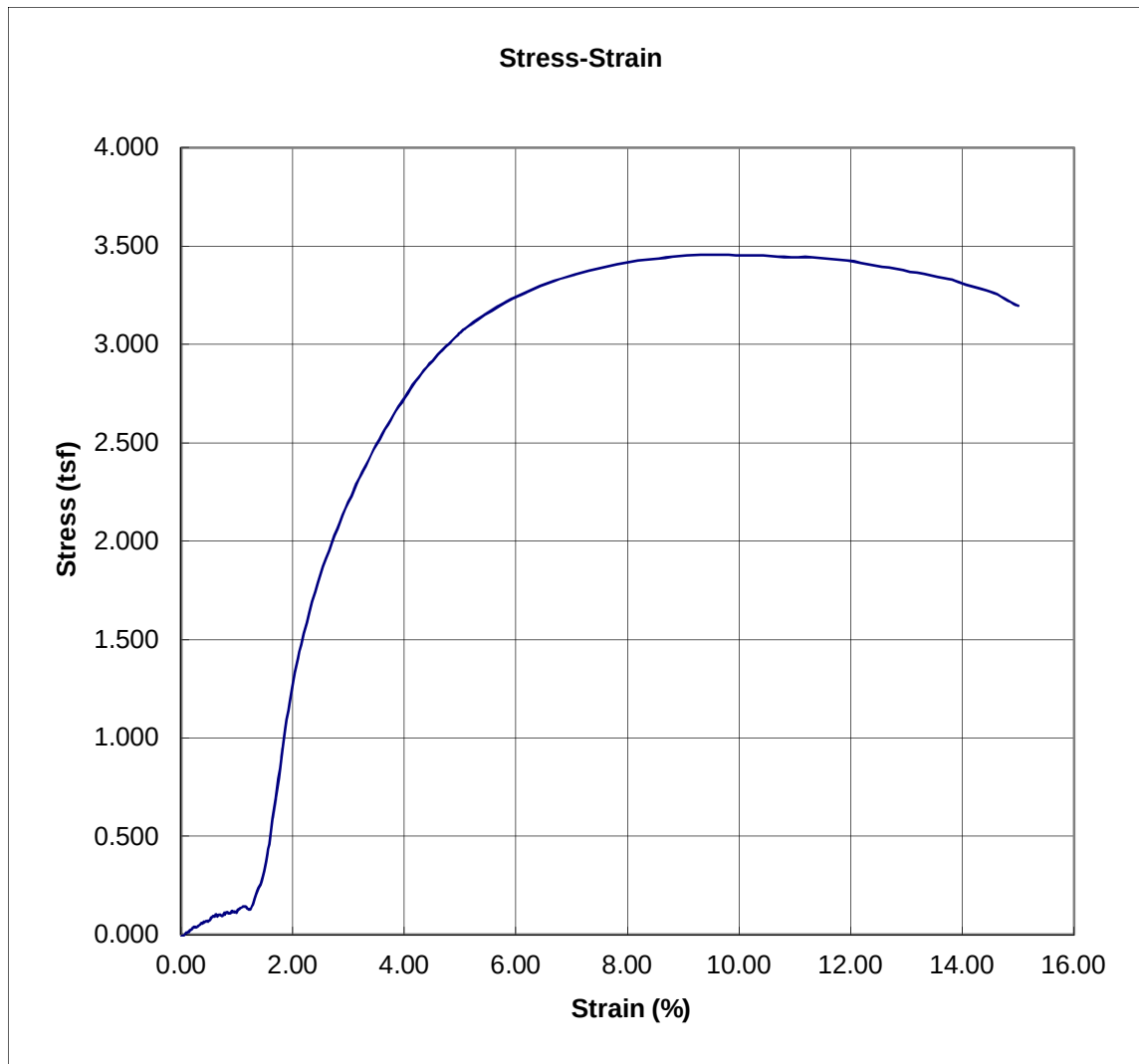
Peak Point	14.10	3.777
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2010
Depth: 33'-35'



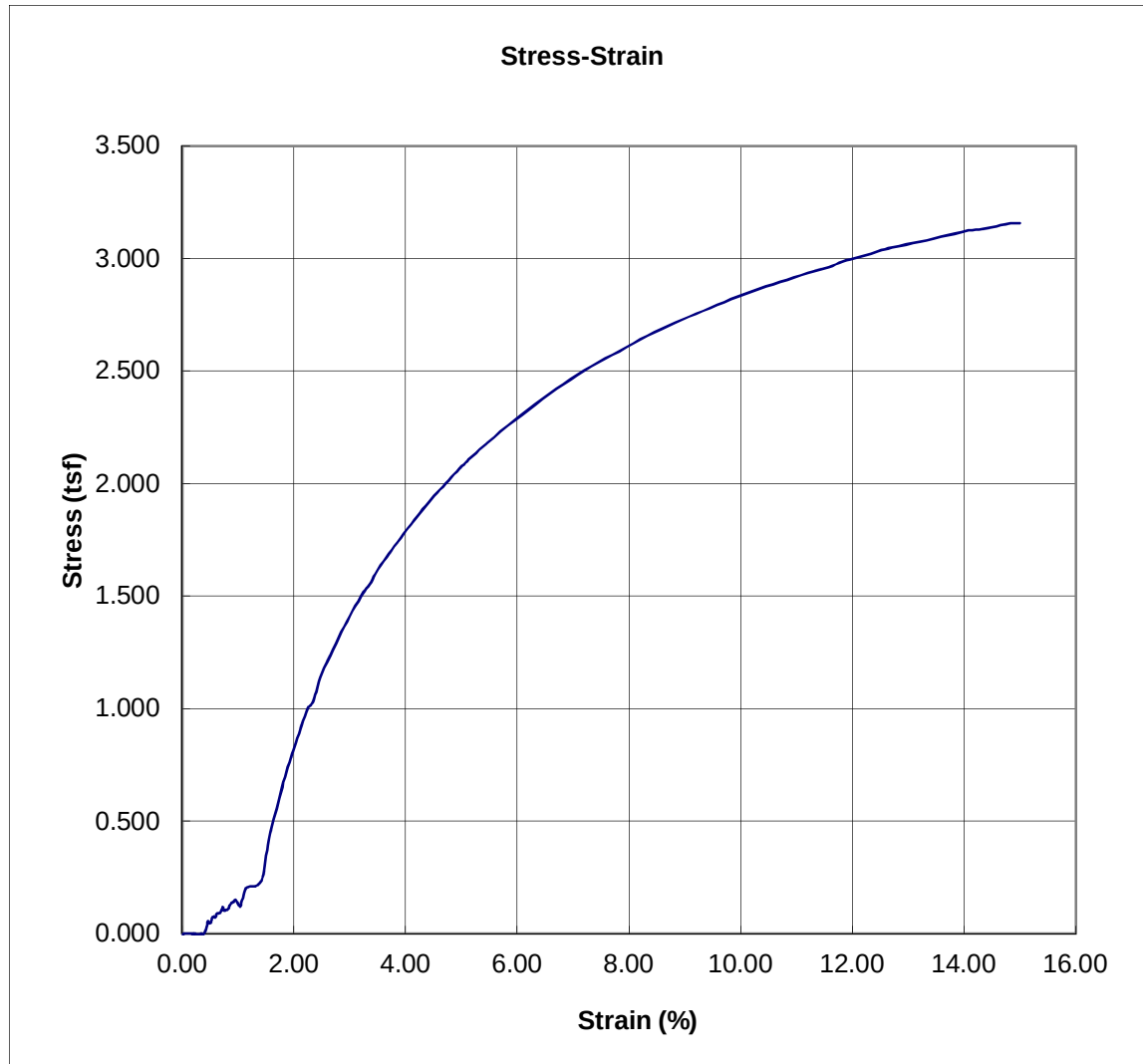
Peak Point	14.85	2.828
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2012
Depth: 18'-20'



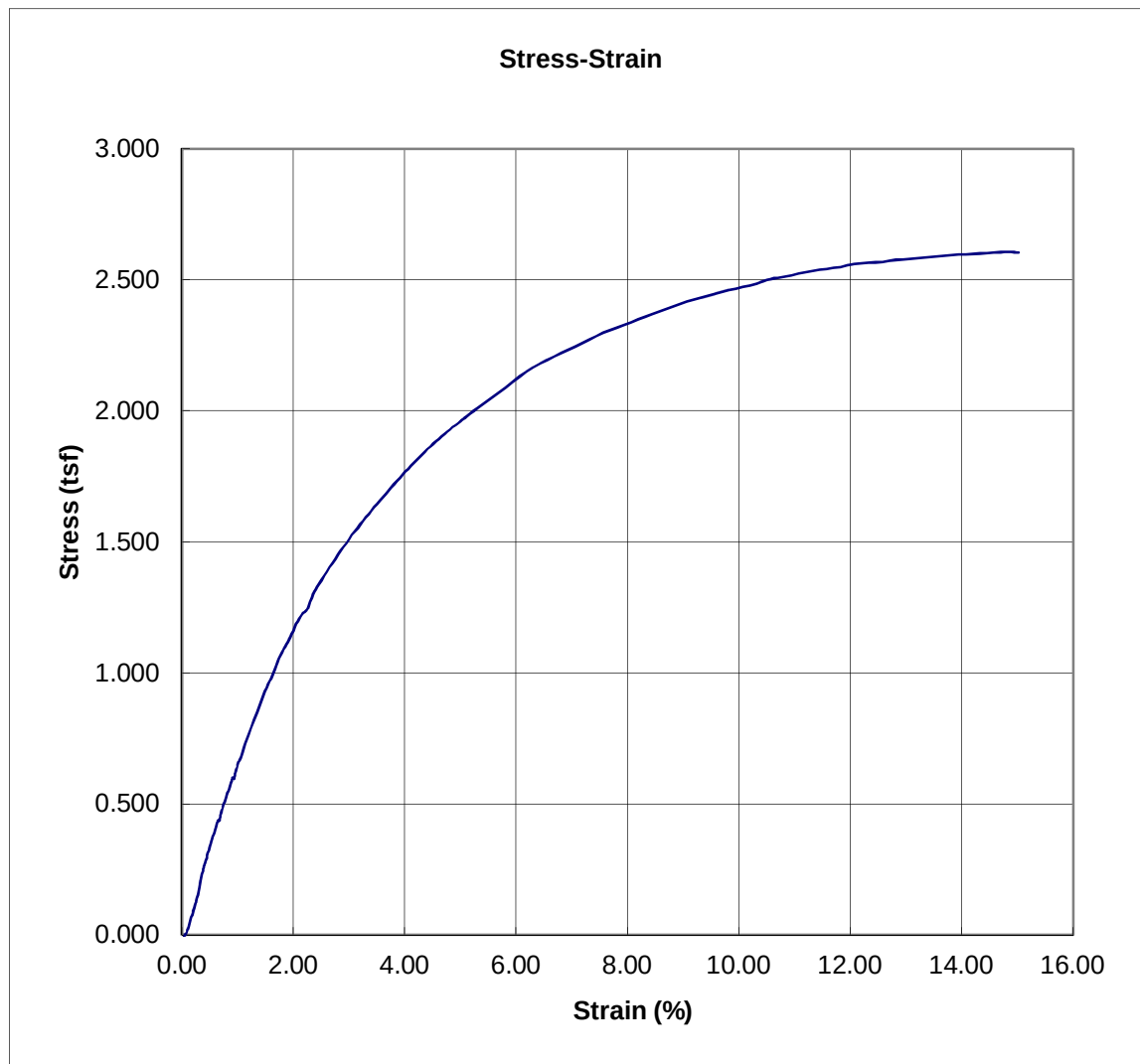
Peak Point	9.56	3.456
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2012
Depth: 23'-25'



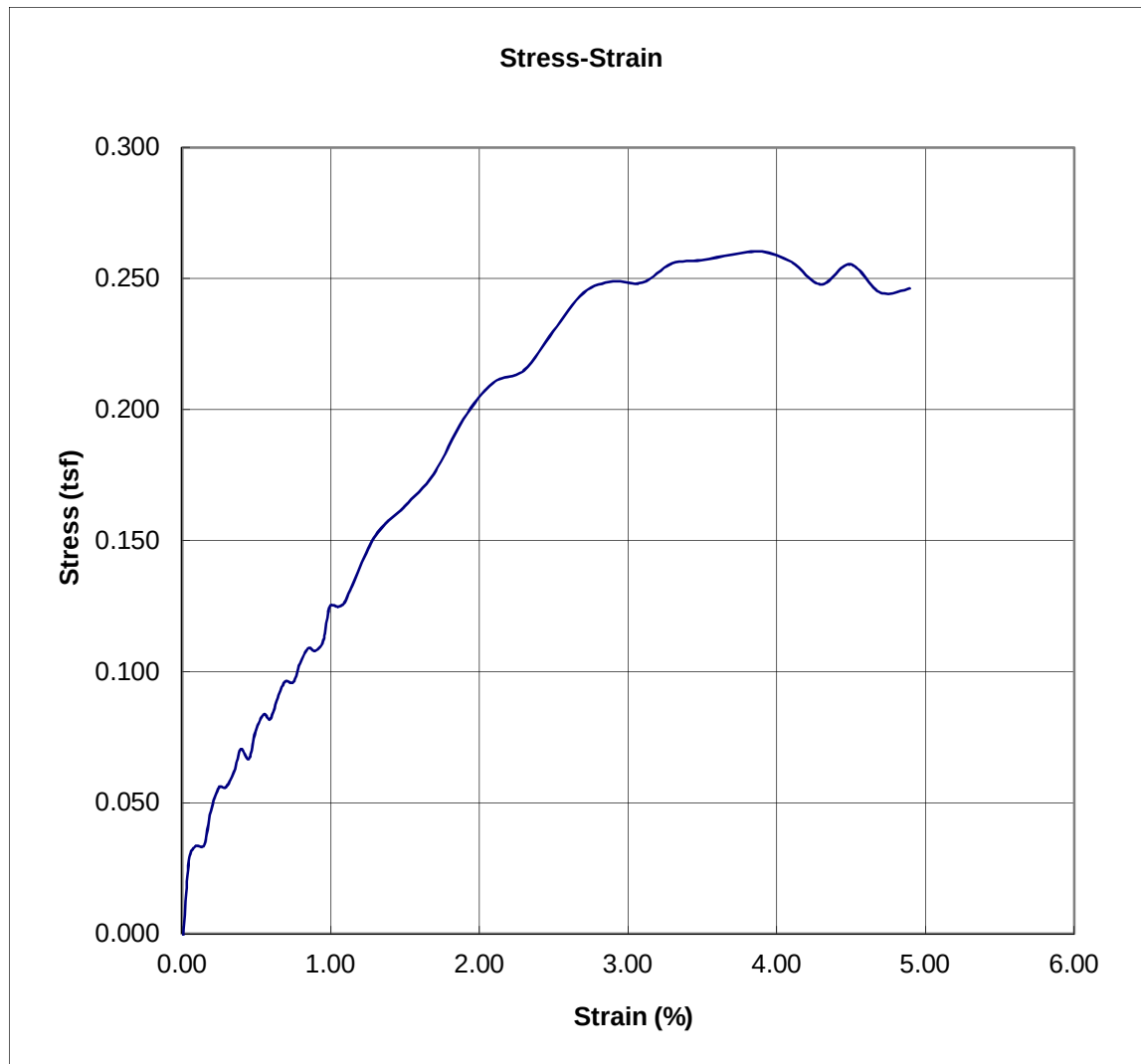
Peak Point	15.00	3.157
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2013
Depth: 28'-30'



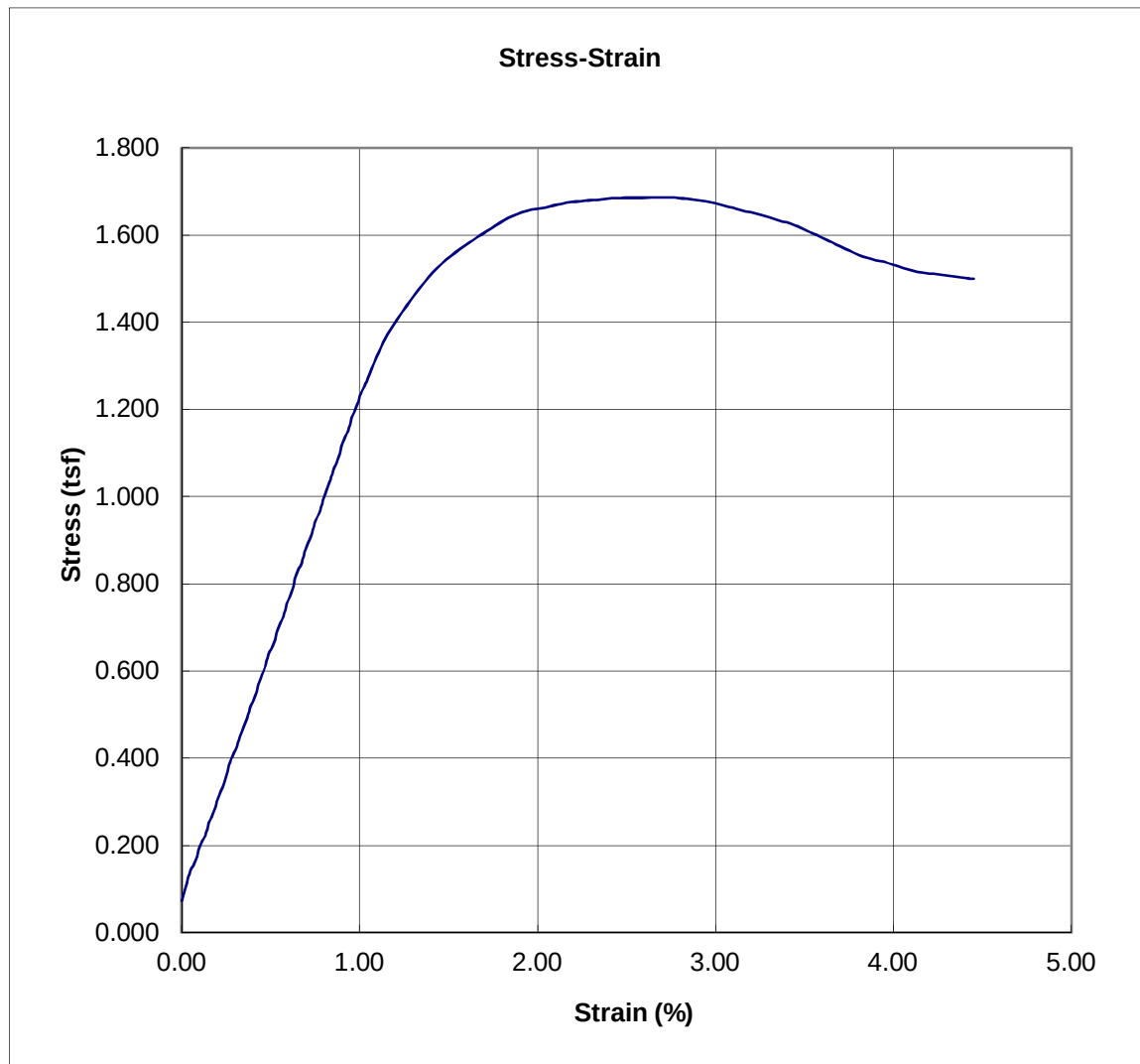
Peak Point	14.83	2.606
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2014
Depth: 16'-18'



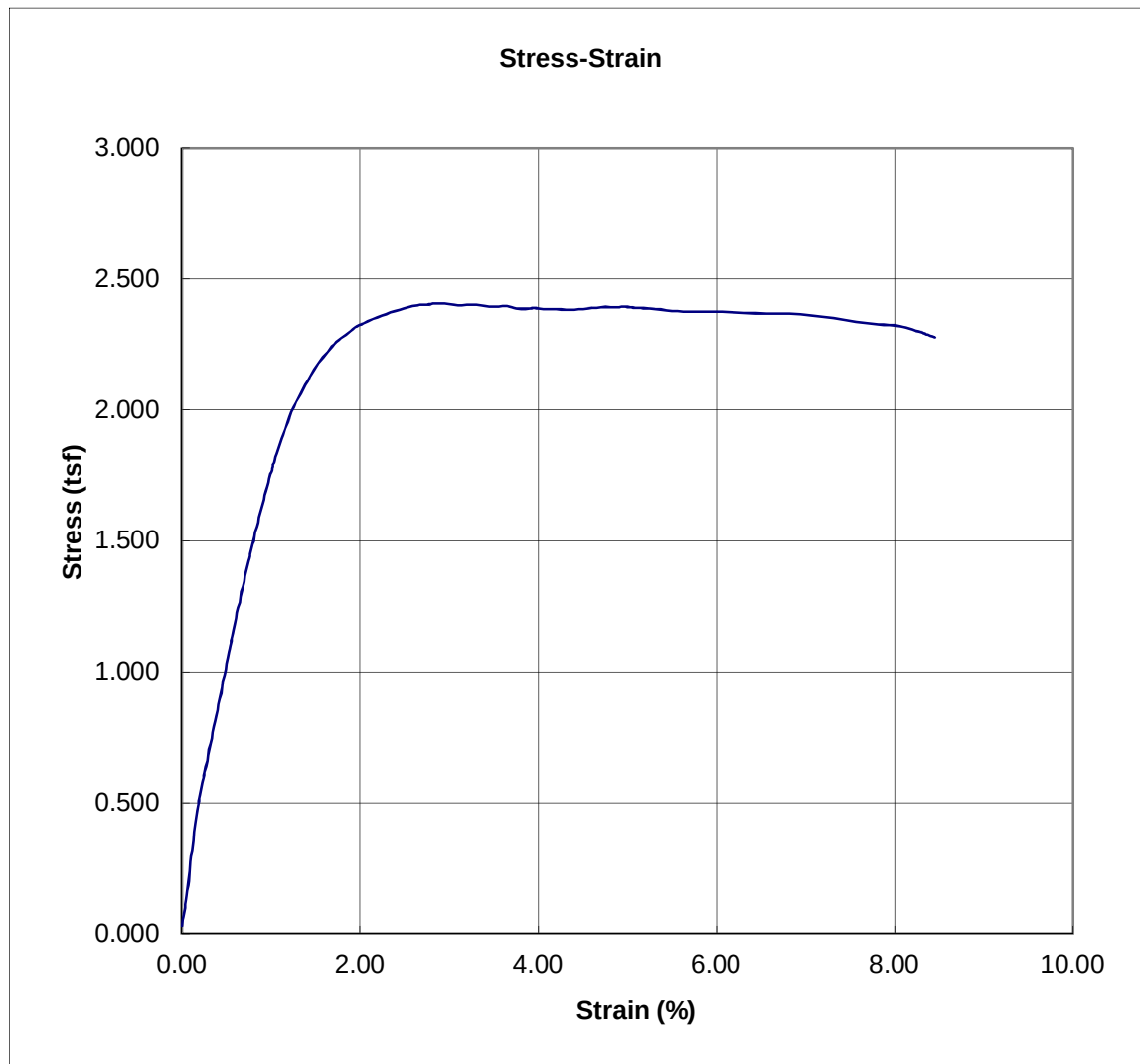
Peak Point	3.90	0.260
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2014
Depth: 23'-25'



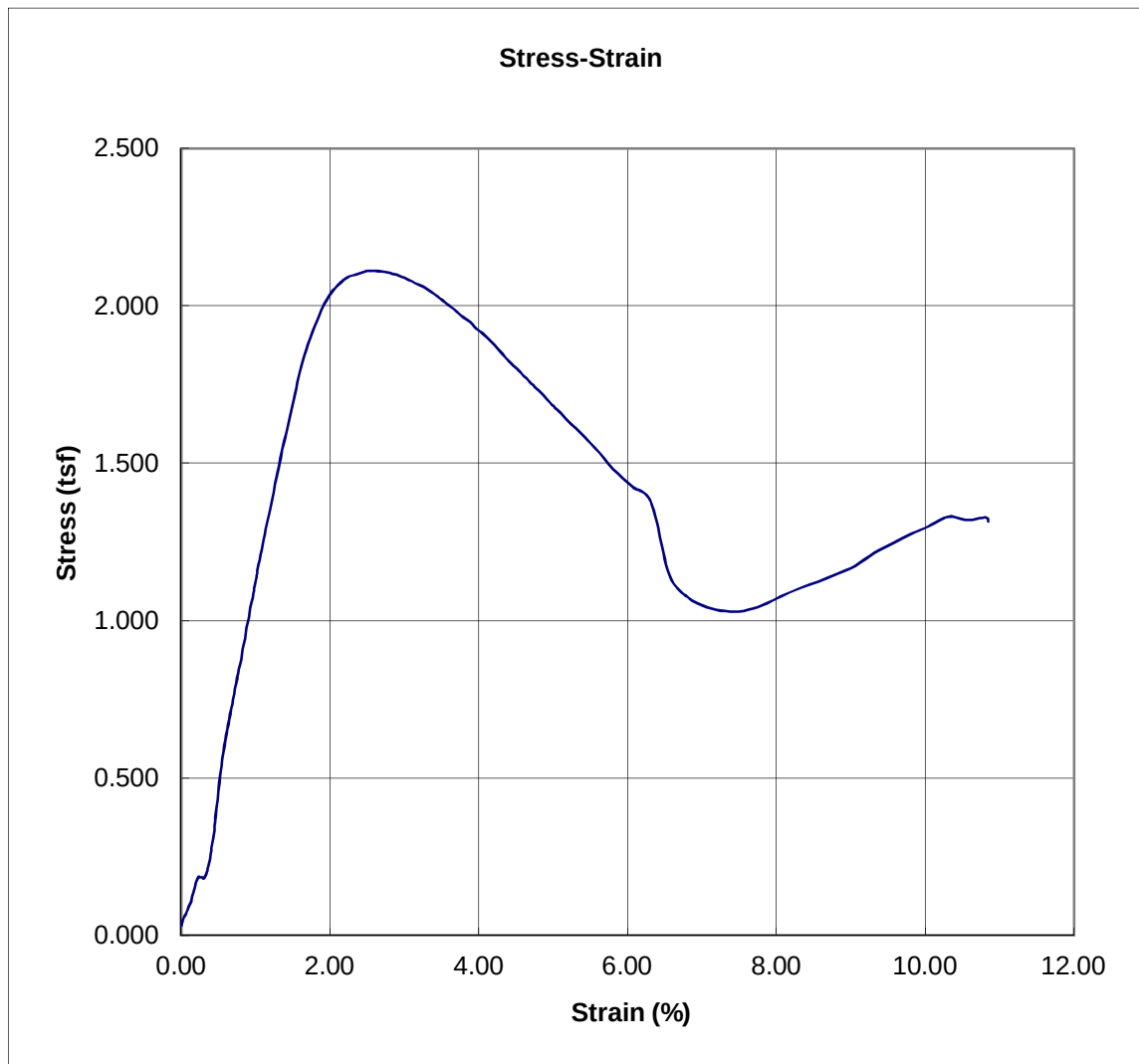
Peak Point	2.75	1.686
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2014
Depth: 33'-35'



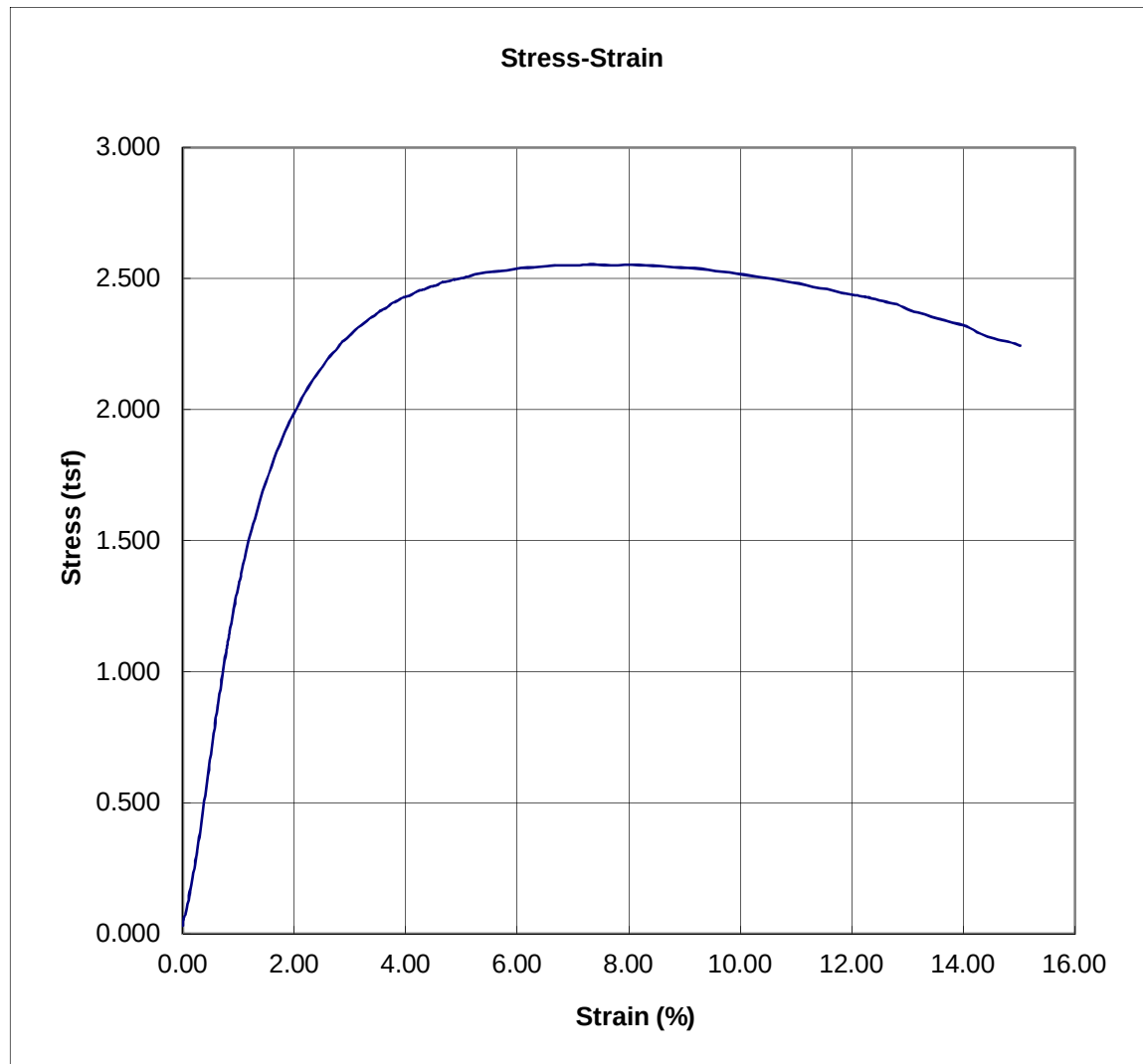
Peak Point	2.84	2.408
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2015
Depth: 14'-16'



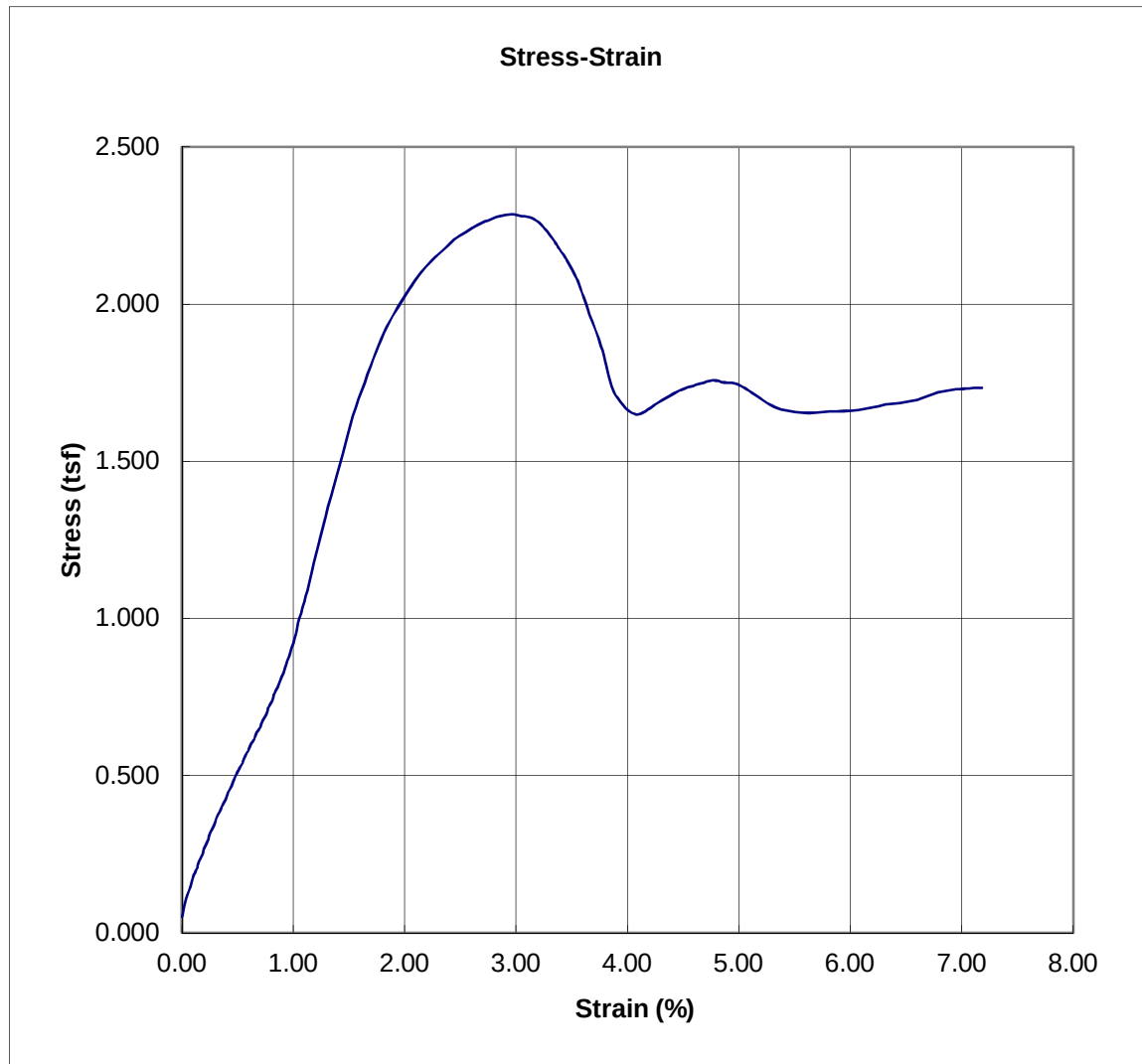
Peak Point	2.54	2.112
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2015
Depth: 23'-25'



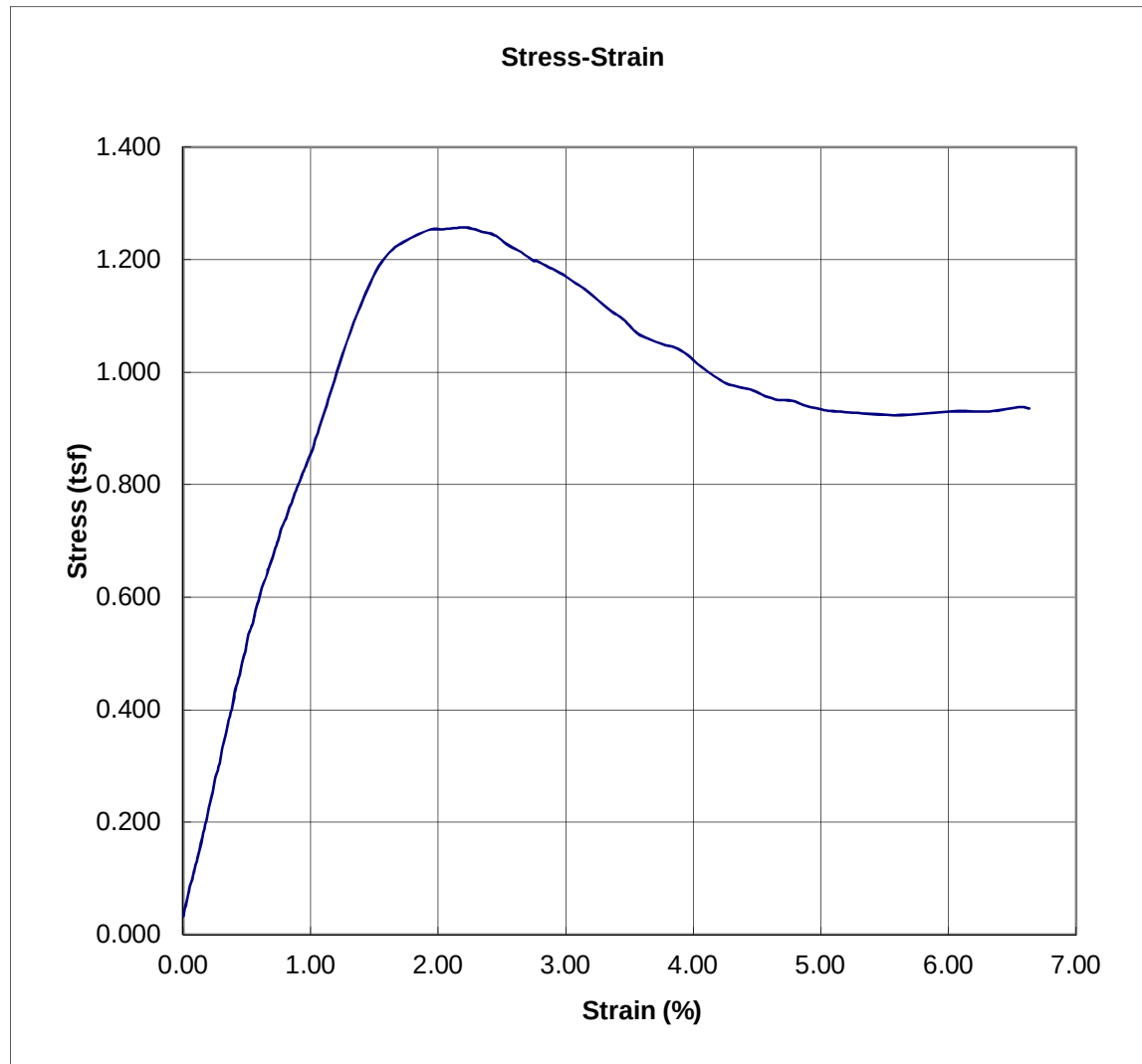
Peak Point	7.31	2.554
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2016
Depth: 12'-14'



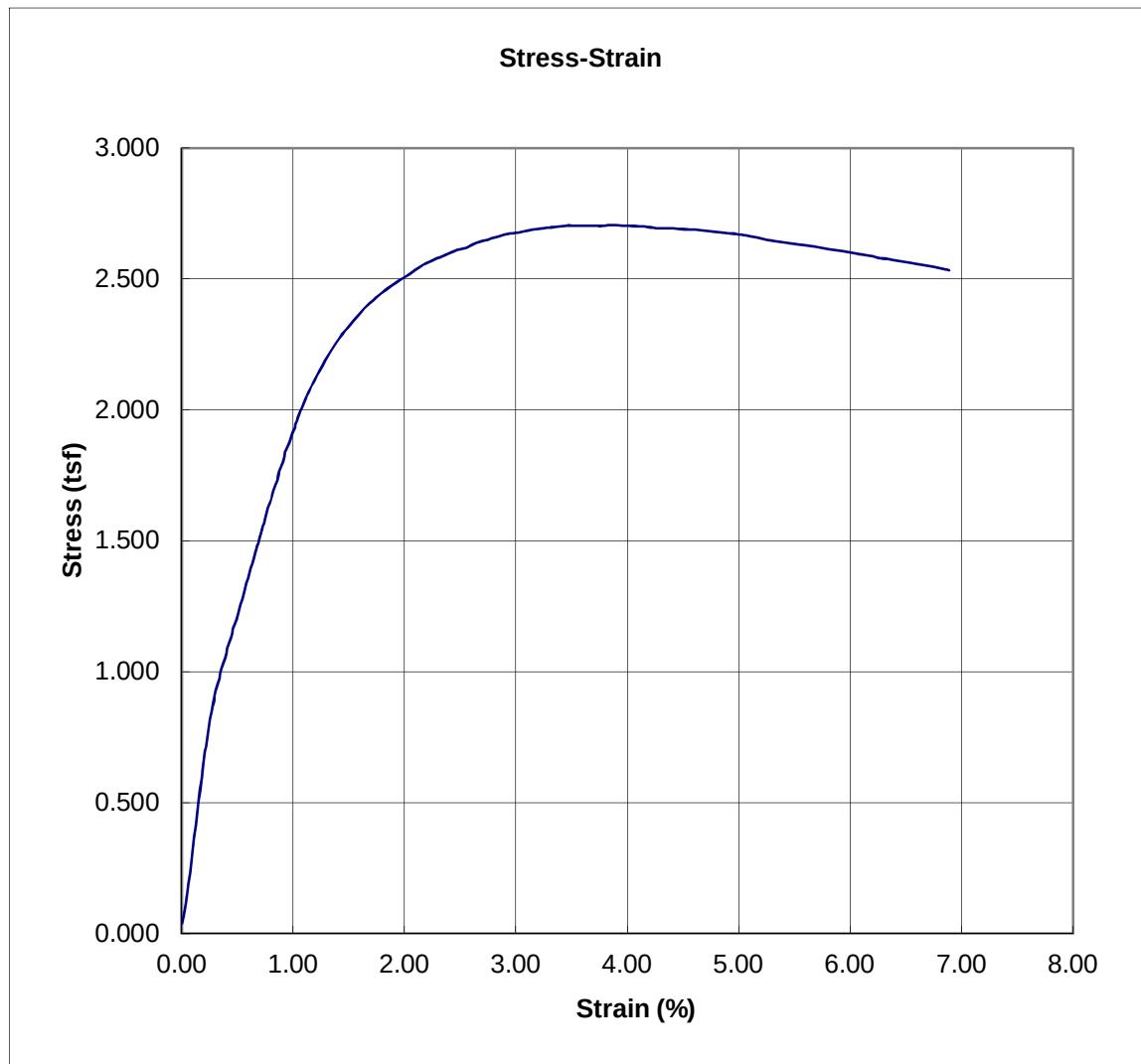
Peak Point	2.96	2.285
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2016
Depth: 18'-20'



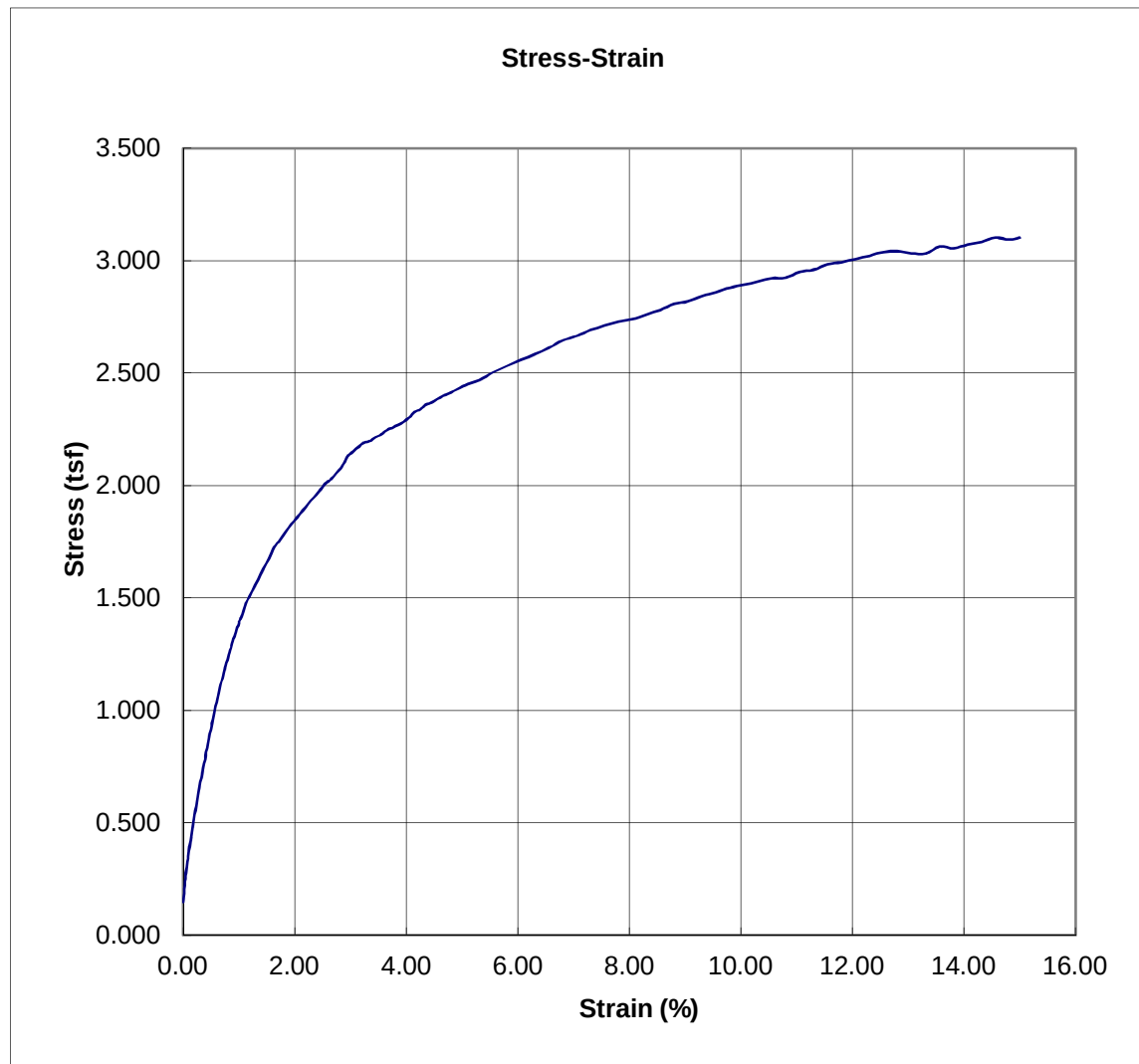
Peak Point	2.24	1.257
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2016
Depth: 28'-30'



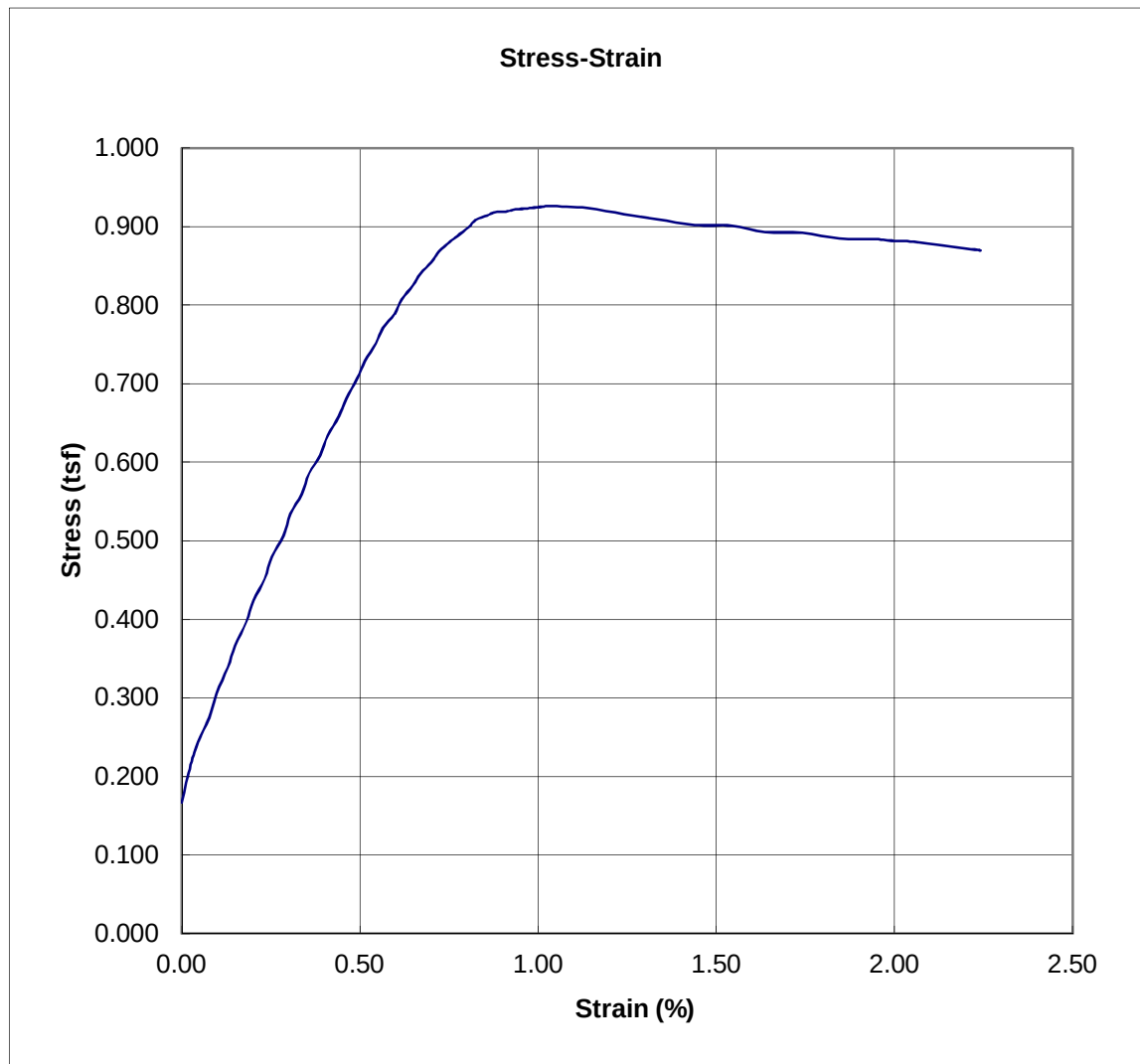
Peak Point	3.85	2.705
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2016
Depth: 38'-40'



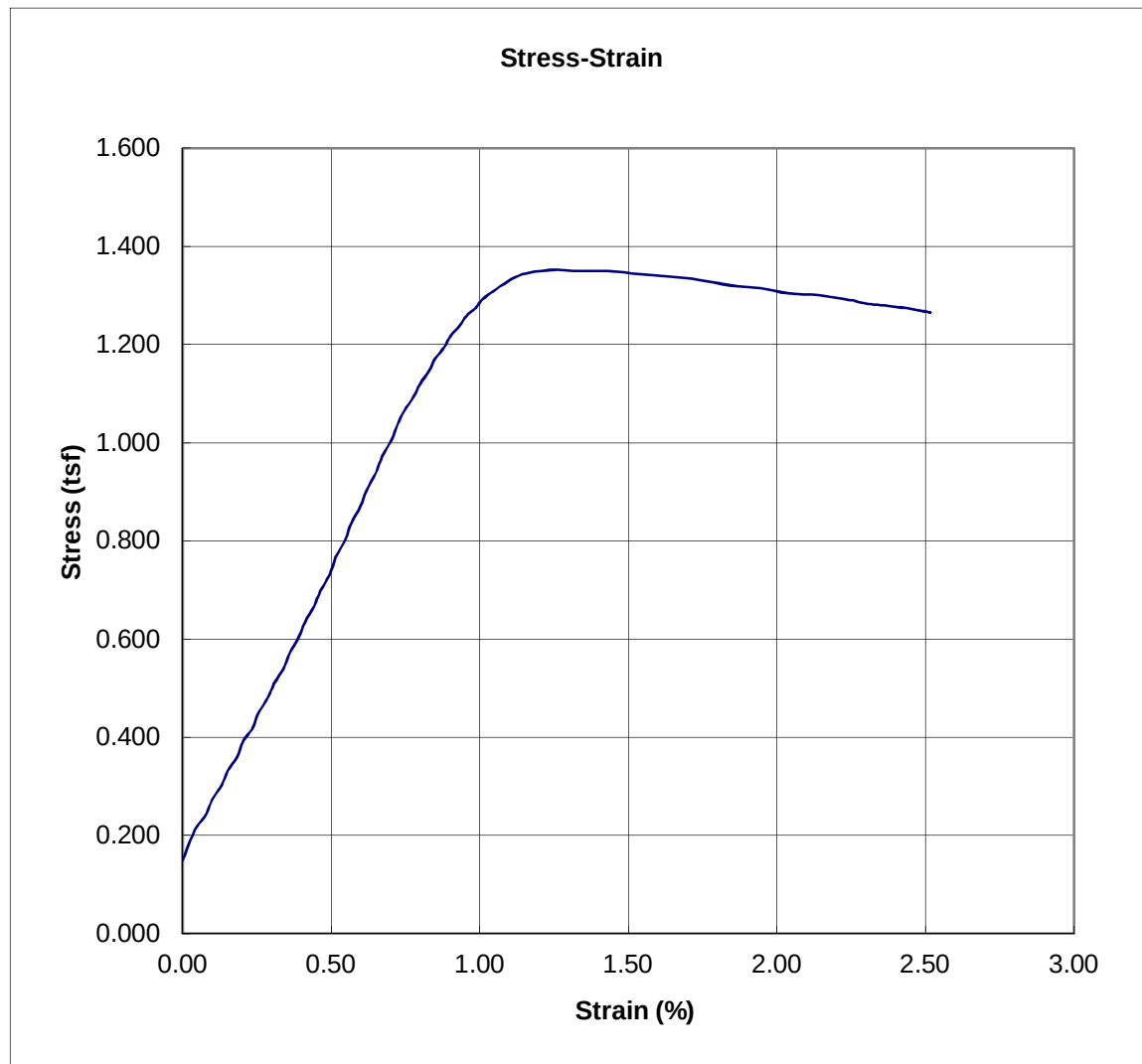
Peak Point	15.00	3.102
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2017
Depth: 8'-10'



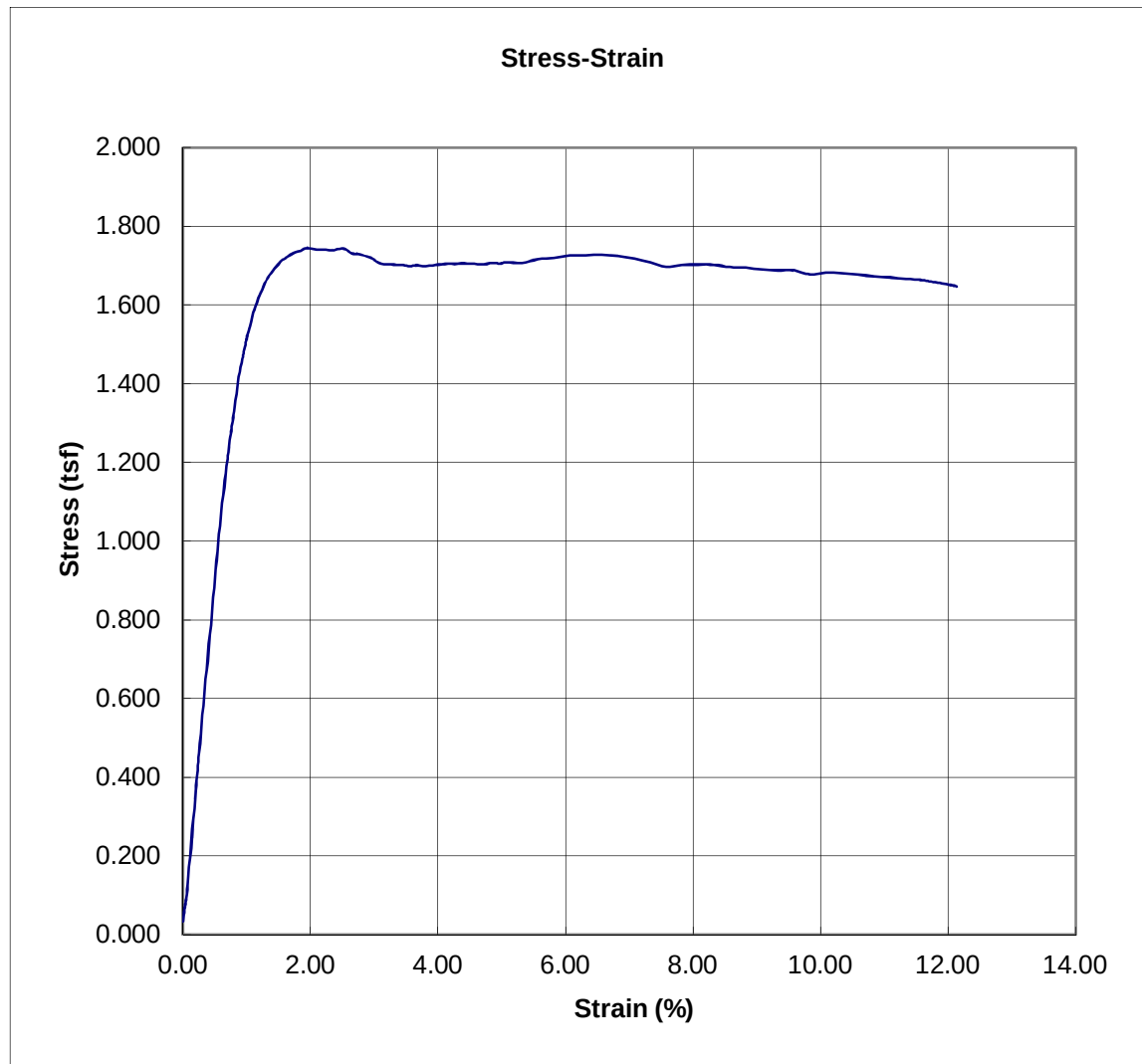
Peak Point	1.03	0.926
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2017
Depth: 14'-16'



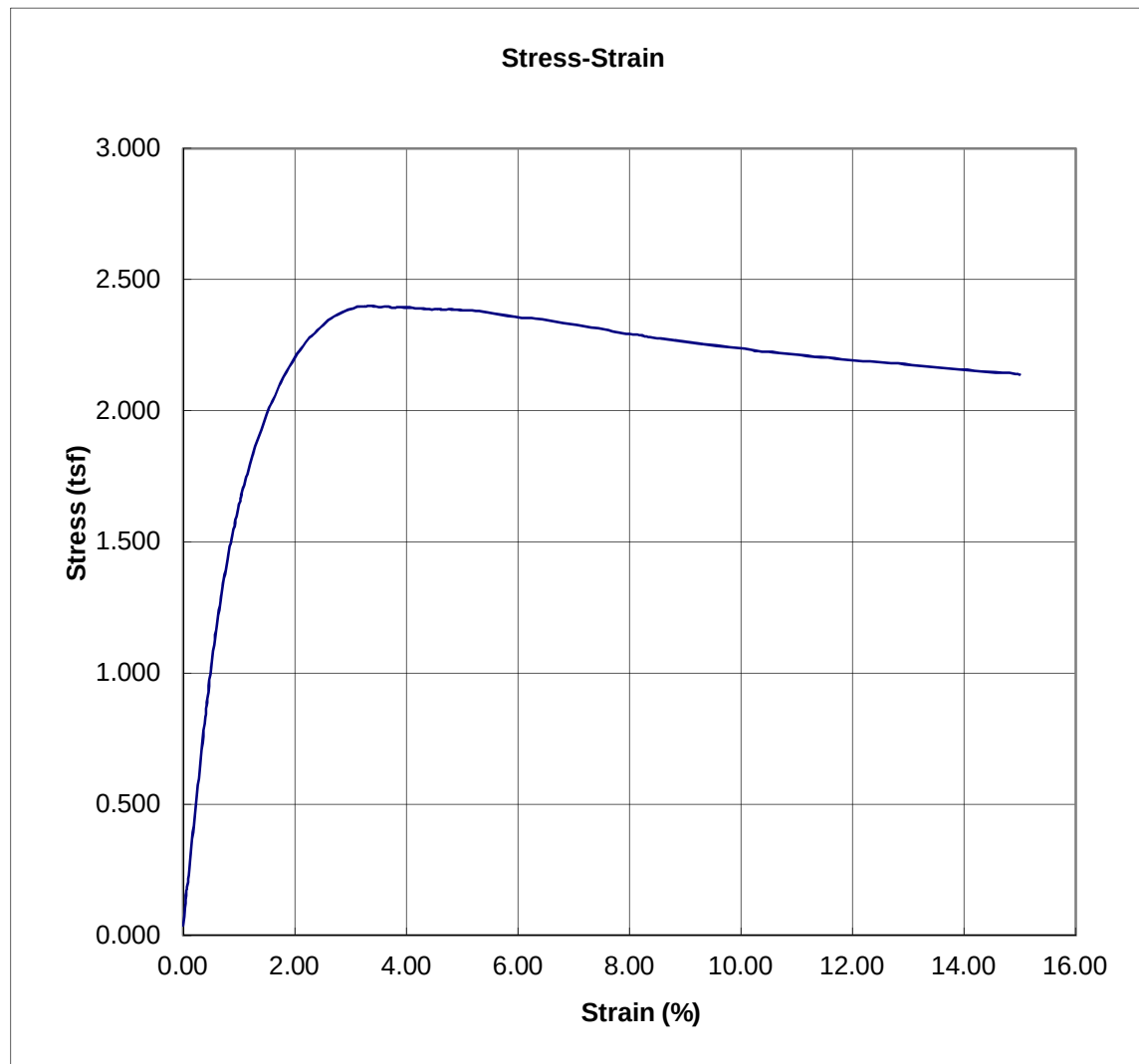
Peak Point	1.24	1.352
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2017
Depth: 23'-25'



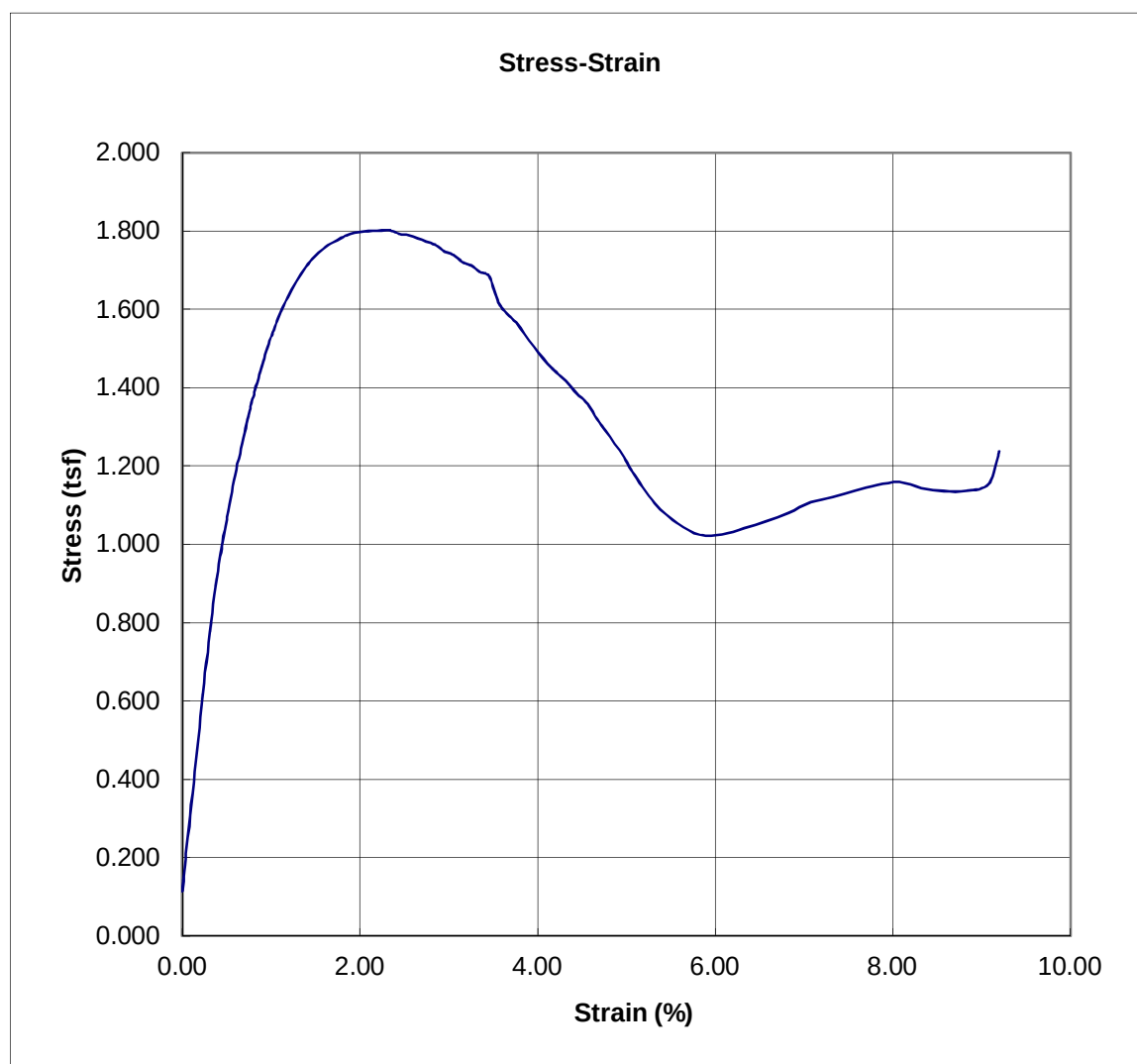
Peak Point	1.94	1.744
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2017
Depth: 33'-35'



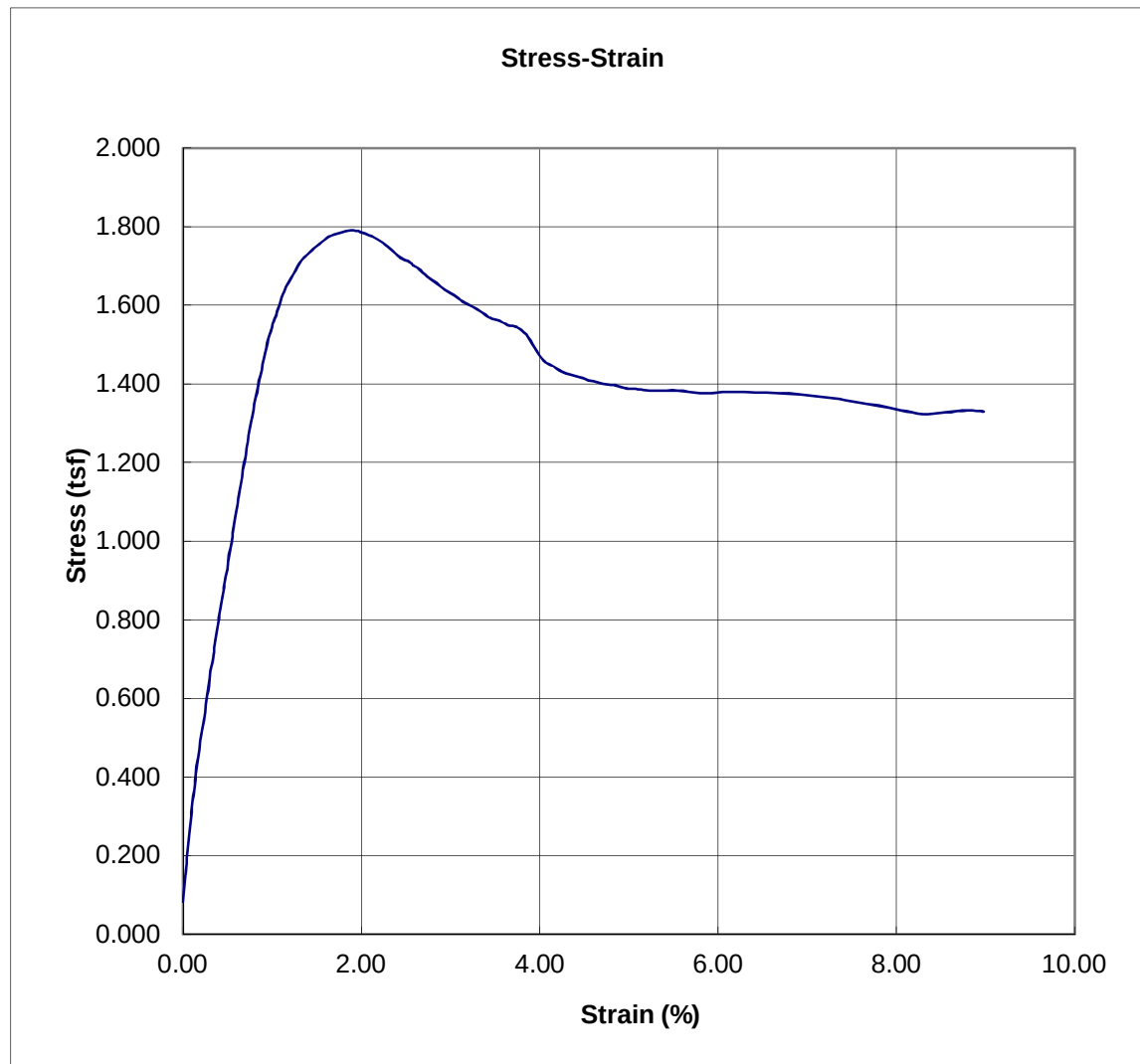
Peak Point	3.35	2.400
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2018
Depth: 10'-12'



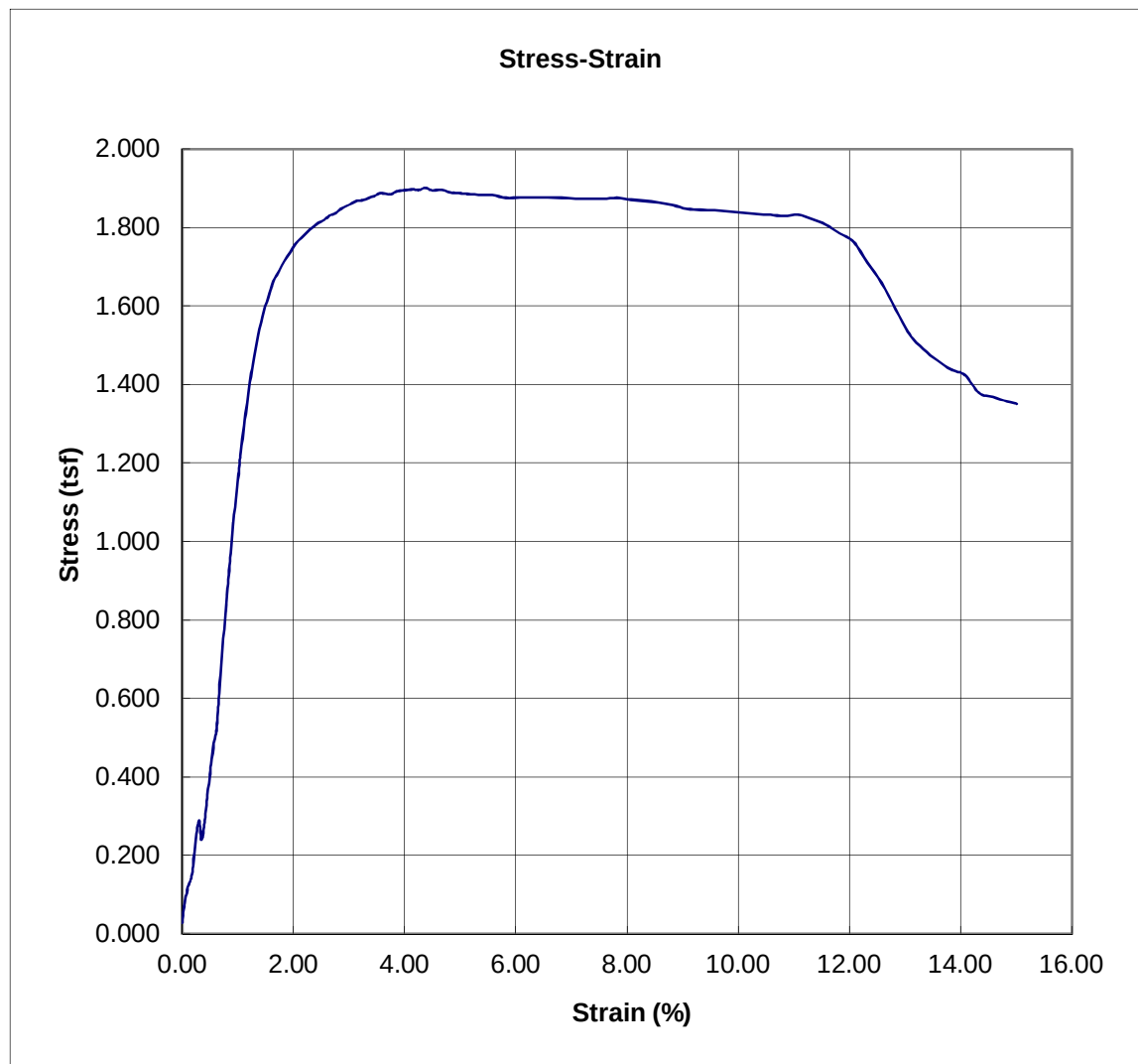
Peak Point	2.25	1.801
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2018
Depth: 16'-18'



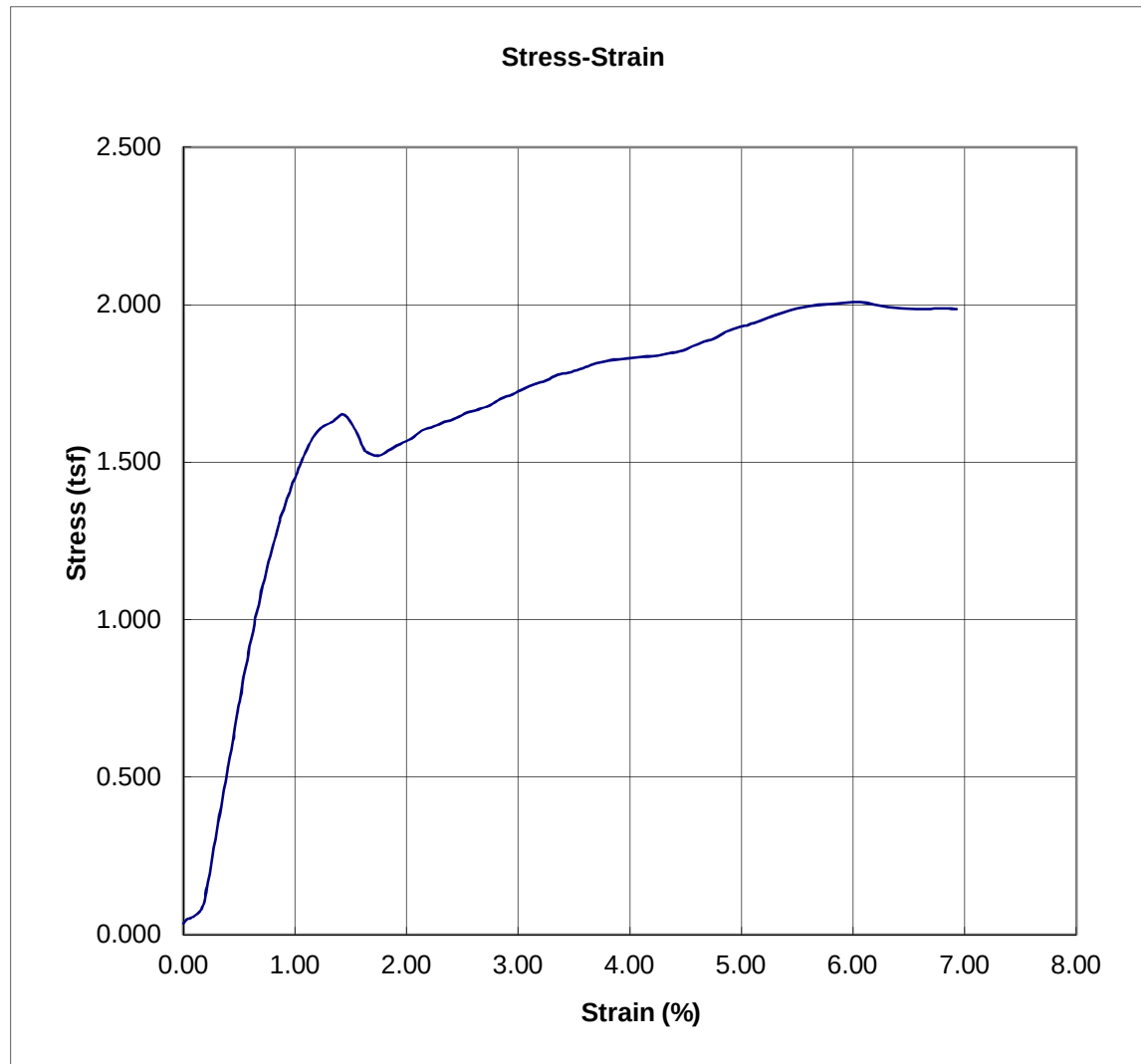
Peak Point	1.94	1.790
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2018
Depth: 23'-25'



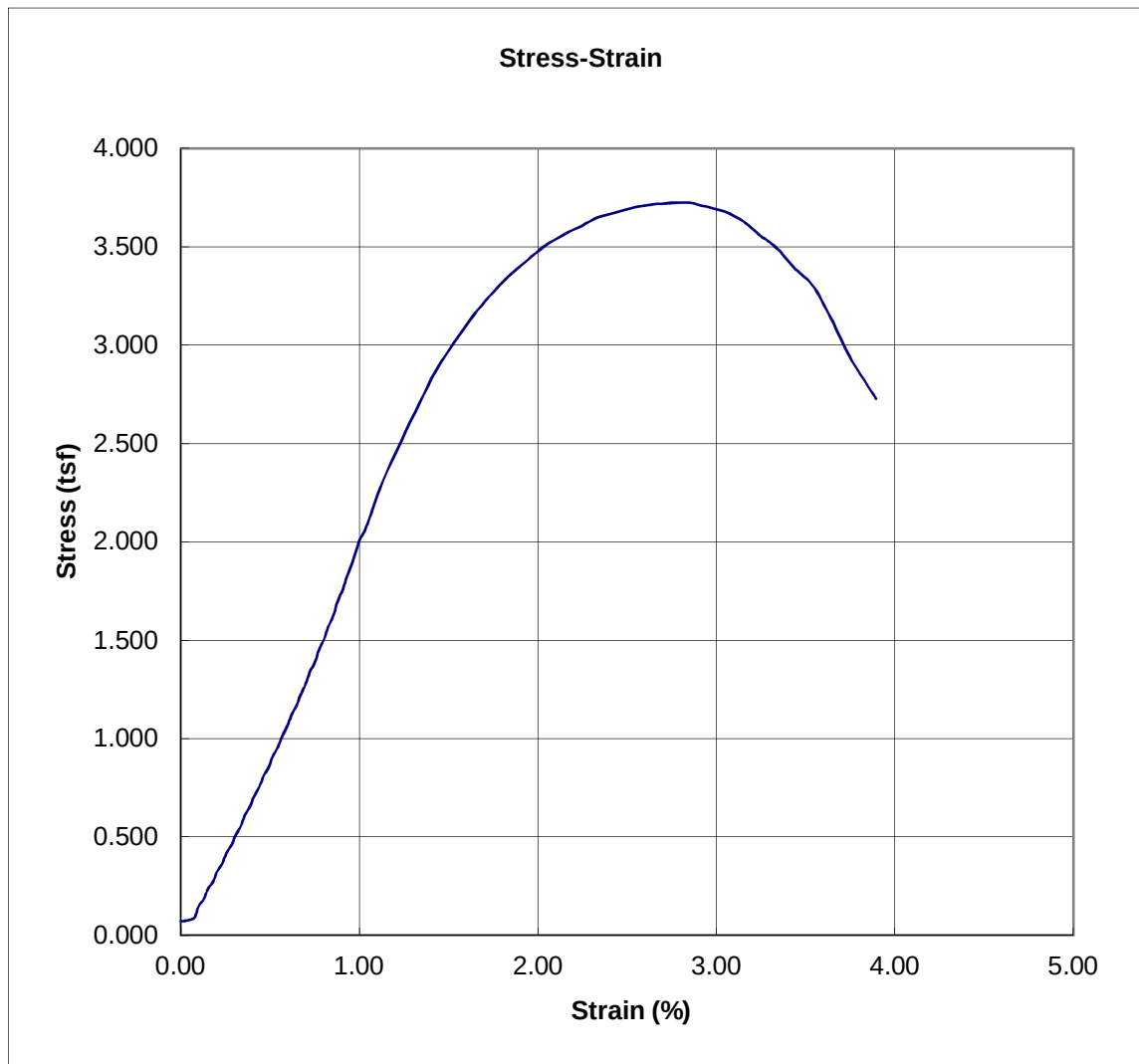
Peak Point	4.36	1.901
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2018
Depth: 33'-35'



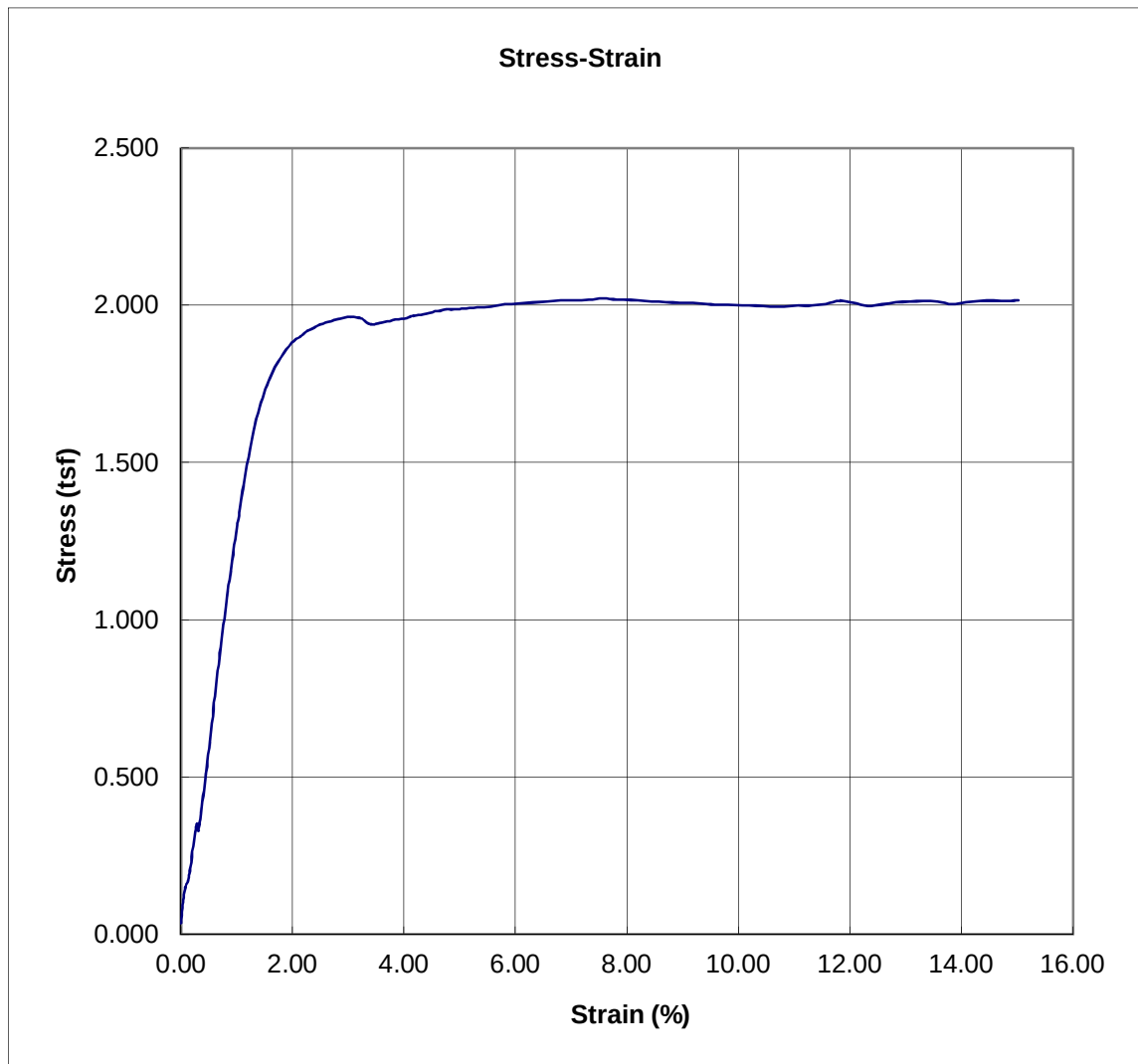
Peak Point	6.06	2.008
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2019
Depth: 10'-12'



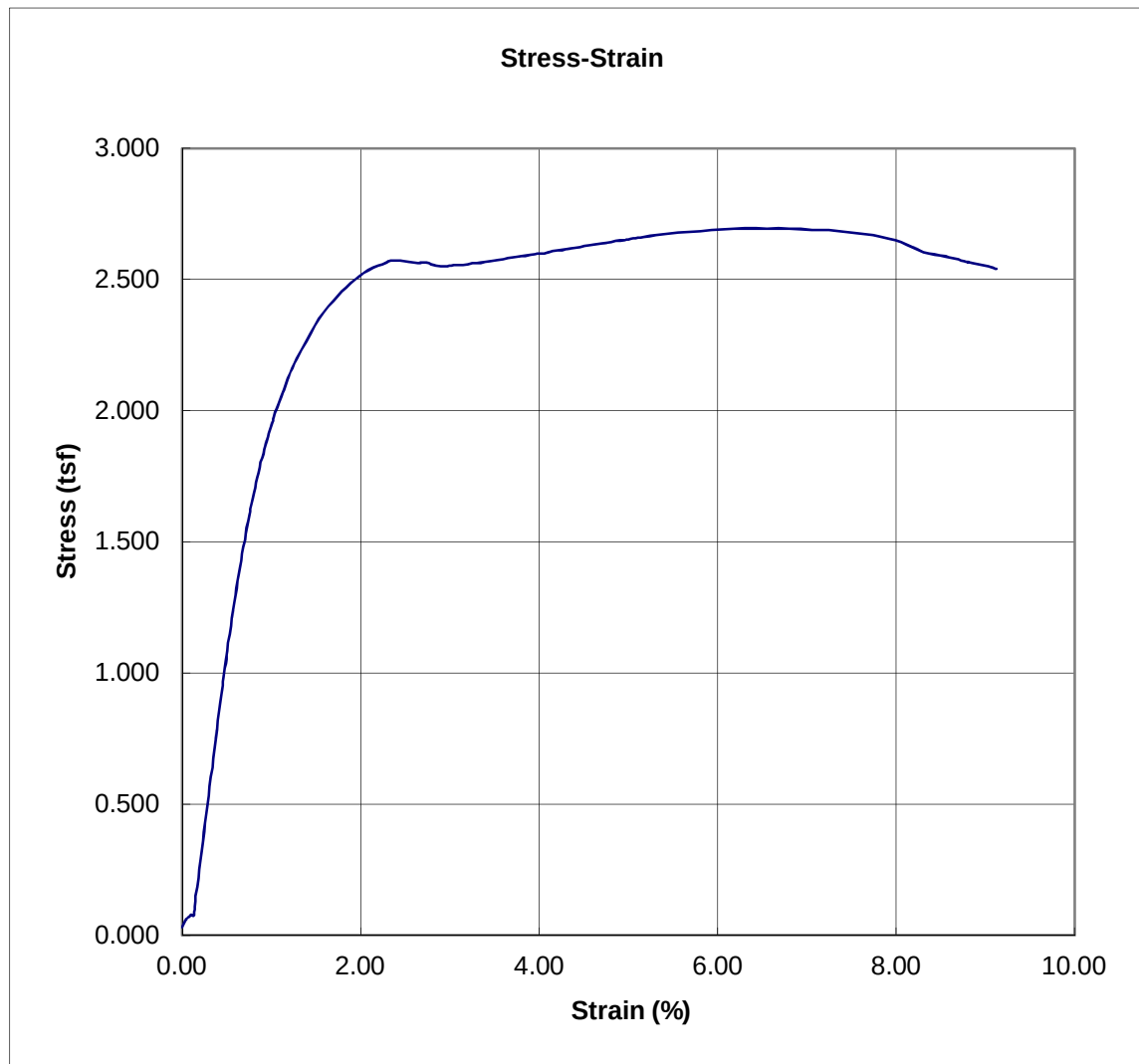
Peak Point	2.85	3.723
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2019
Depth: 23'-25'



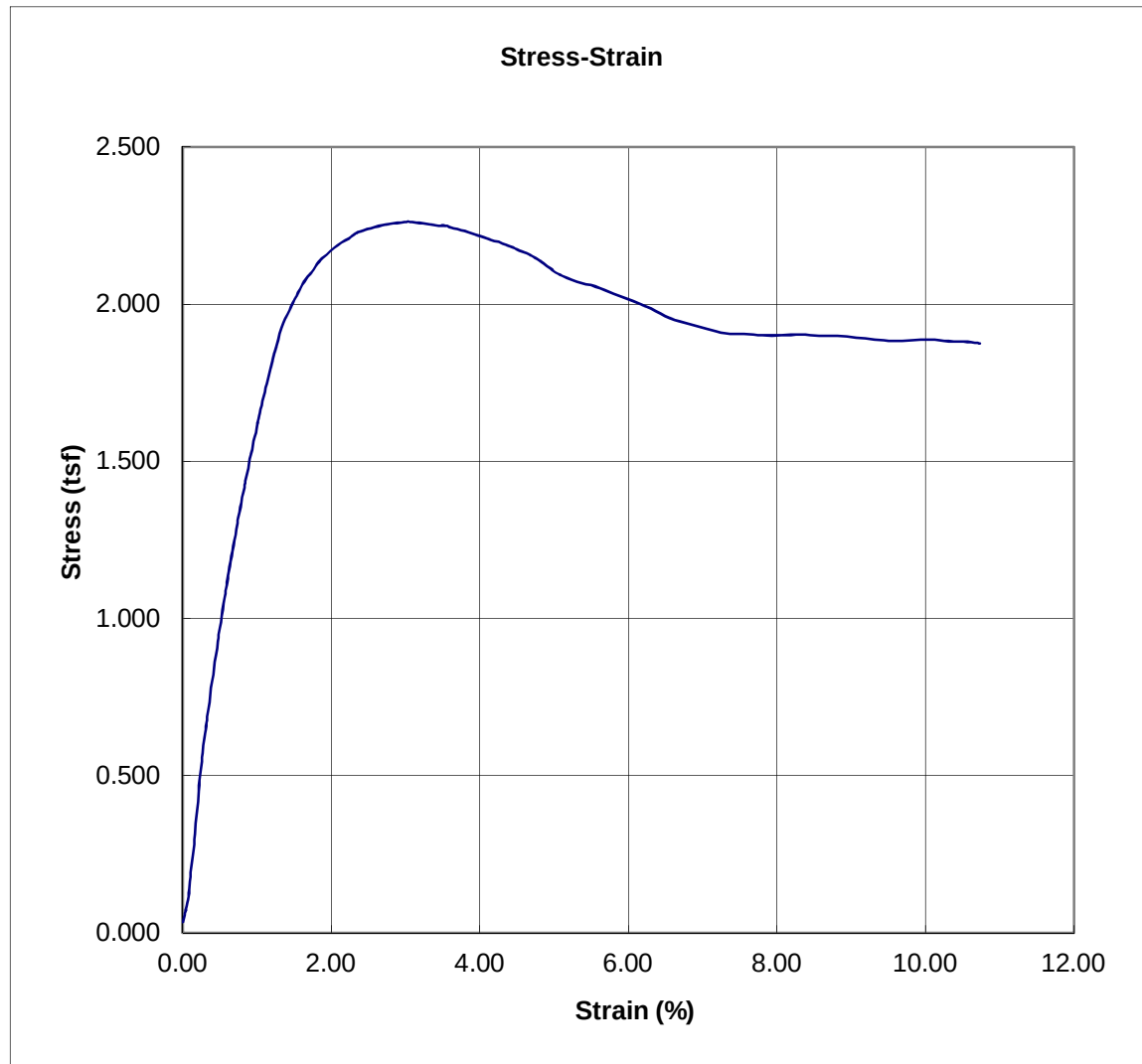
Peak Point	7.57	2.022
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2019
Depth: 33'-35'



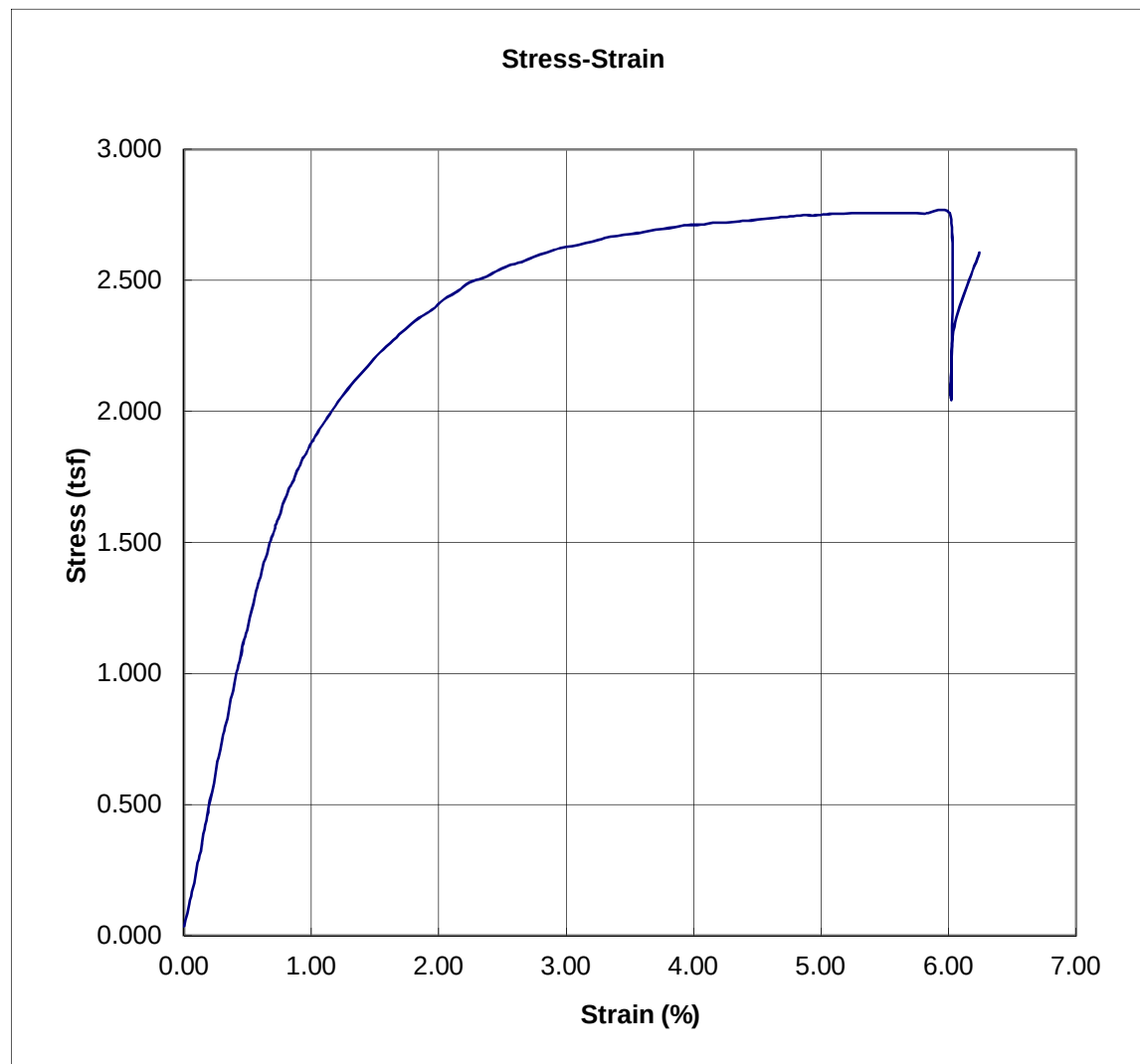
Peak Point	6.31	2.695
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2020
Depth: 14'-16'



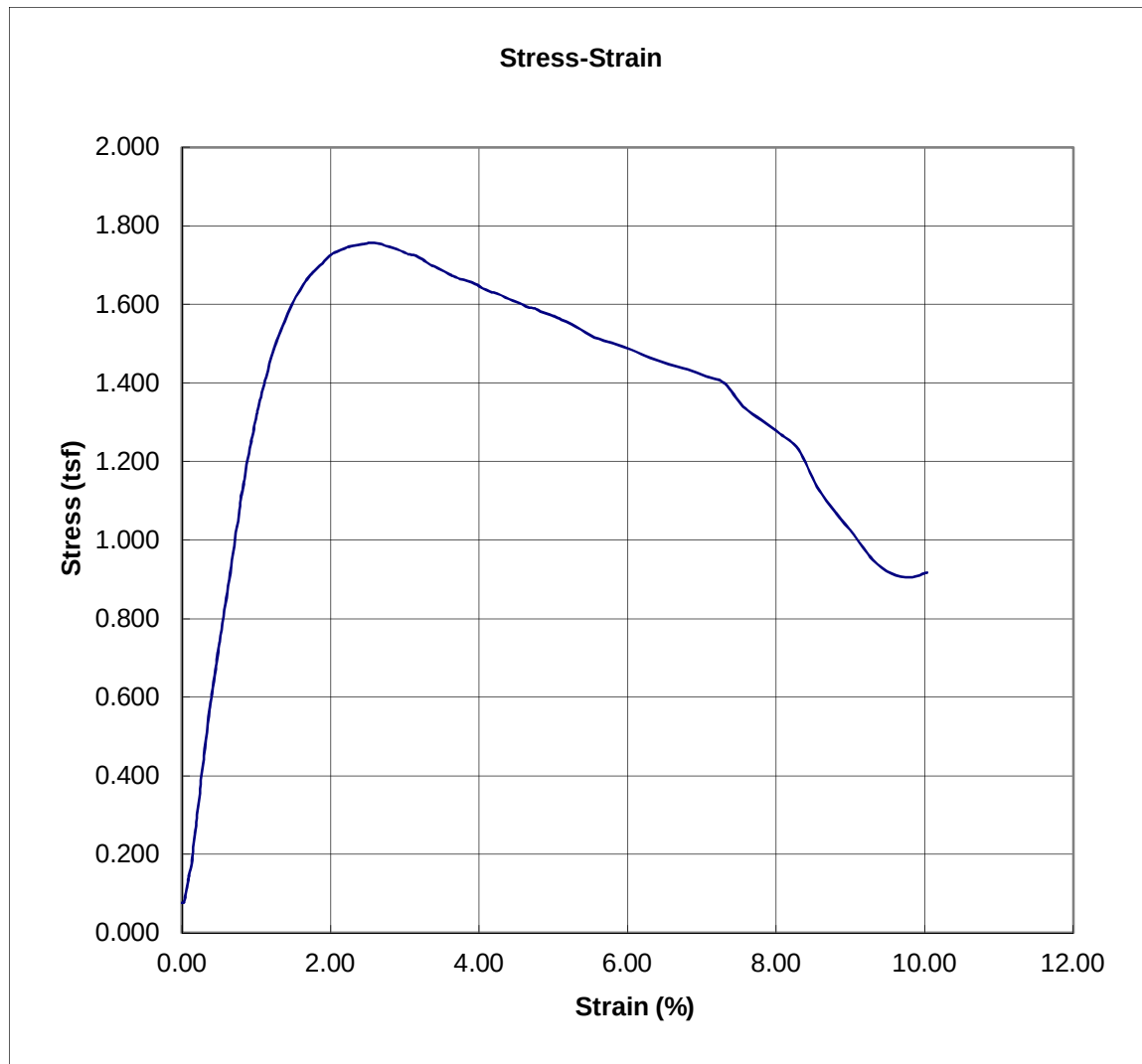
Peak Point	3.04	2.262
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2020
Depth: 28'-30'



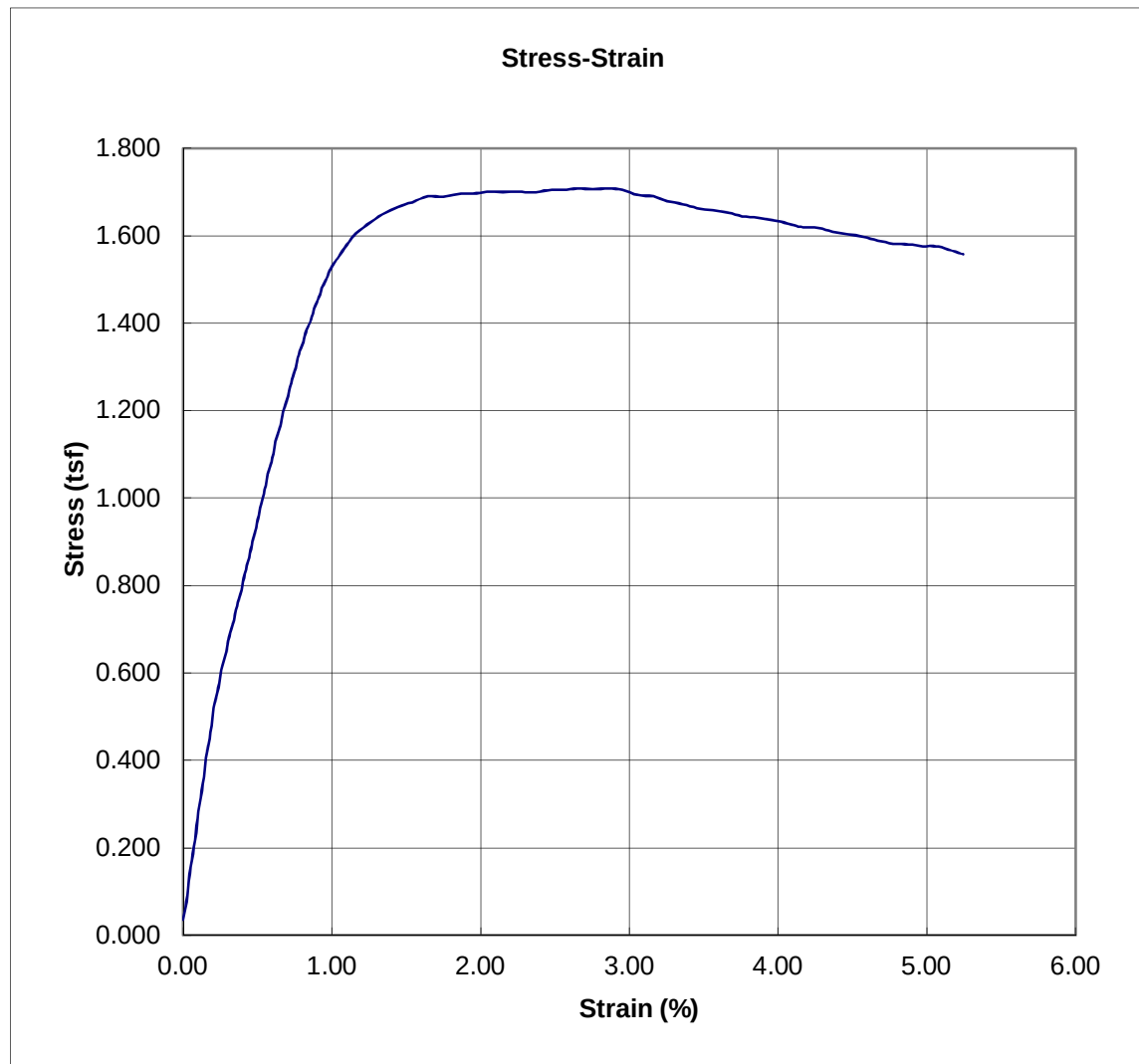
Peak Point	5.56	2.757
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2021
Depth: 14'-16'



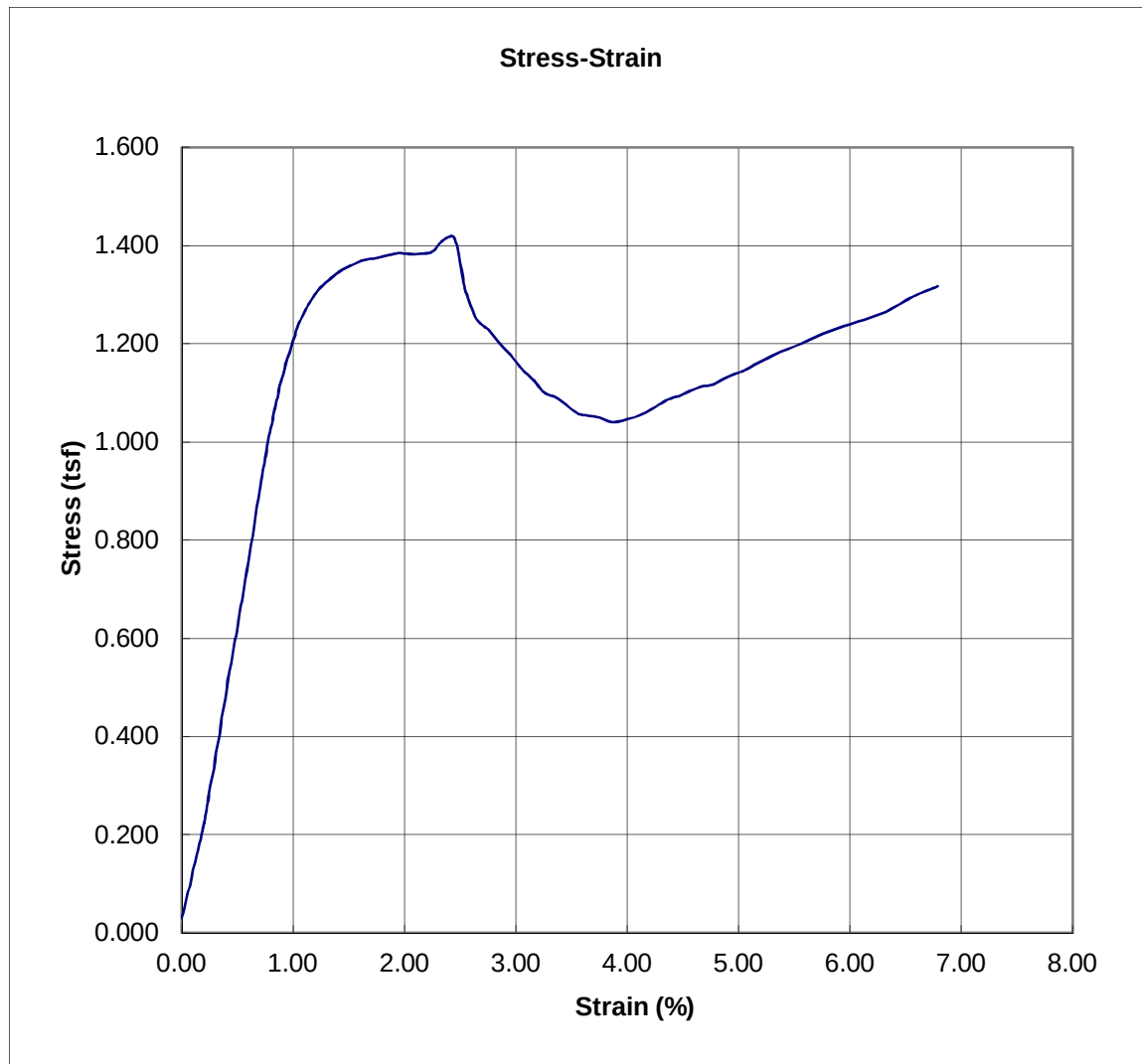
Peak Point	2.54	1.757
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2021
Depth: 18'-20'



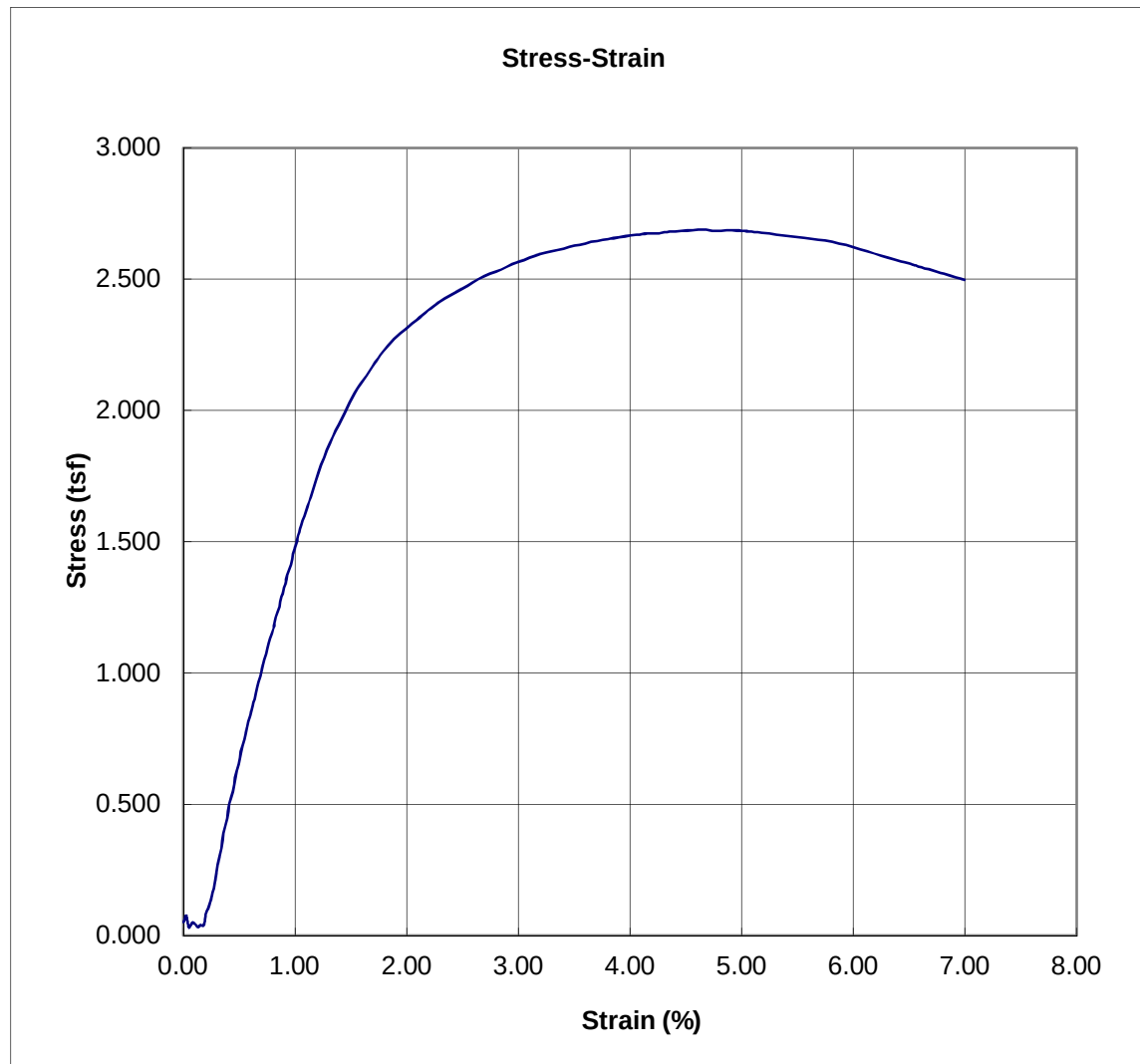
Peak Point	2.65	1.708
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2021
Depth: 23'-25'



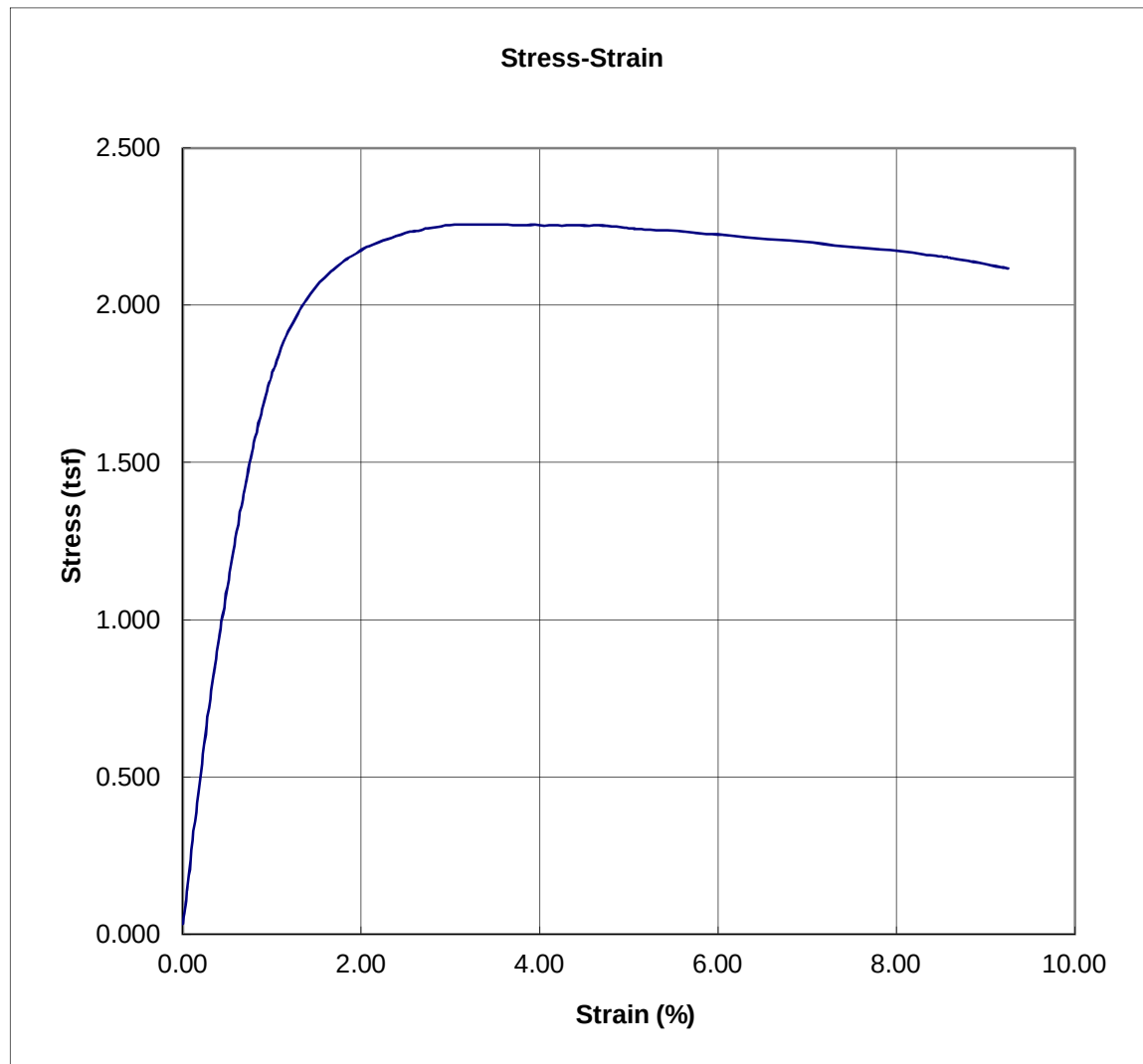
Peak Point	2.45	1.415
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2021
Depth: 33'-35'



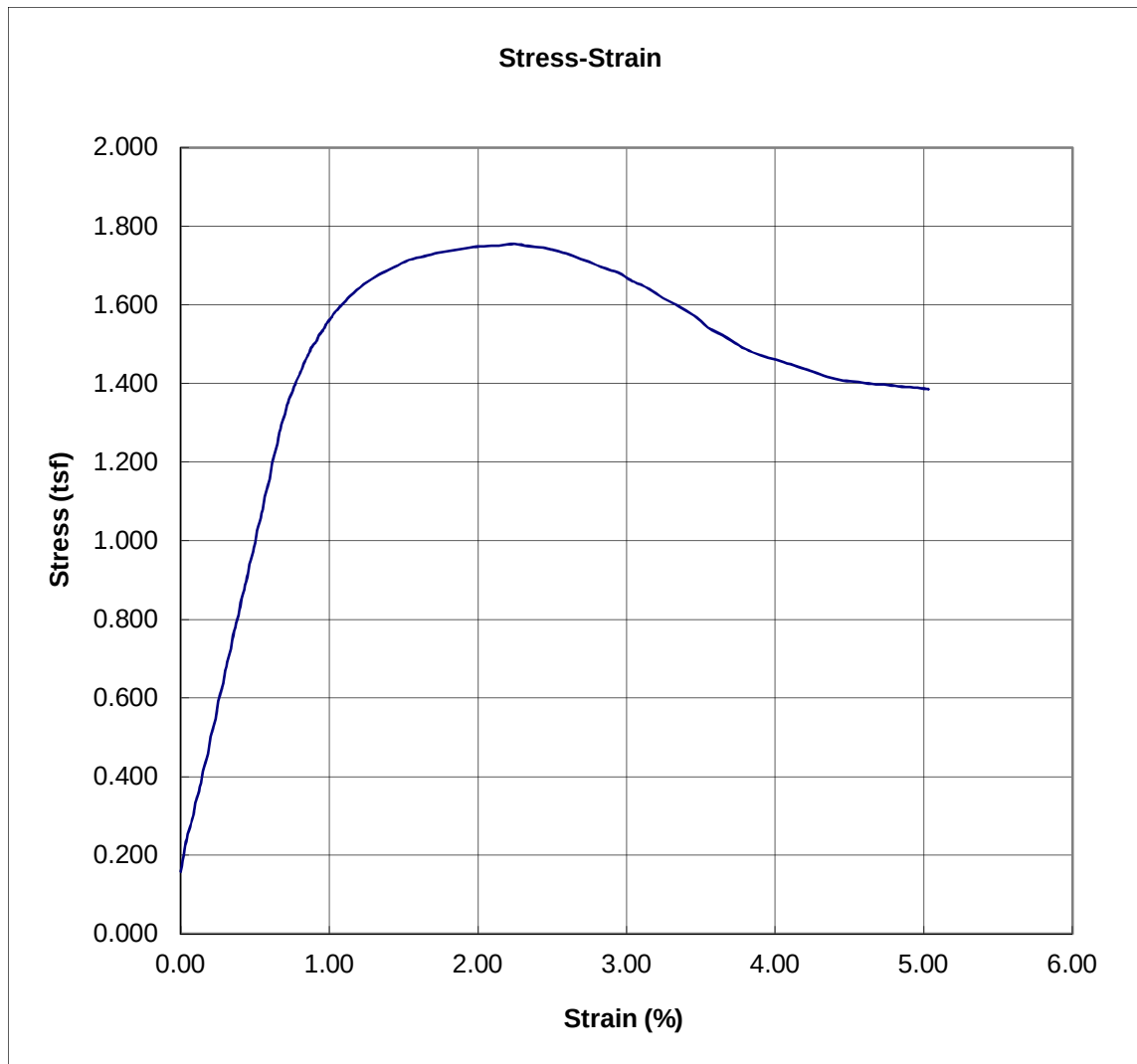
Peak Point	4.66	2.689
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2022
Depth: 14'-16'



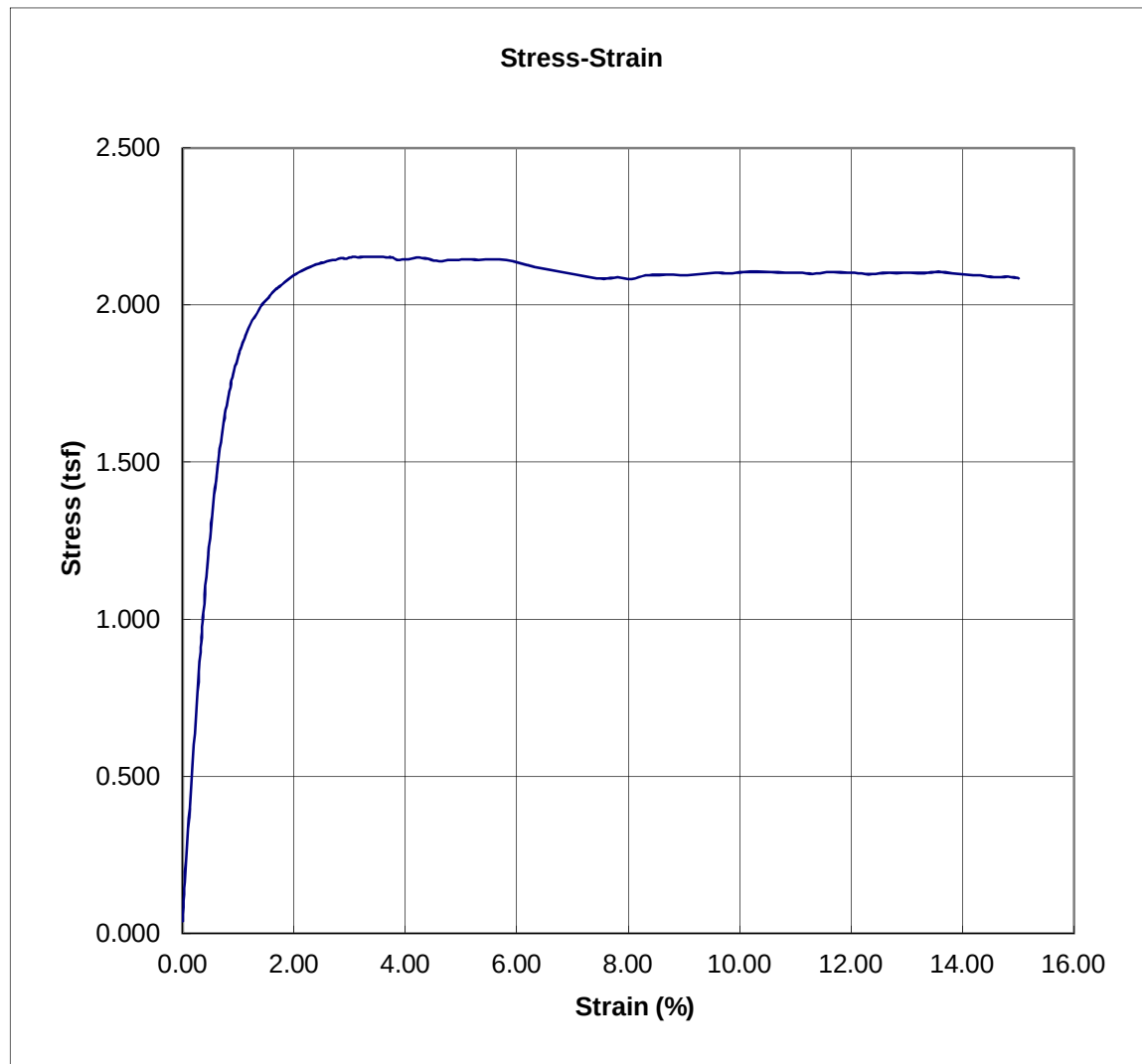
Peak Point	3.25	2.257
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2022
Depth: 18'-20'



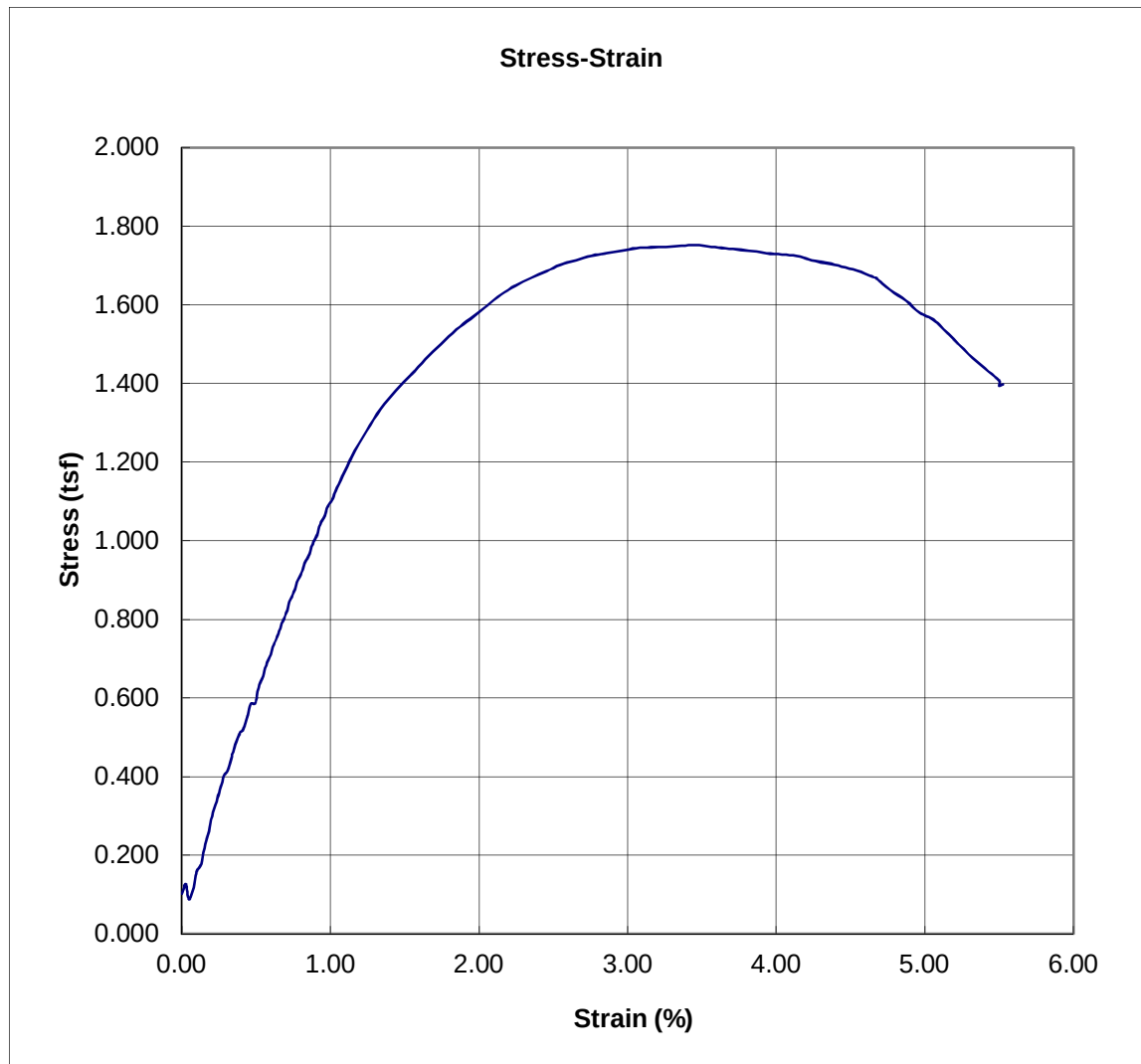
Peak Point	2.24	1.755
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2022
Depth: 28'-30'



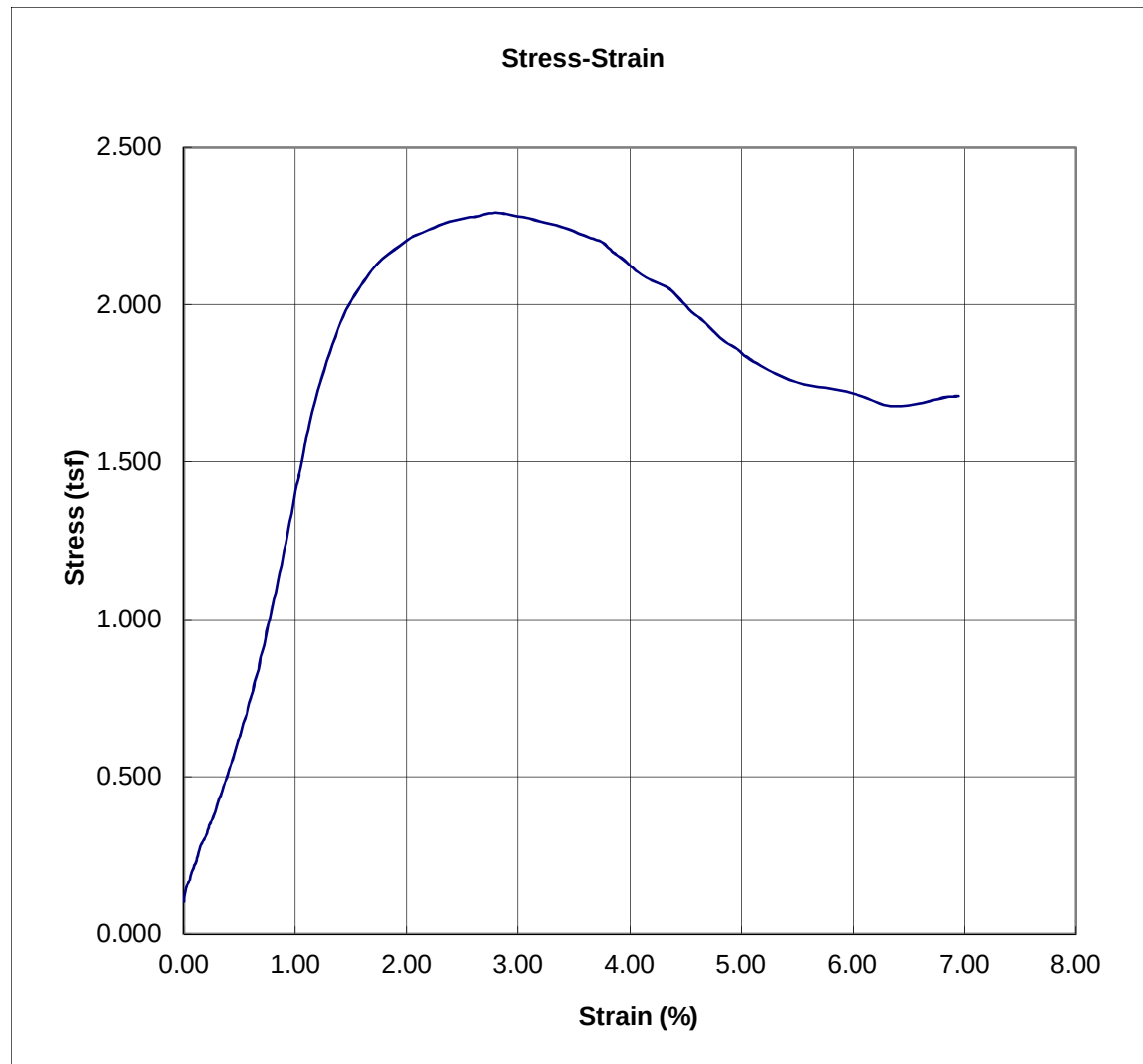
Peak Point	3.55	2.154
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2023
Depth: 12'-14'



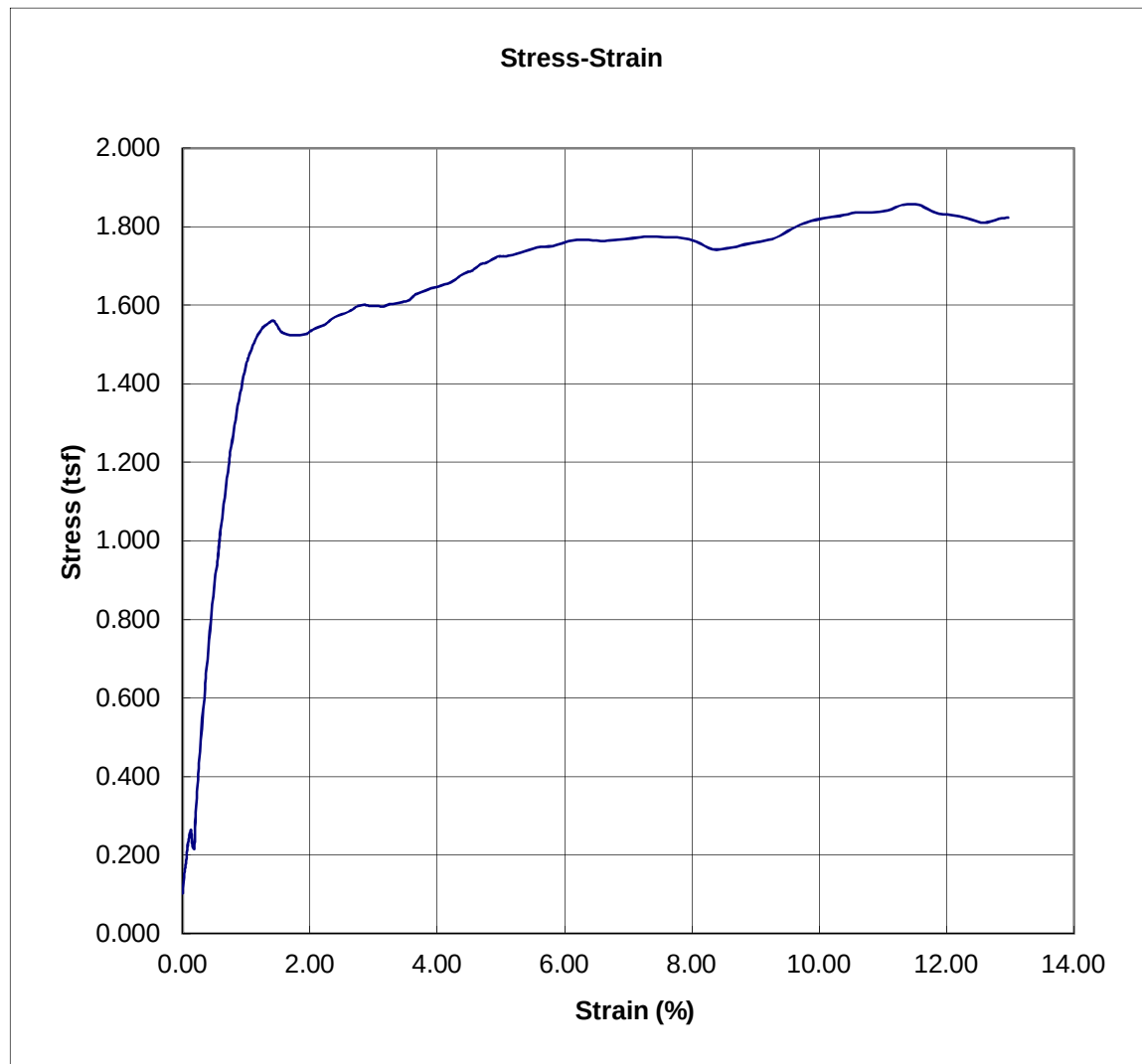
Peak Point	3.46	1.752
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2023
Depth: 23'-25'



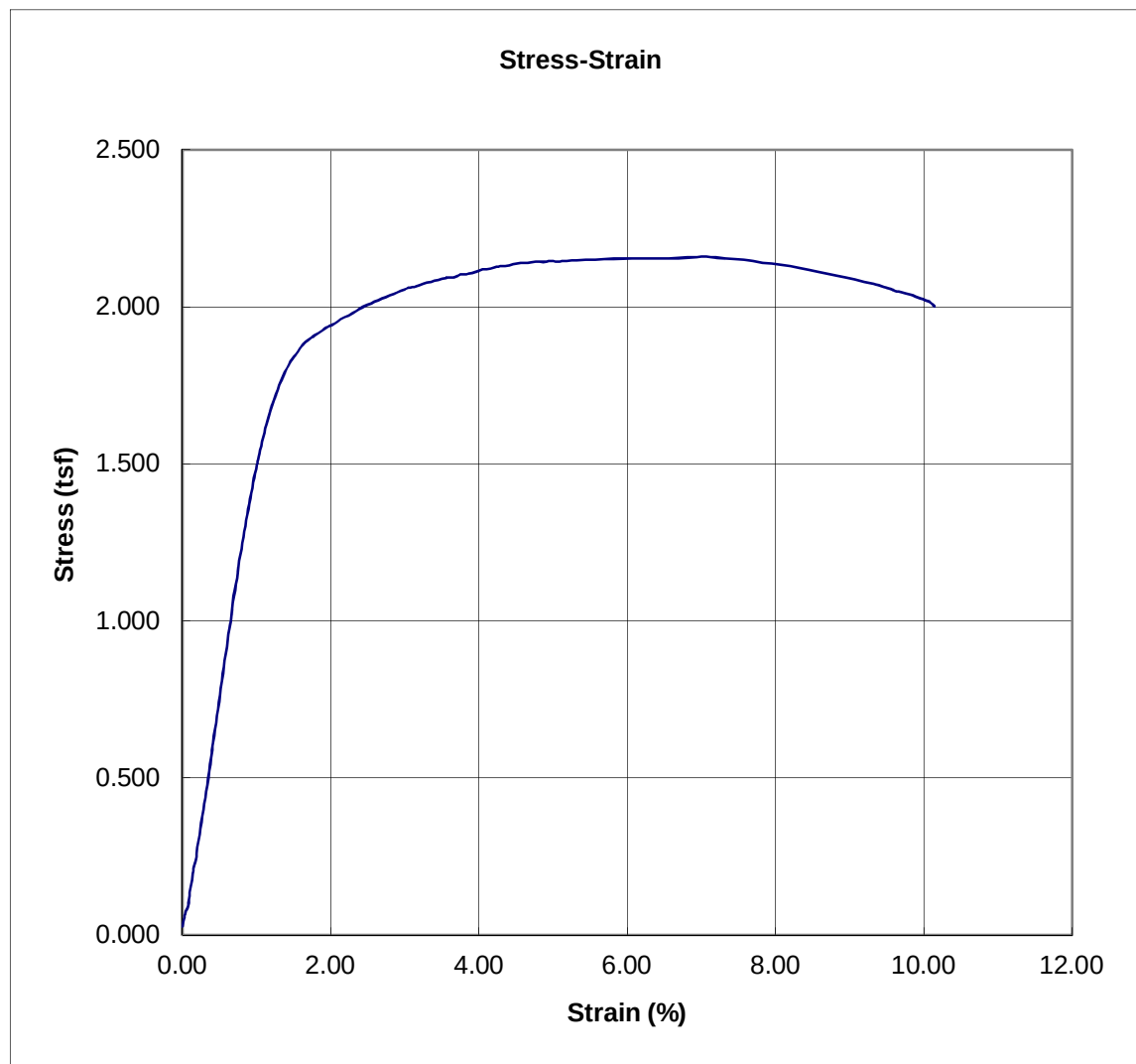
Peak Point	2.84	2.291
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2023
Depth: 38'-40'



Peak Point	11.32	1.856
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2024
Depth: 28'-30'



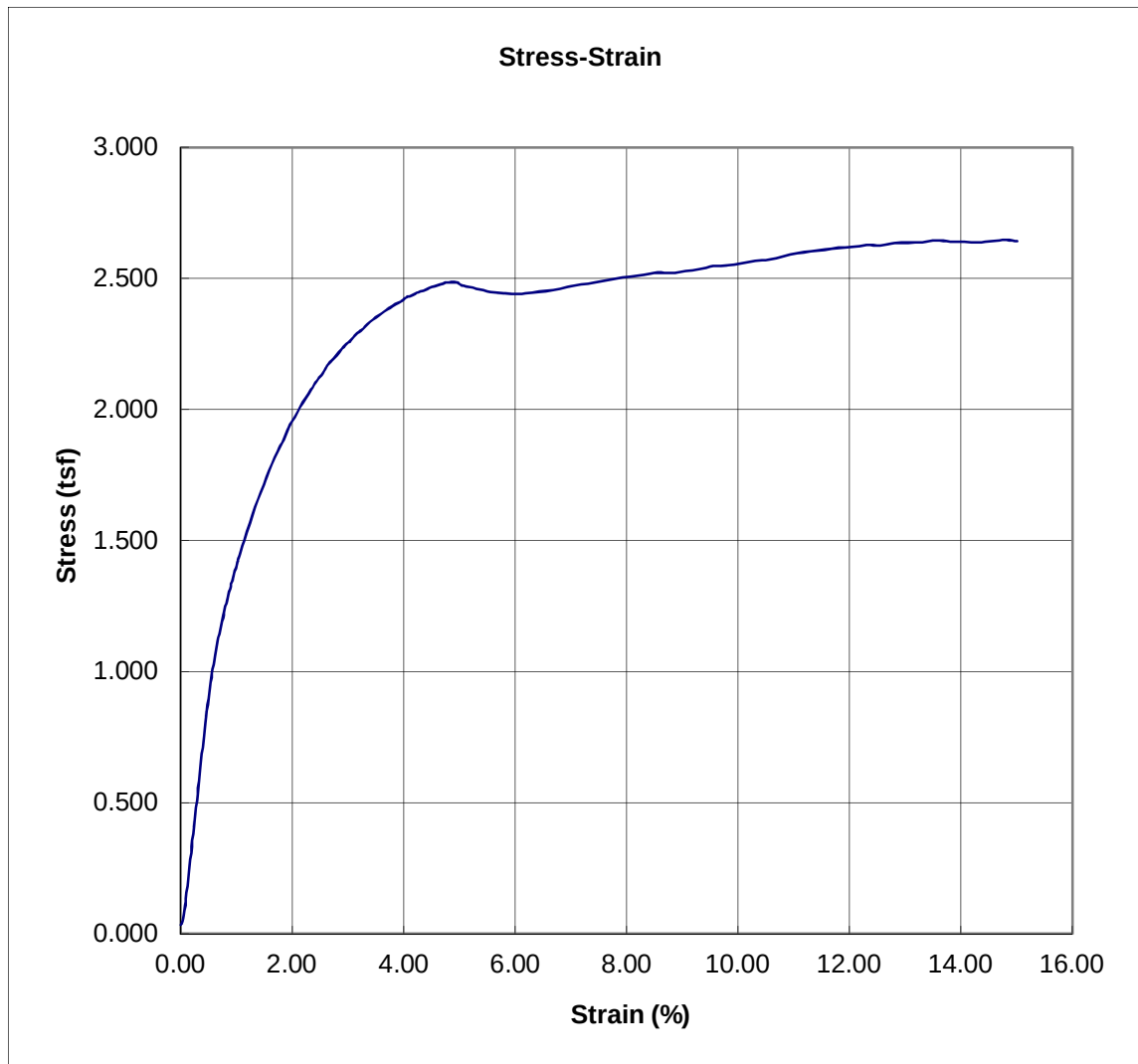
Peak Point	7.07	2.159
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2024
Depth: 38'-40'



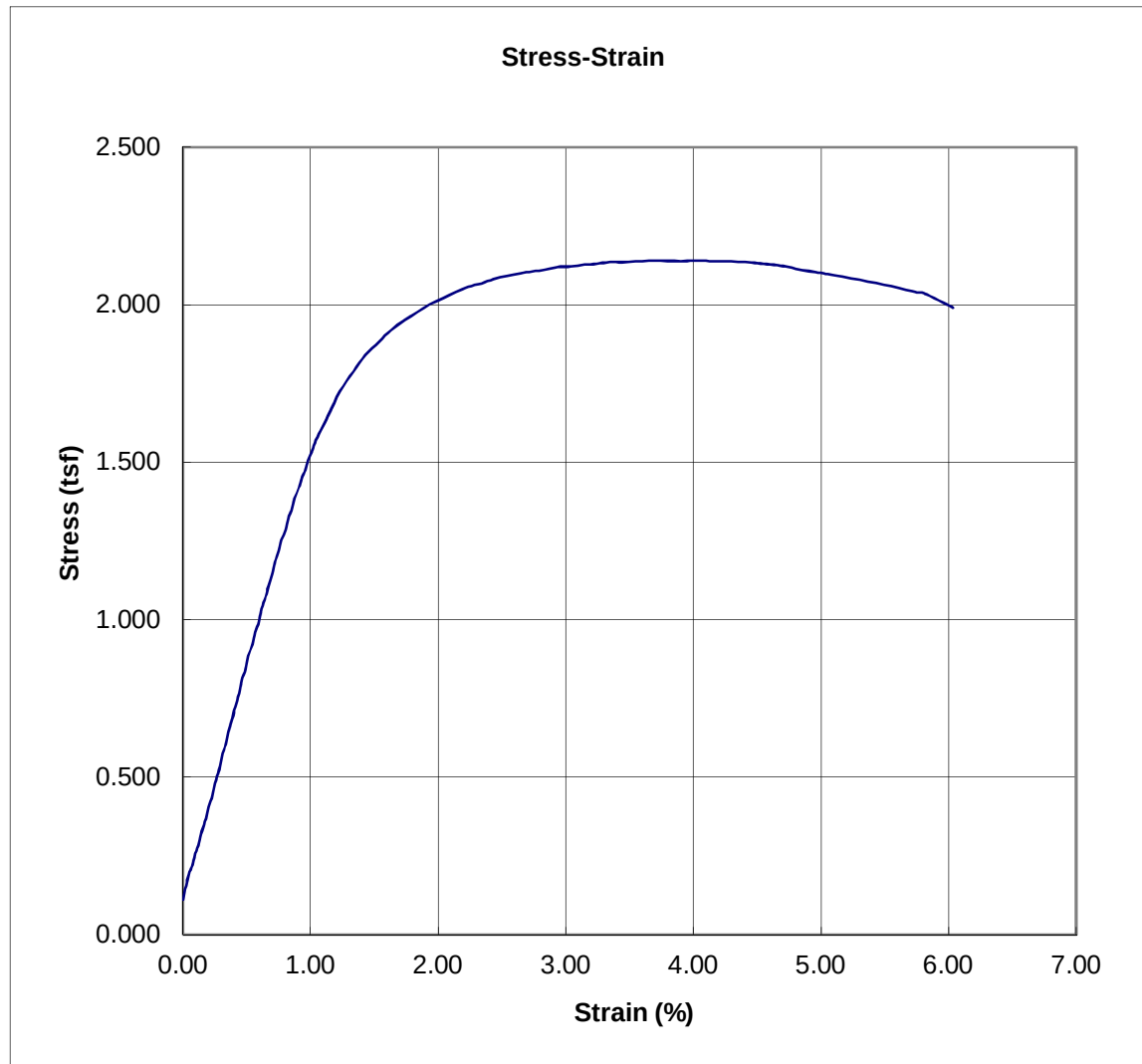
Peak Point	2.05	1.435
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2025
Depth: 10'-12'



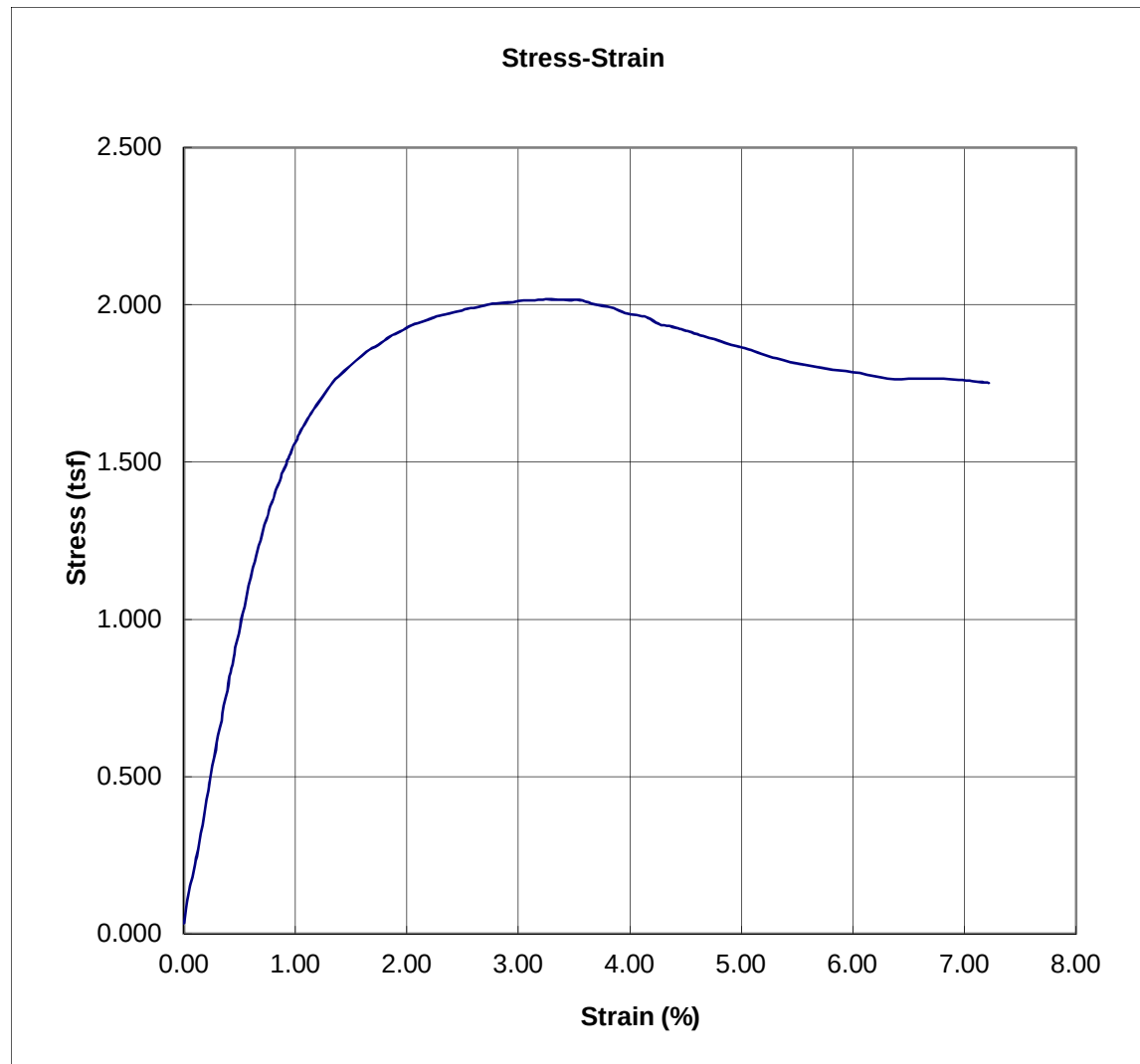
Peak Point	14.81	2.647
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2025
Depth: 16'-18'



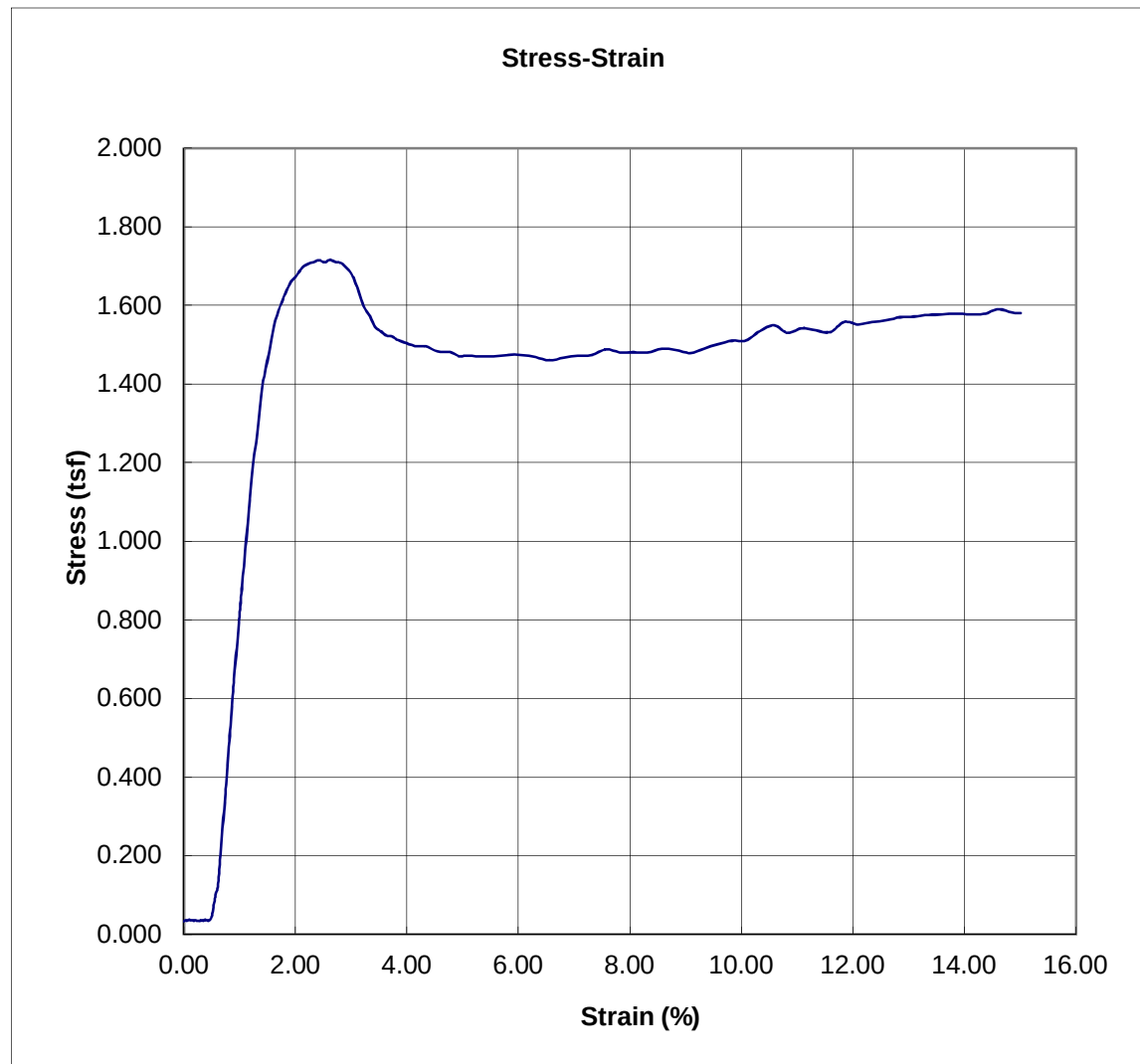
Peak Point	4.05	2.140
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2025
Depth: 28'-30'



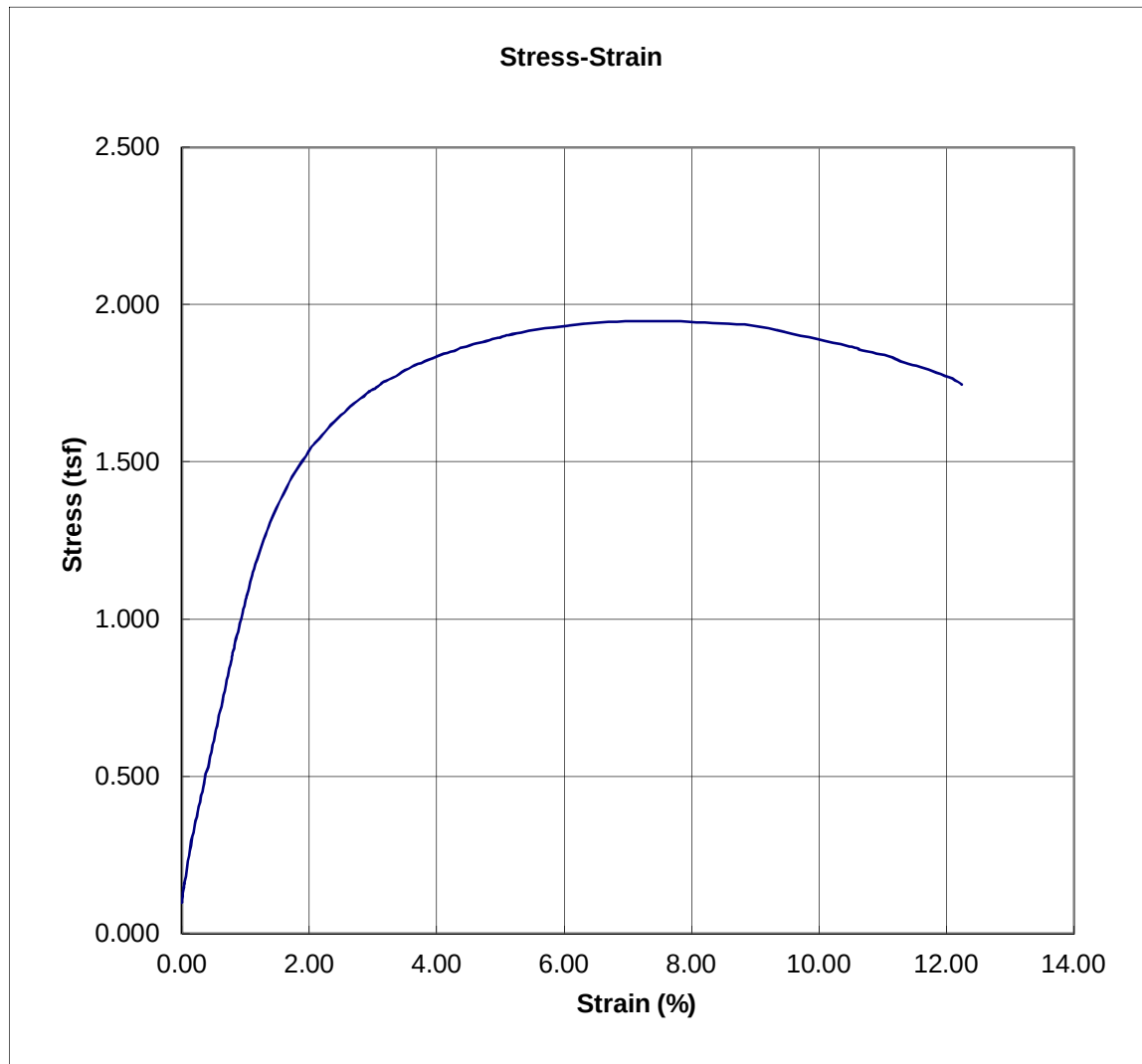
Peak Point	3.24	2.017
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2025
Depth: 38'-40'



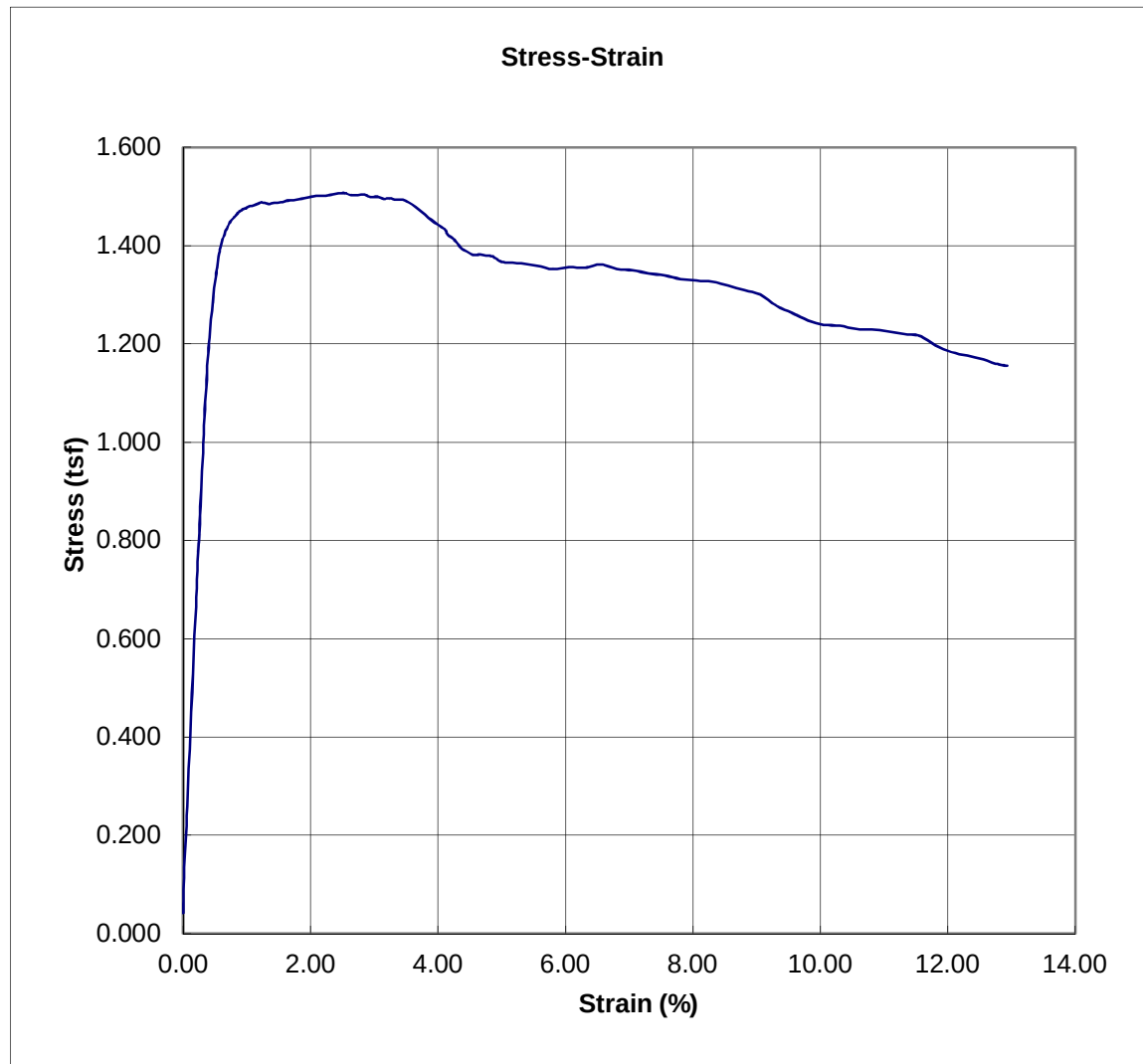
Peak Point	2.62	1.716
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2026
Depth: 10'-12'



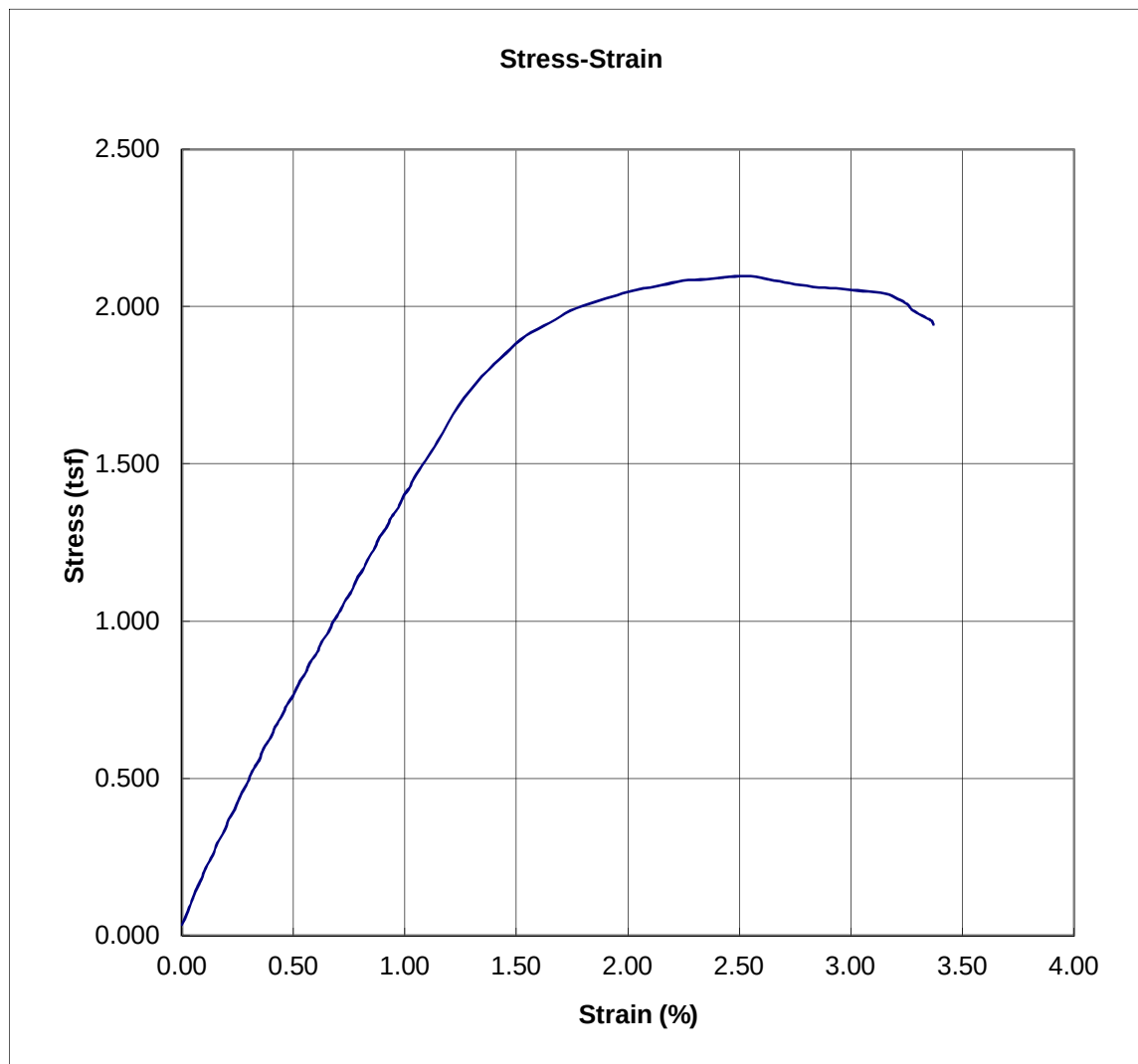
Peak Point	7.58	1.948
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2026
Depth: 16'-18'



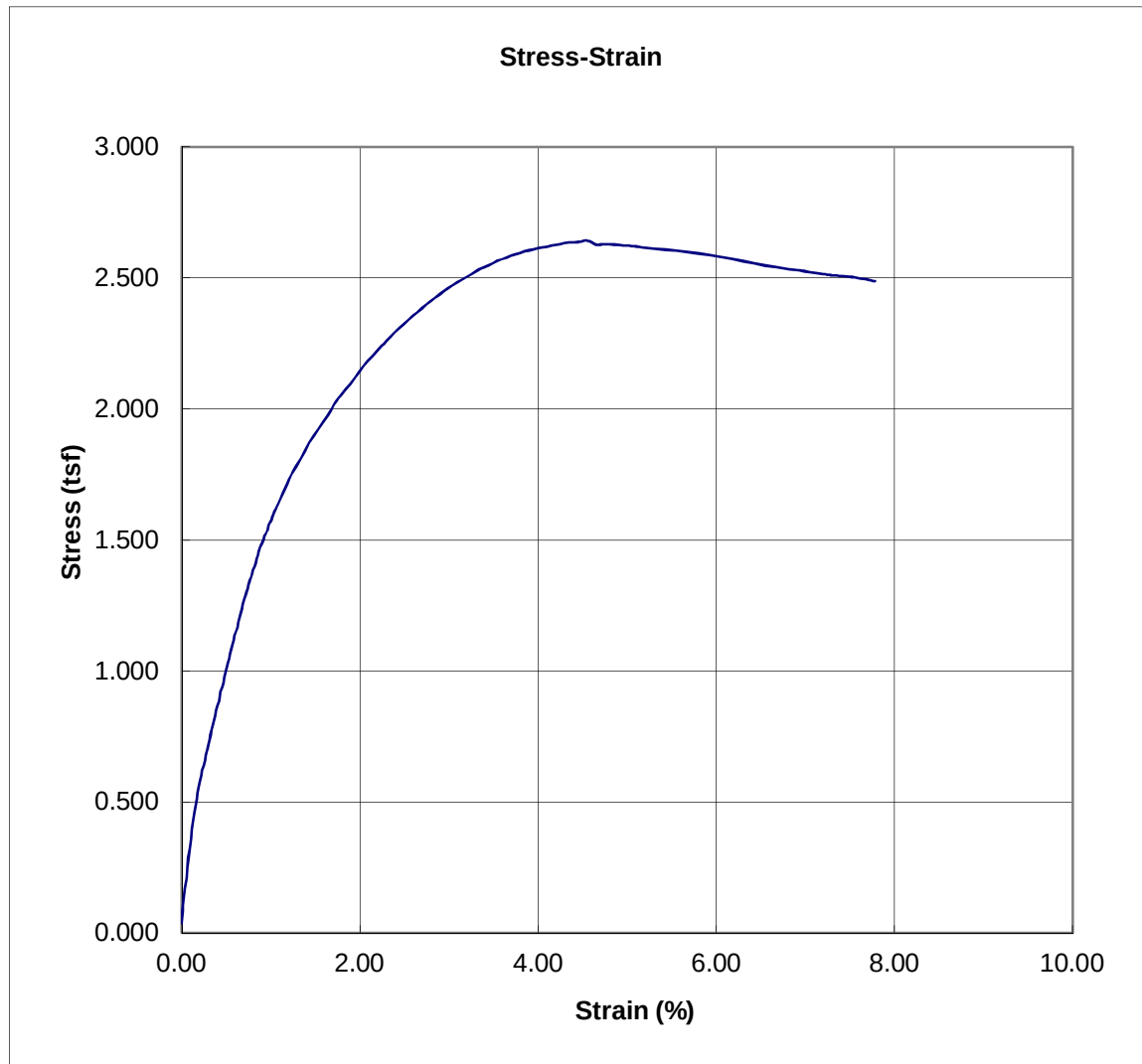
Peak Point	2.54	1.507
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2026
Depth: 23'-25'



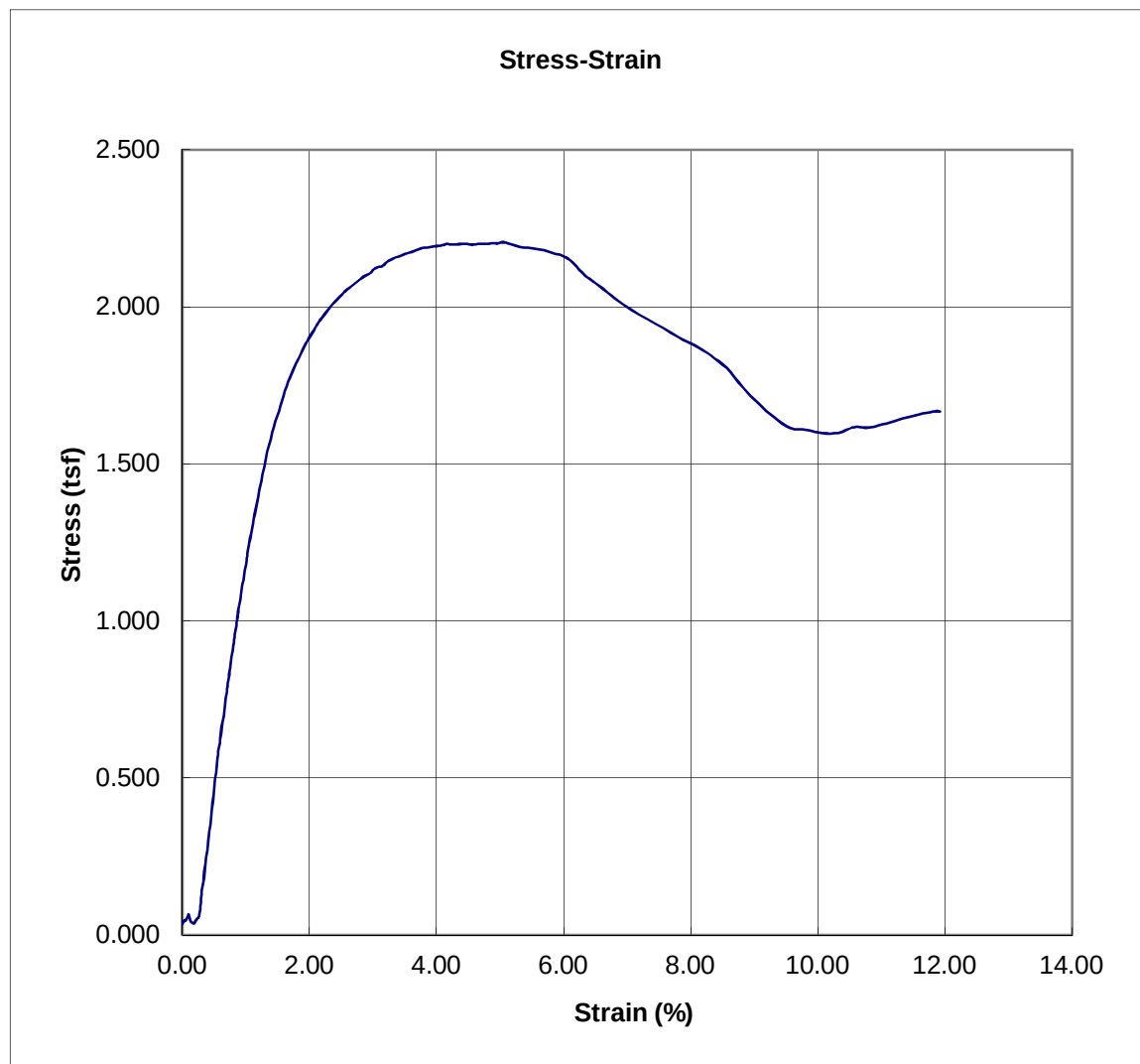
Peak Point	2.55	2.096
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2026
Depth: 33'-35'



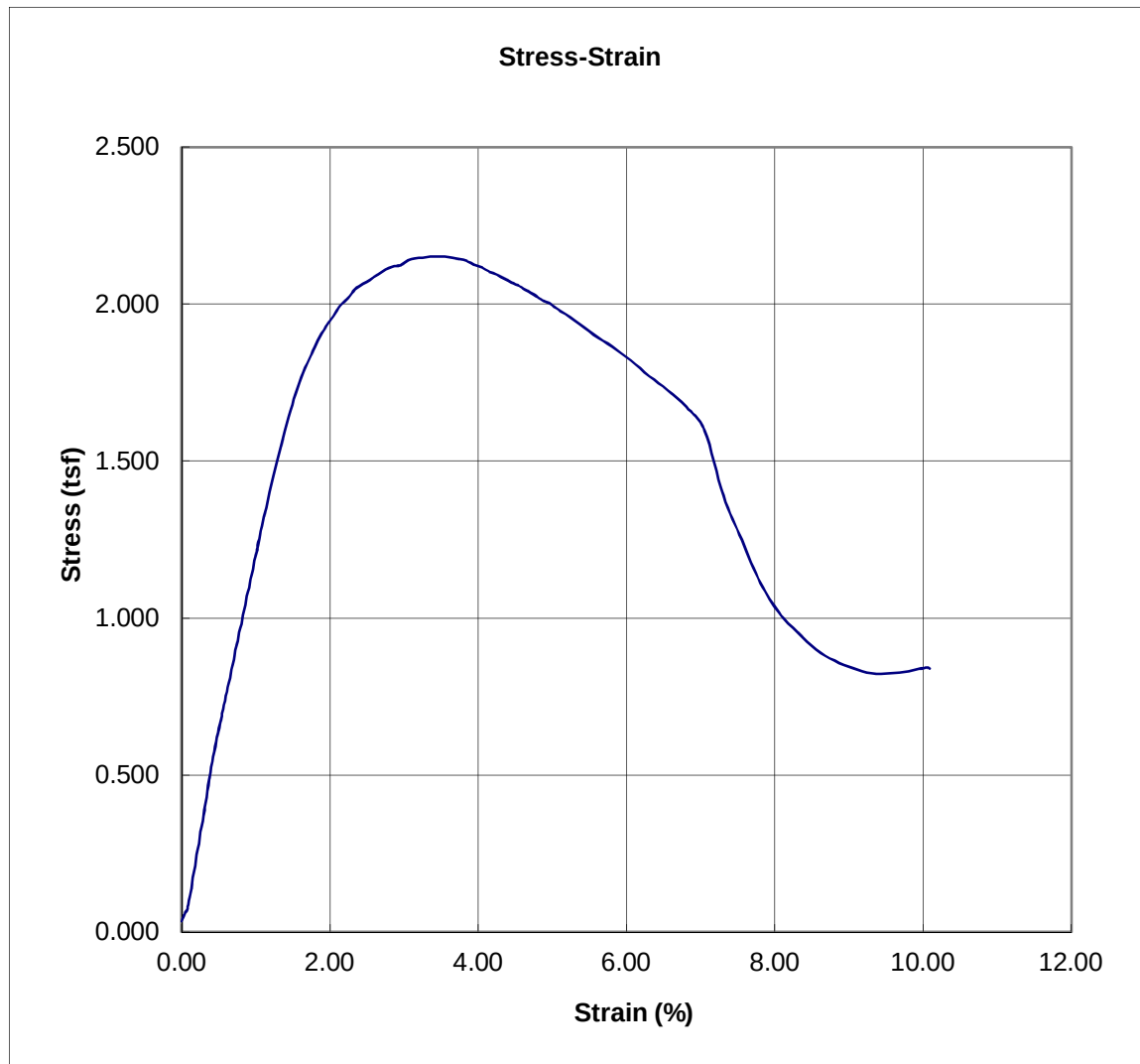
Peak Point	4.55	2.642
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2027
Depth: 10'-12'



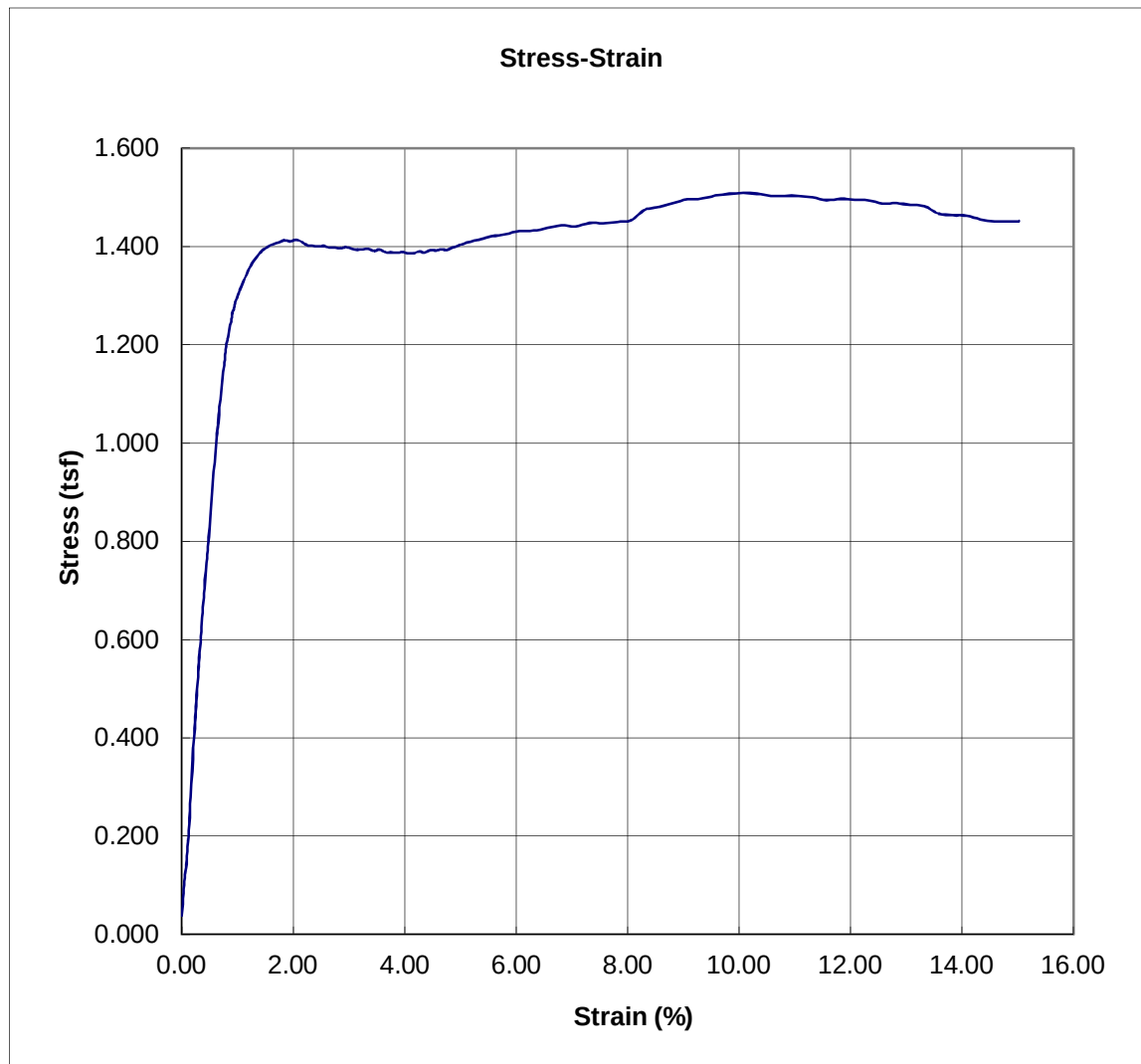
Peak Point	5.07	2.205
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2027
Depth: 16'-18'



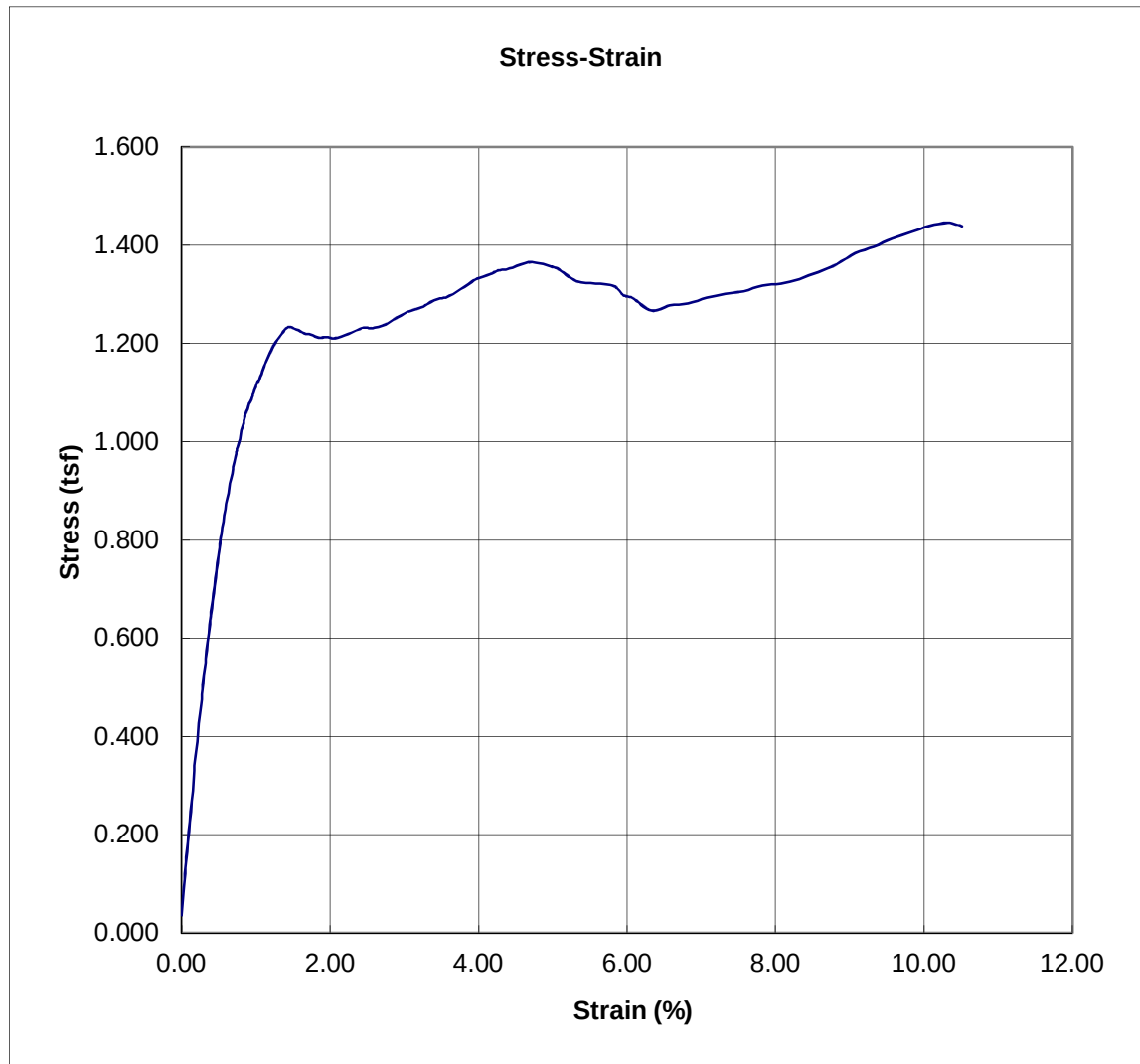
Peak Point	3.55	2.152
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2027
Depth: 23'-25'



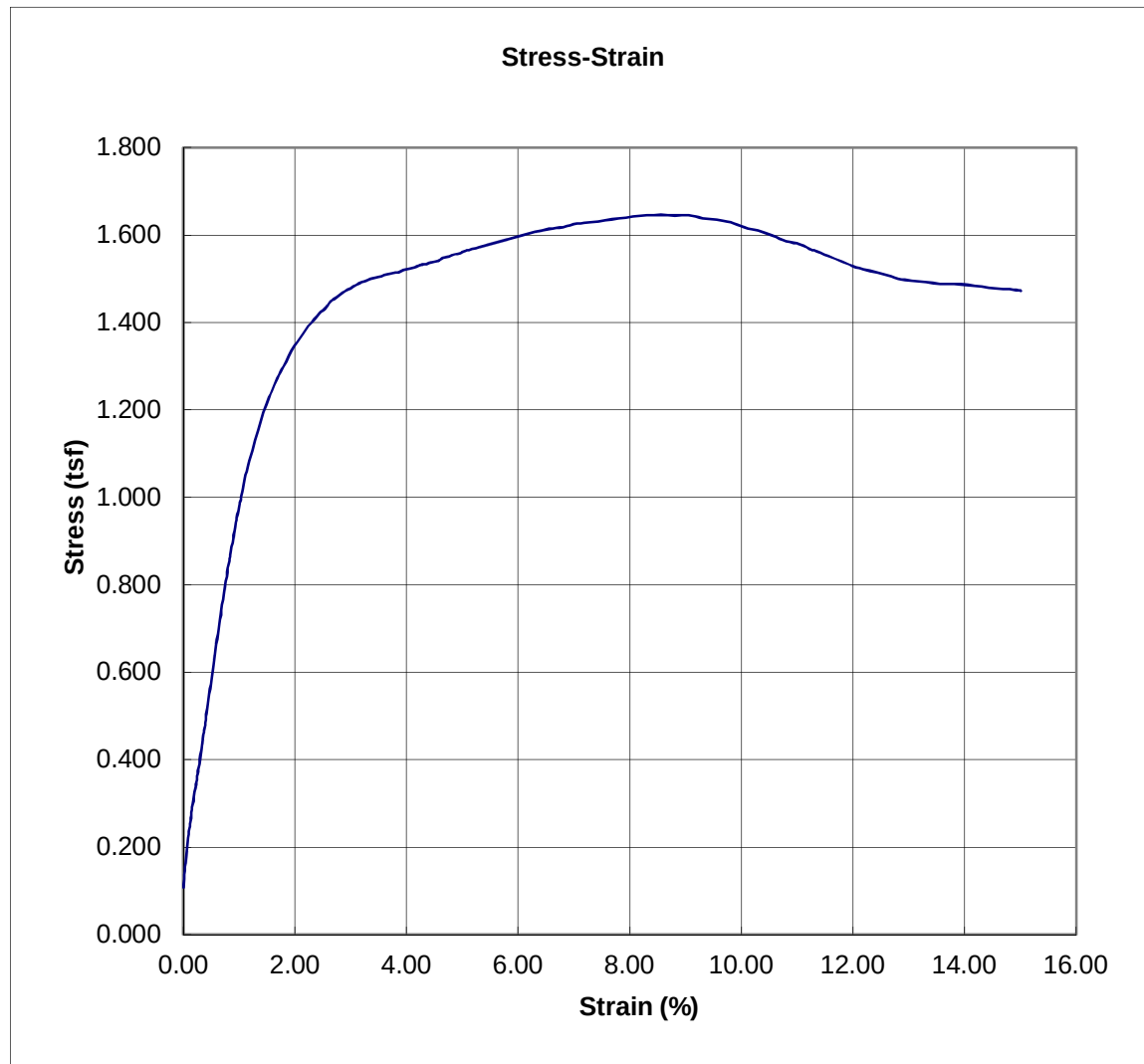
Peak Point	10.07	1.509
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2027
Depth: 38'-40'



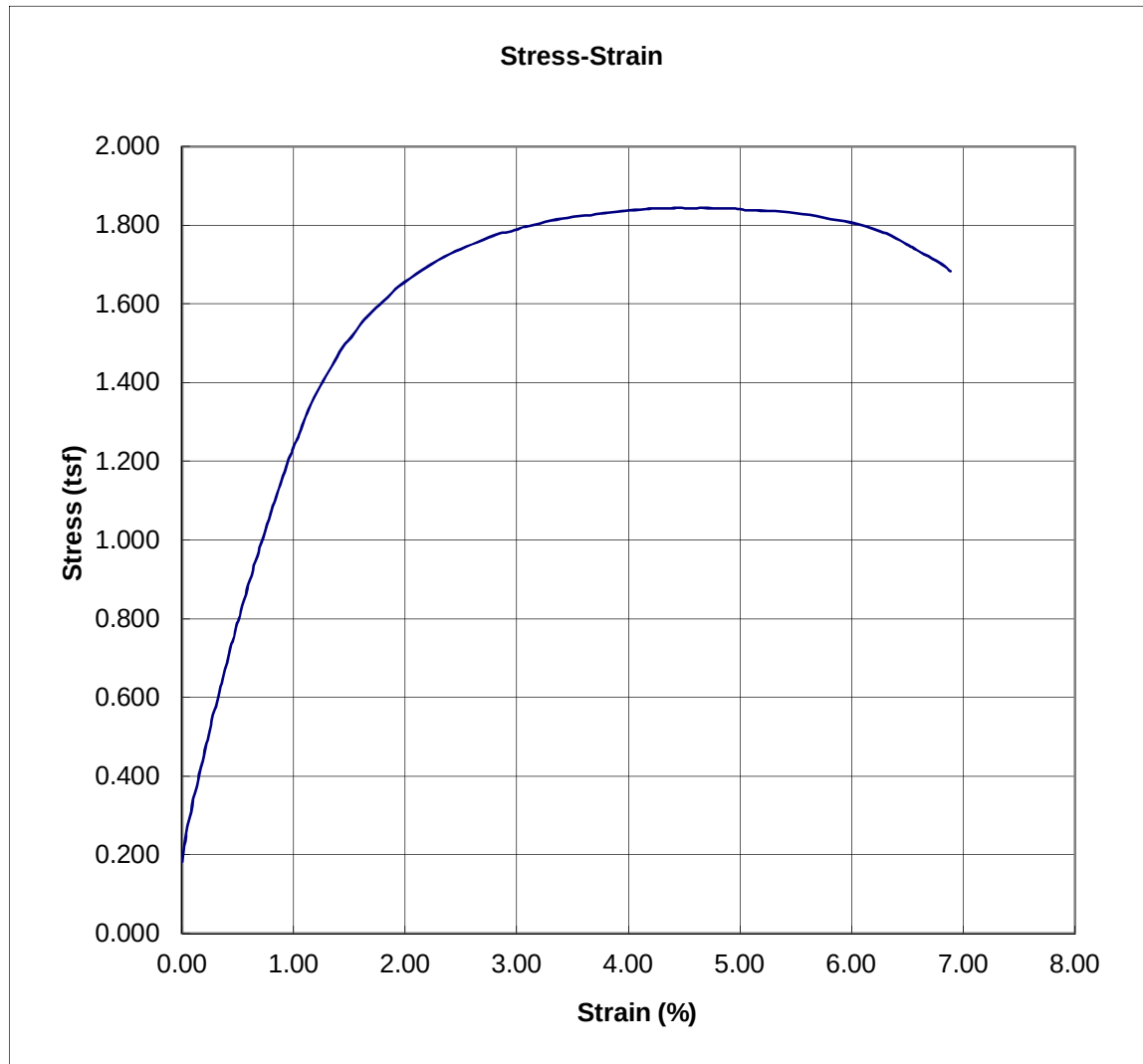
Peak Point	10.32	1.446
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2028
Depth: 8'-10'



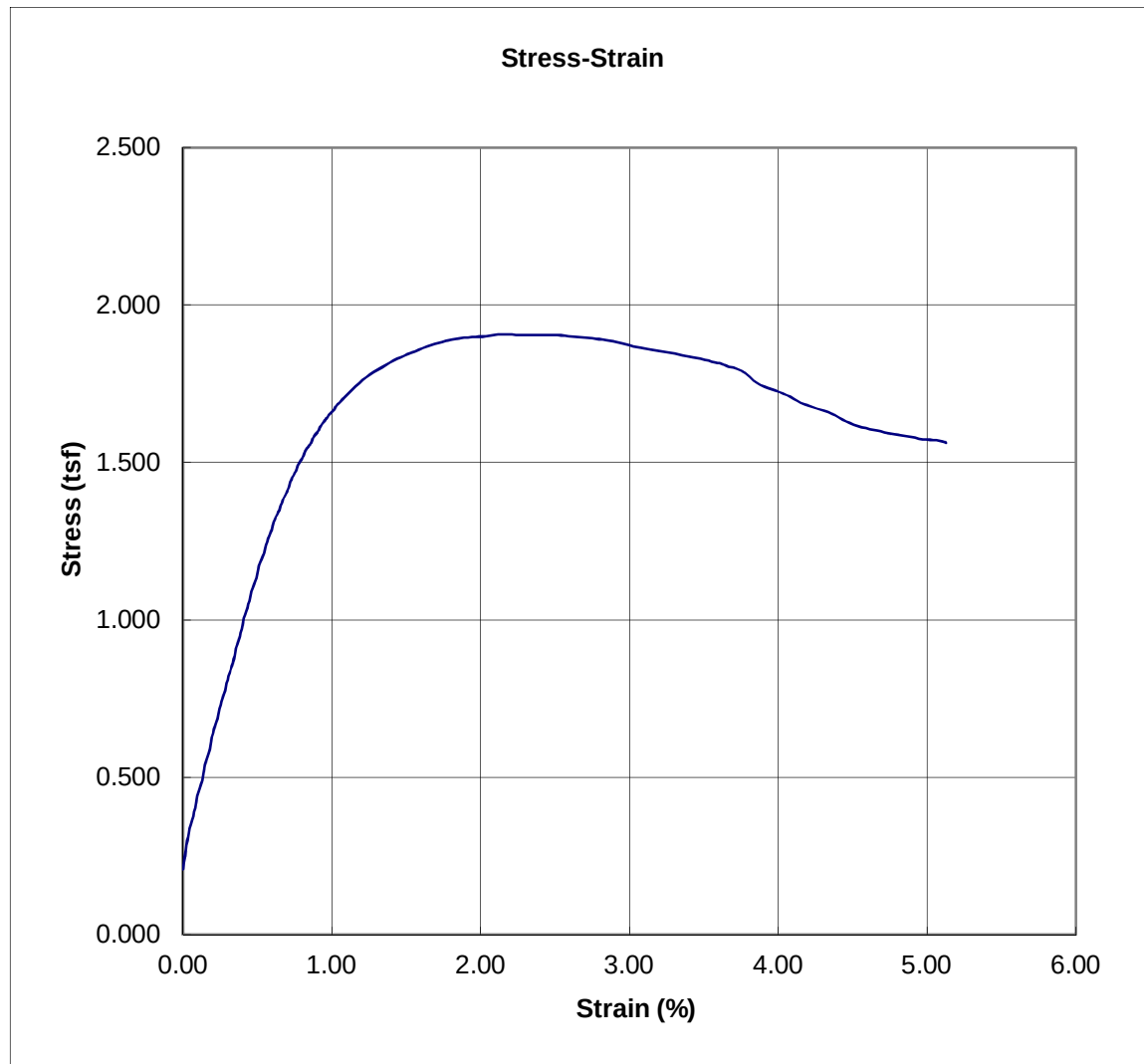
Peak Point	8.56	1.646
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2028
Depth: 14'-16'



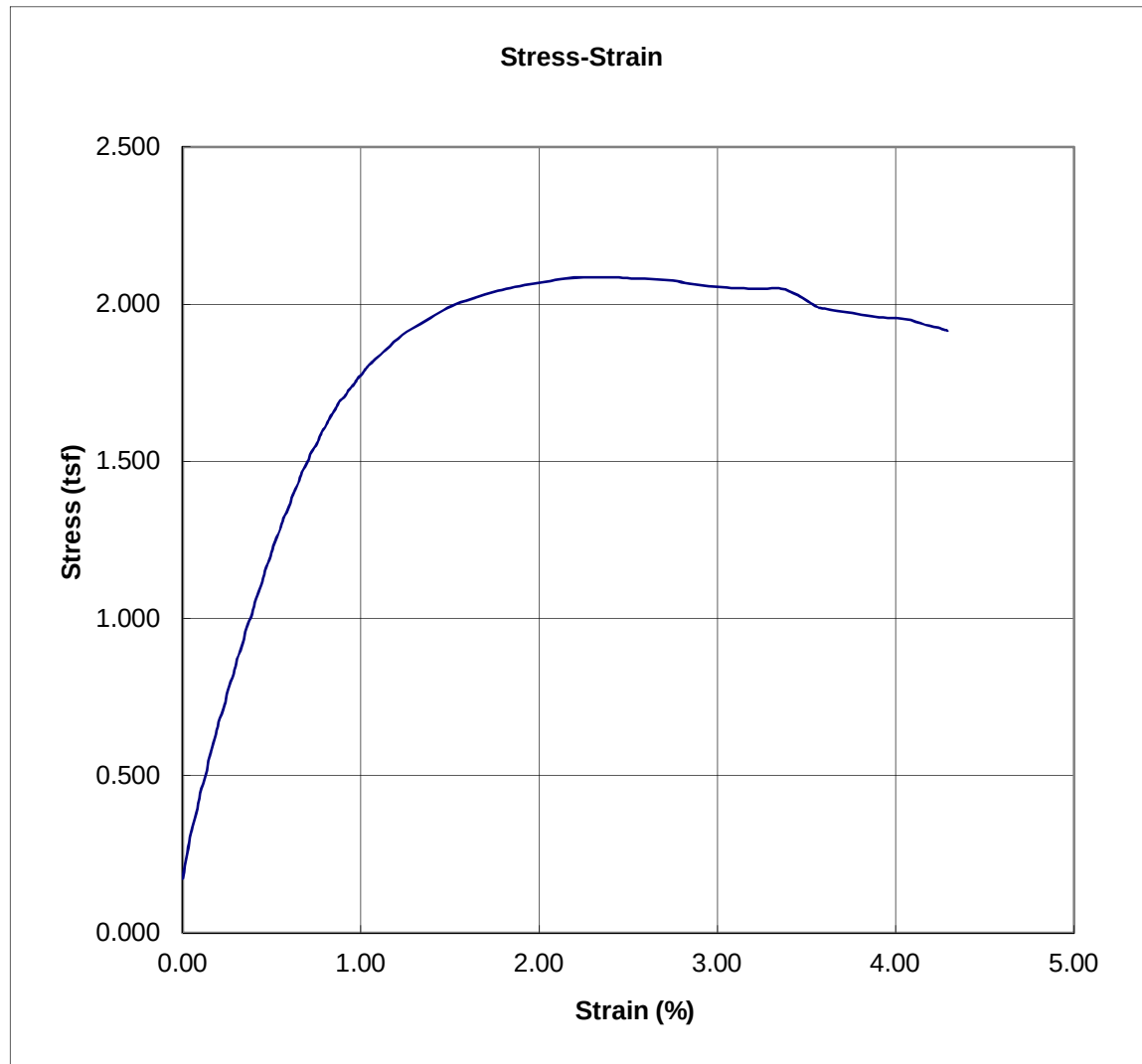
Peak Point	4.45	1.844
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2028
Depth: 23'-25'



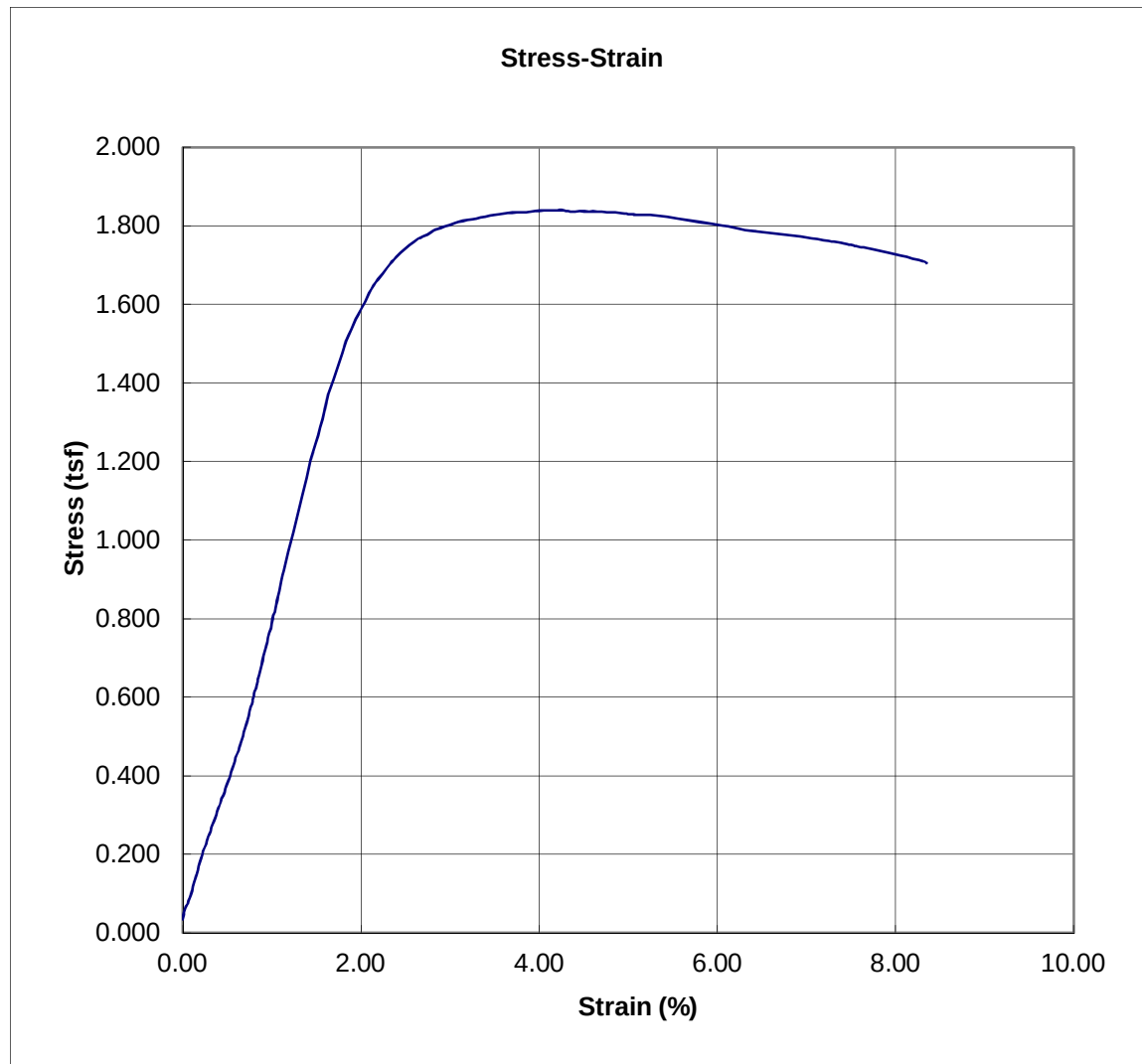
Peak Point	2.14	1.907
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2028
Depth: 33'-35'



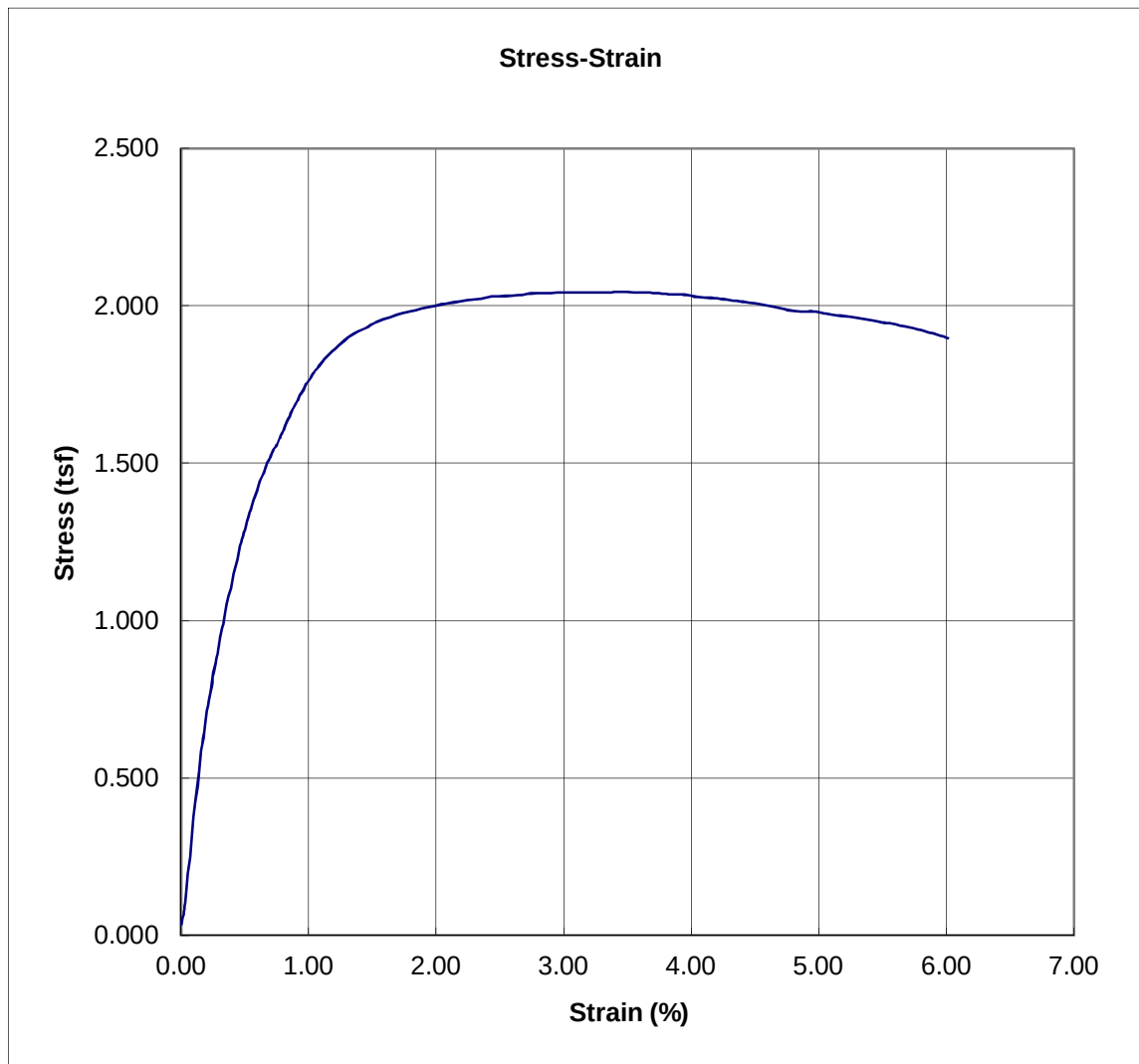
Peak Point	2.34	2.086
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2029
Depth: 14'-16'



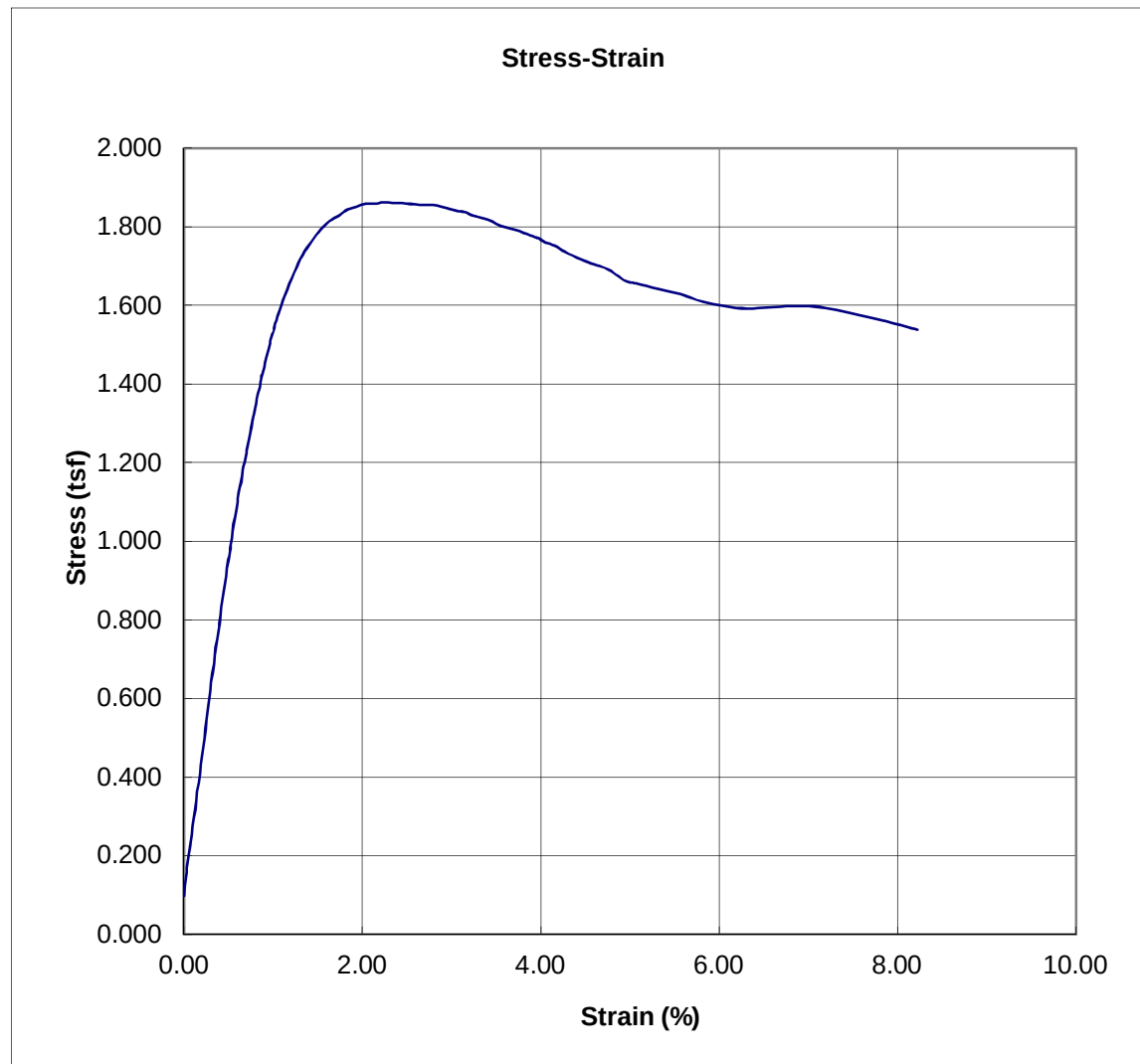
Peak Point	4.25	1.840
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2029
Depth: 23'-25'



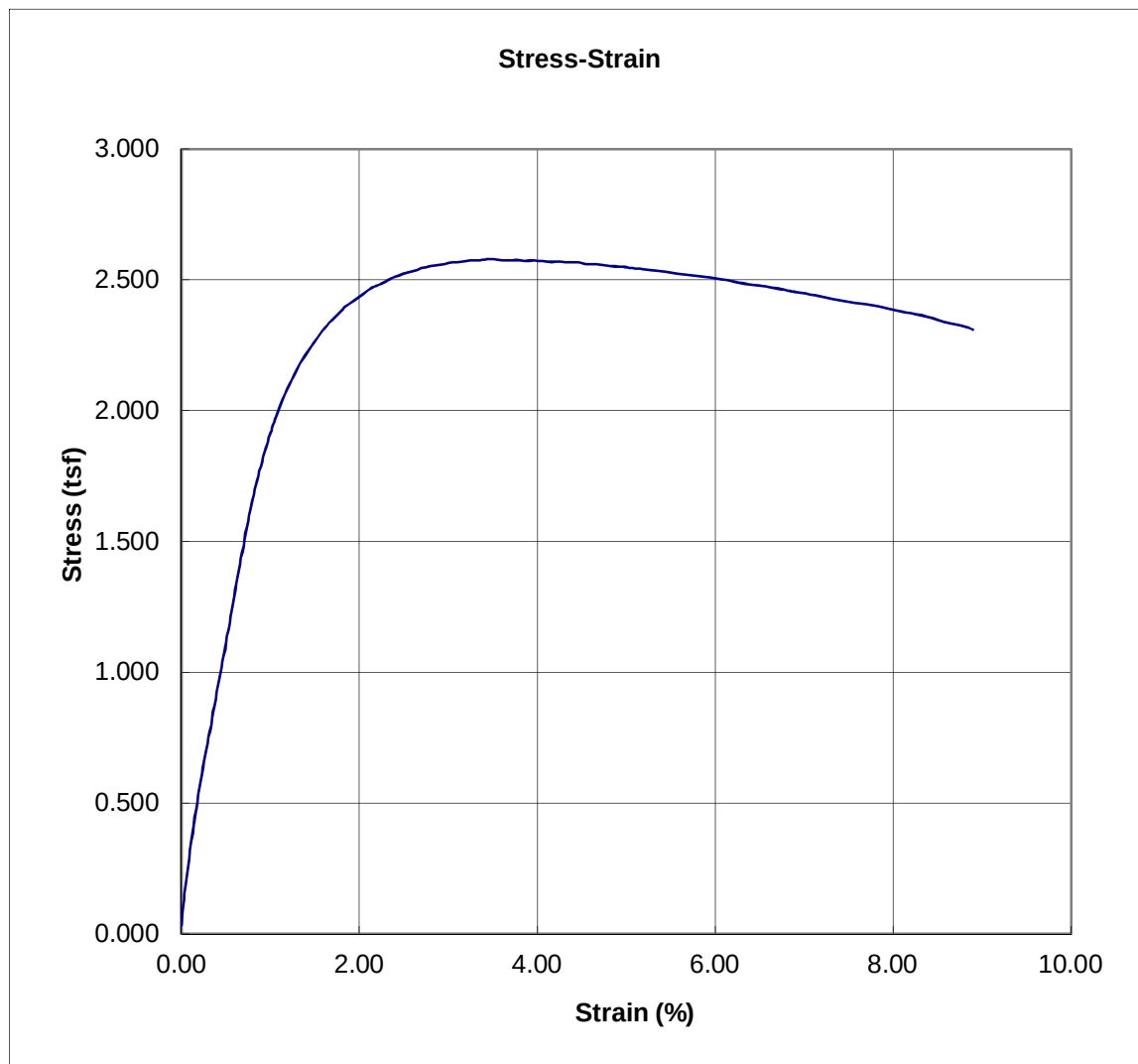
Peak Point	3.44	2.045
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2030
Depth: 12'-14'



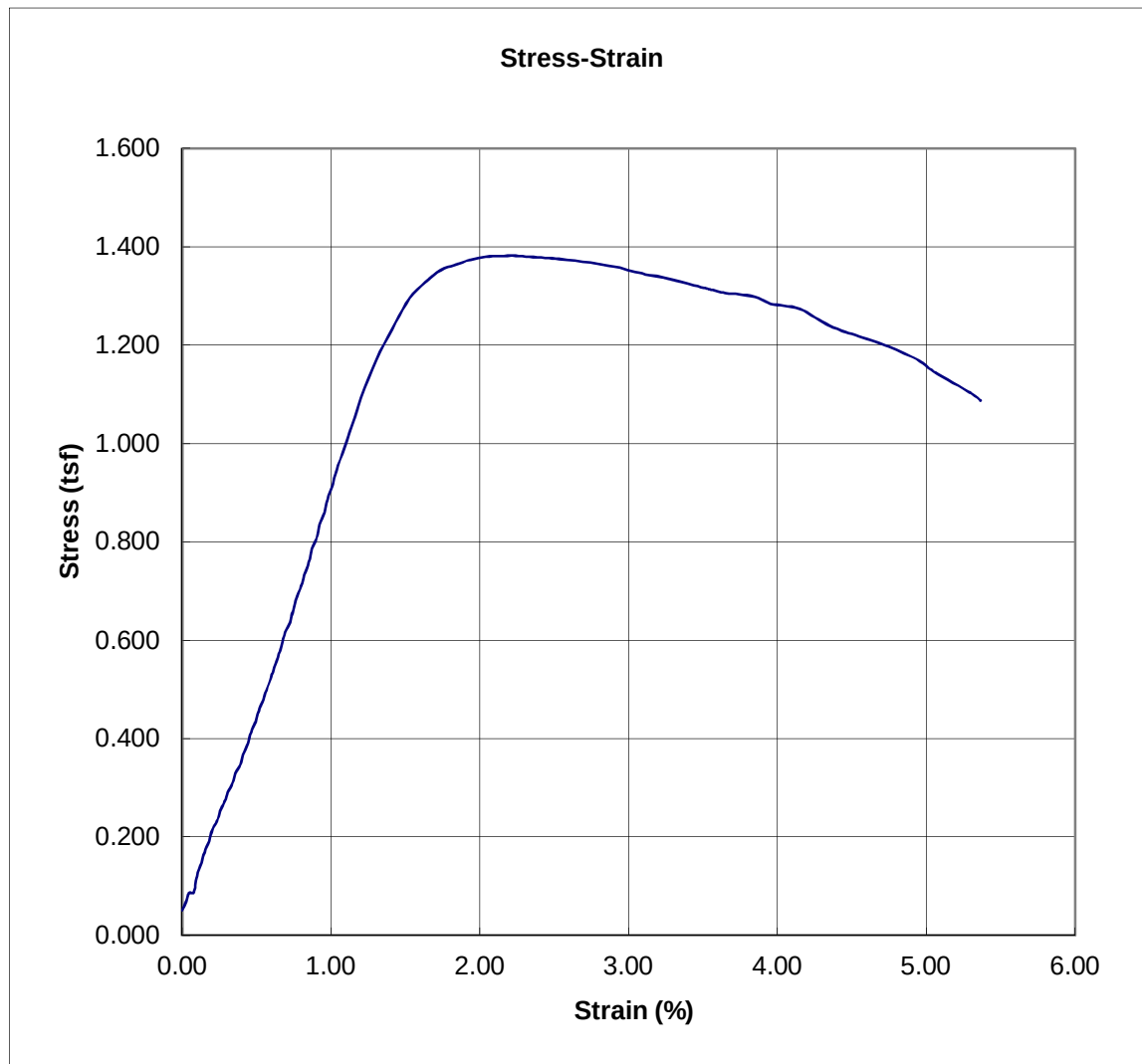
Peak Point	2.23	1.862
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2030
Depth: 23'-25'



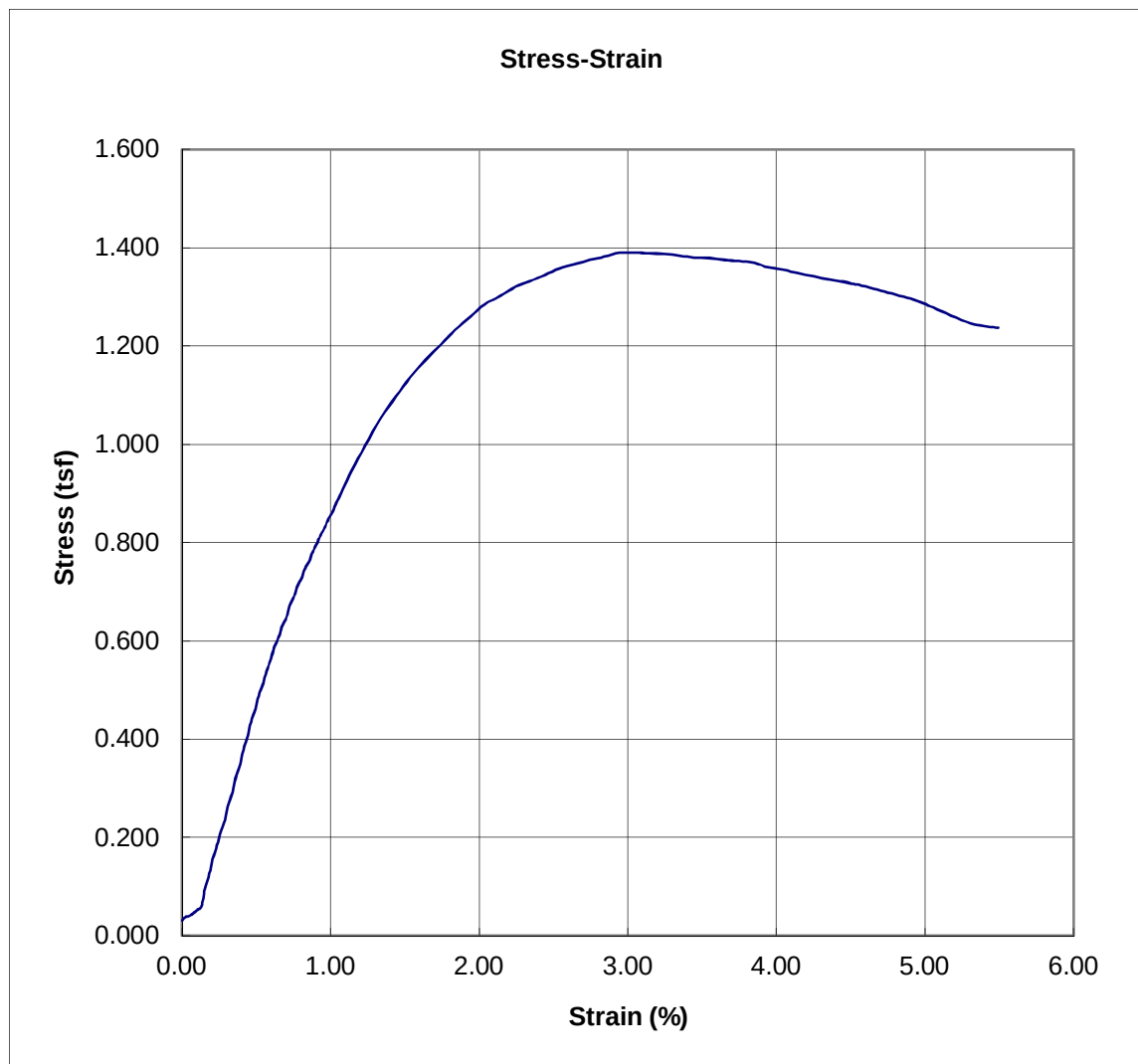
Peak Point	3.46	2.580
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2031
Depth: 12'-14'



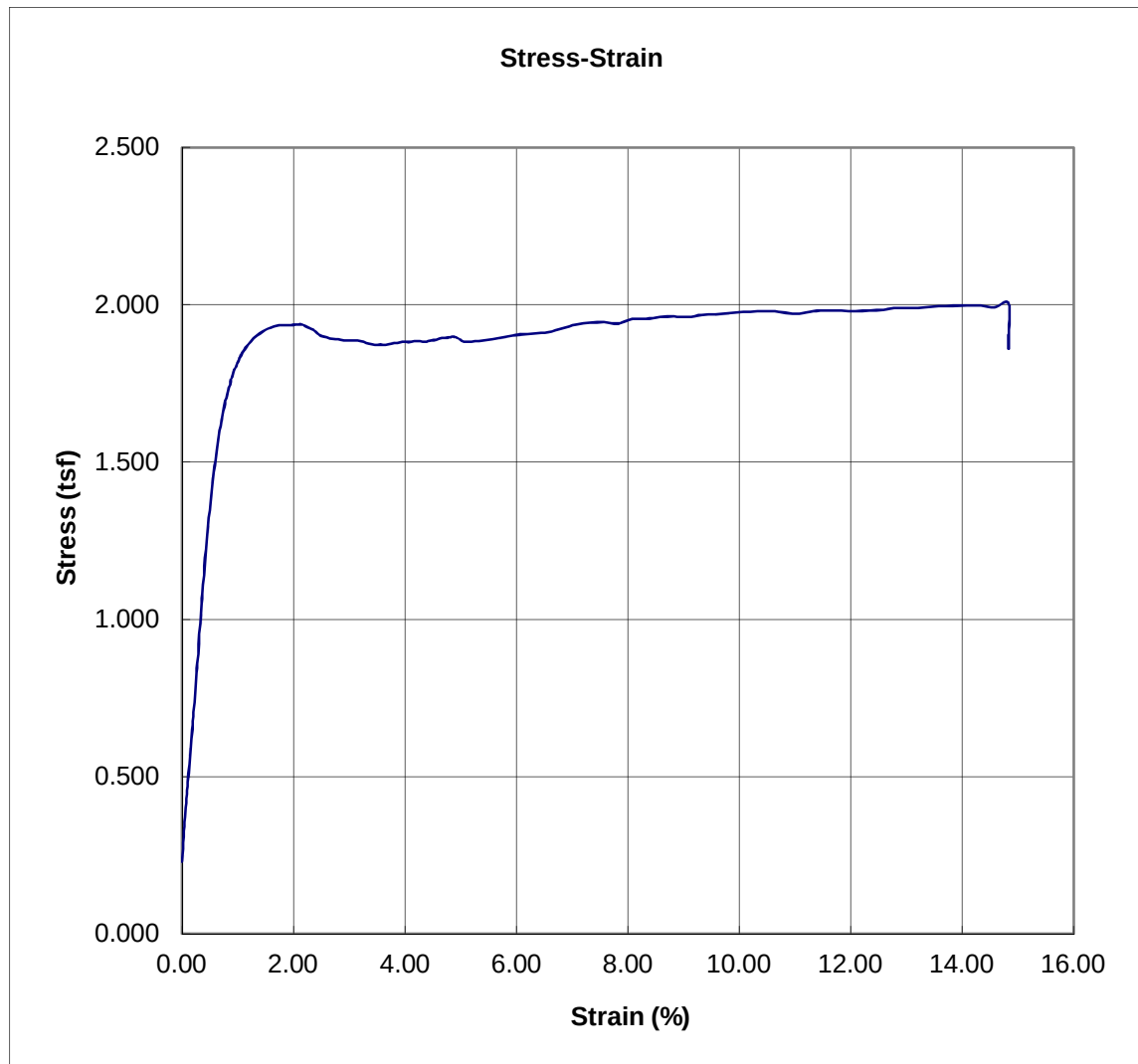
Peak Point	2.24	1.382
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2031
Depth: 16'-18'



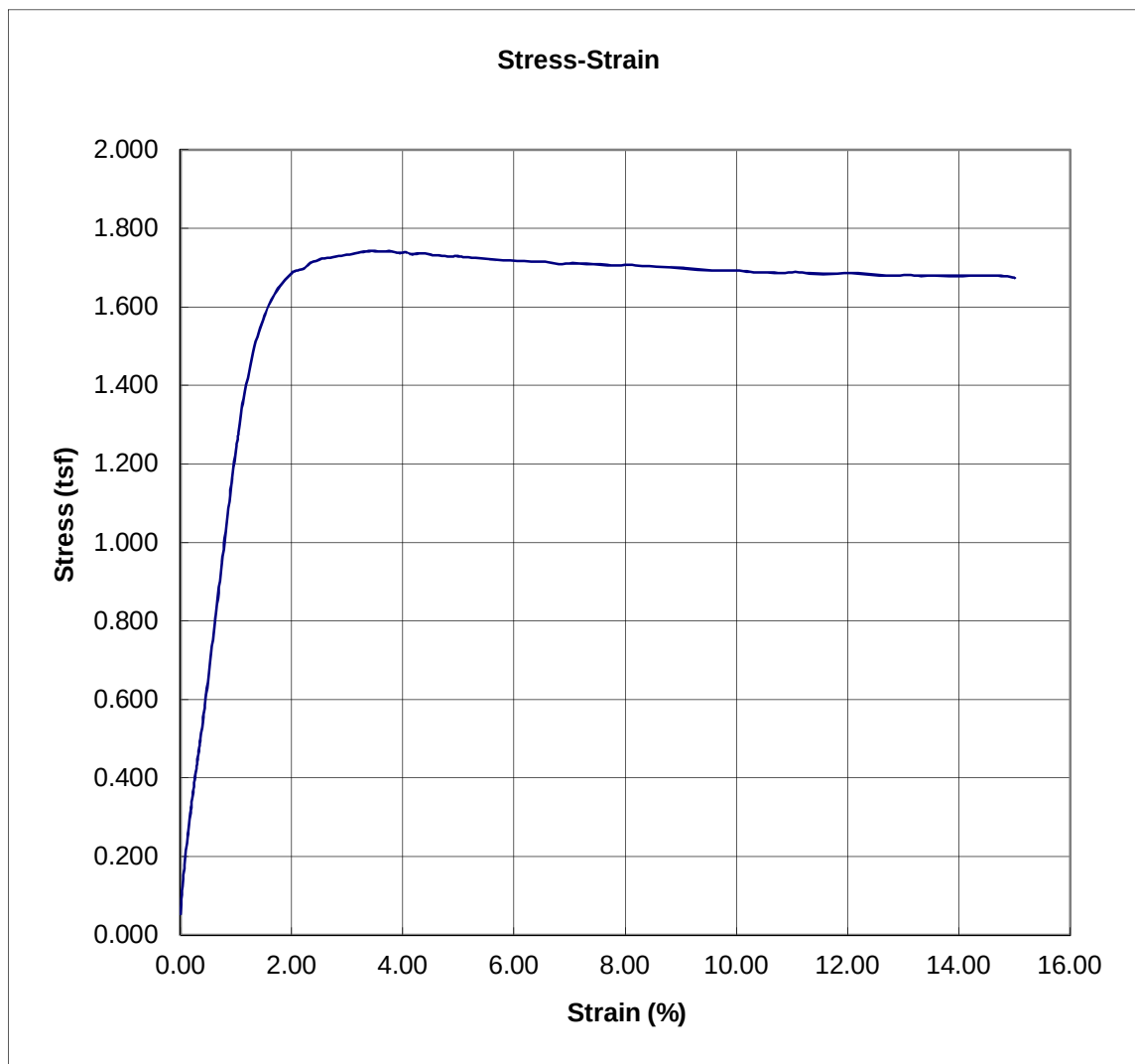
Peak Point	3.05	1.390
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2031
Depth: 28'-30'



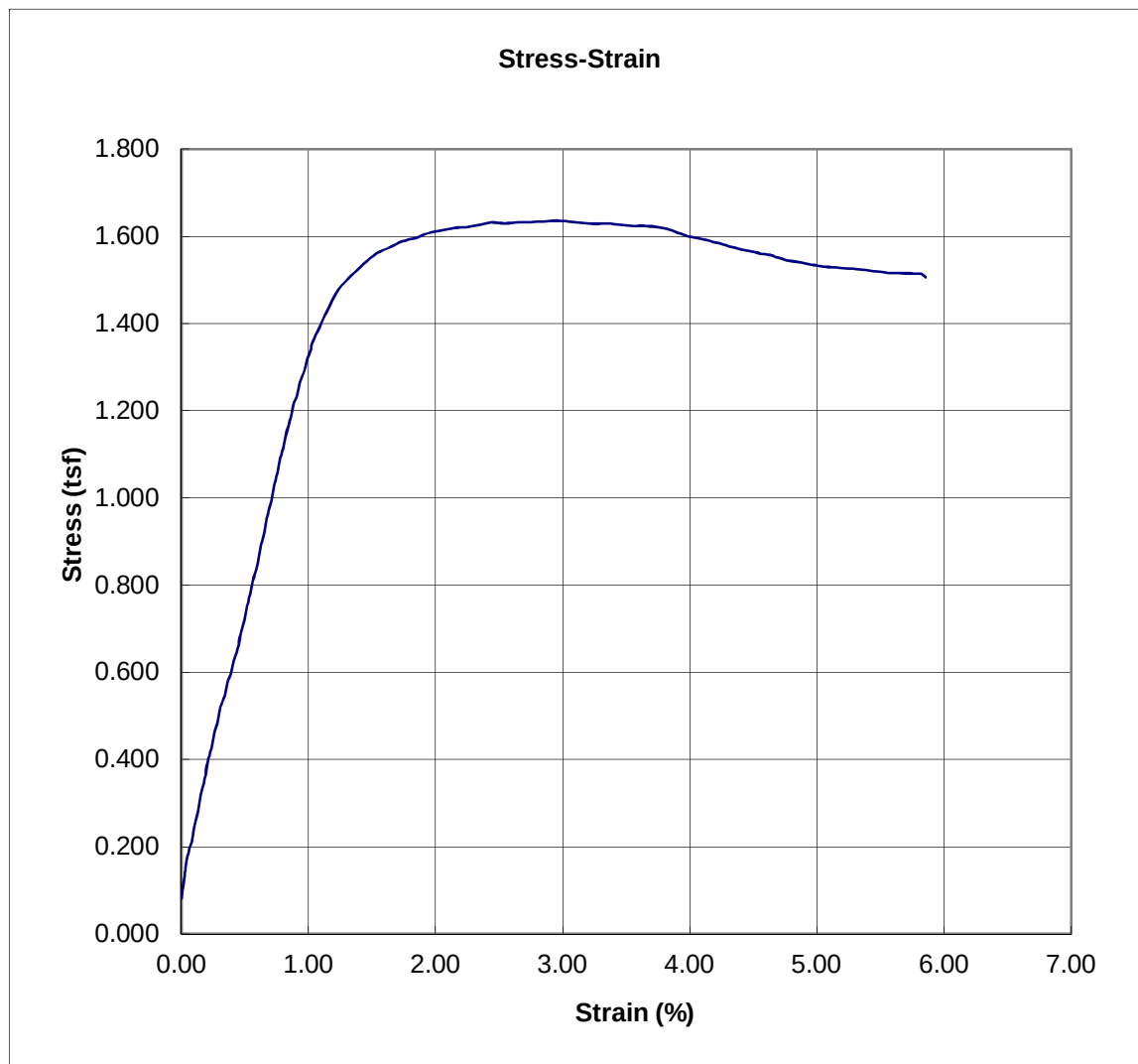
Peak Point	14.83	2.005
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2032
Depth: 16'-18'



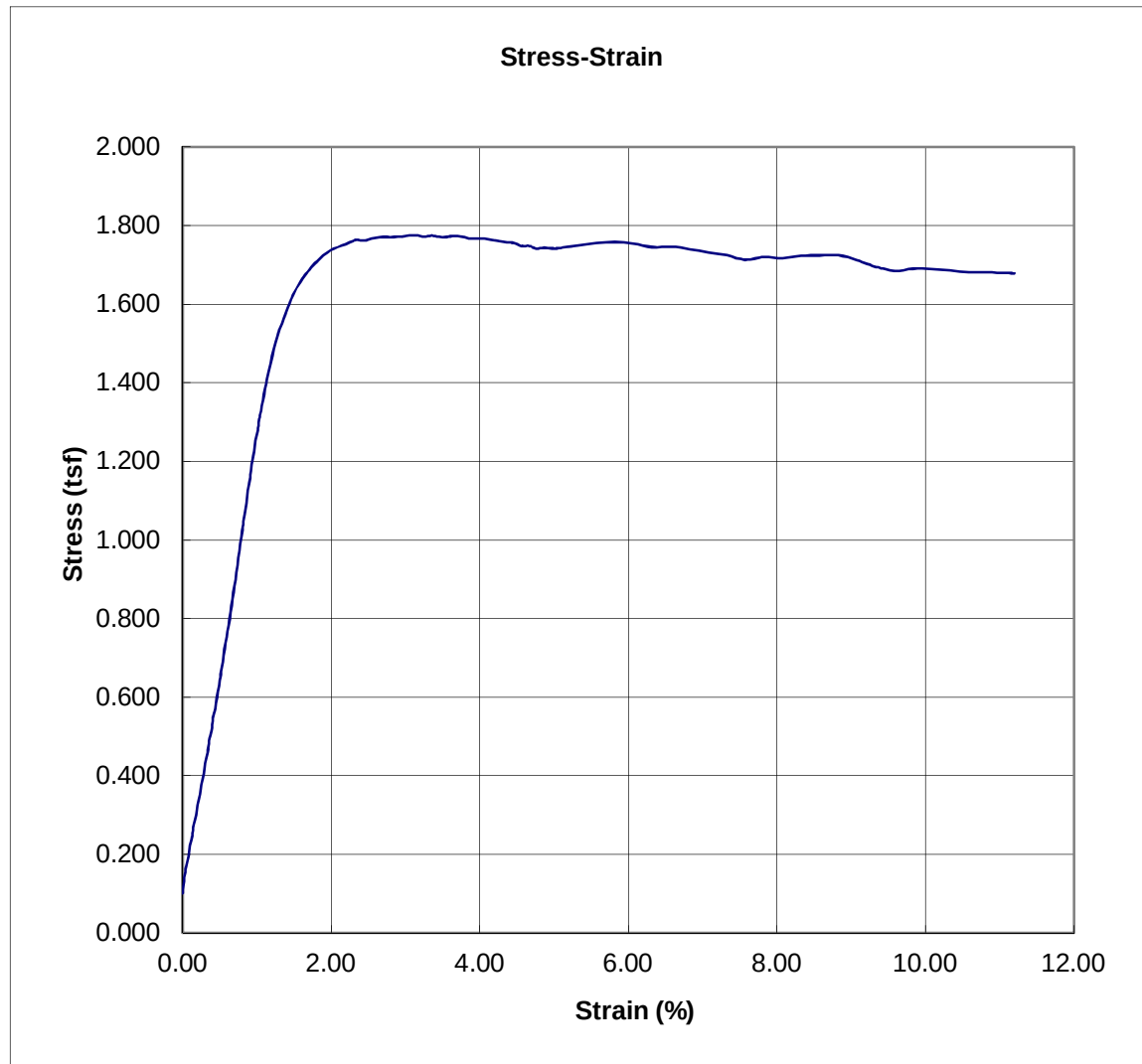
Peak Point	3.45	1.742
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2032
Depth: 23'-25'



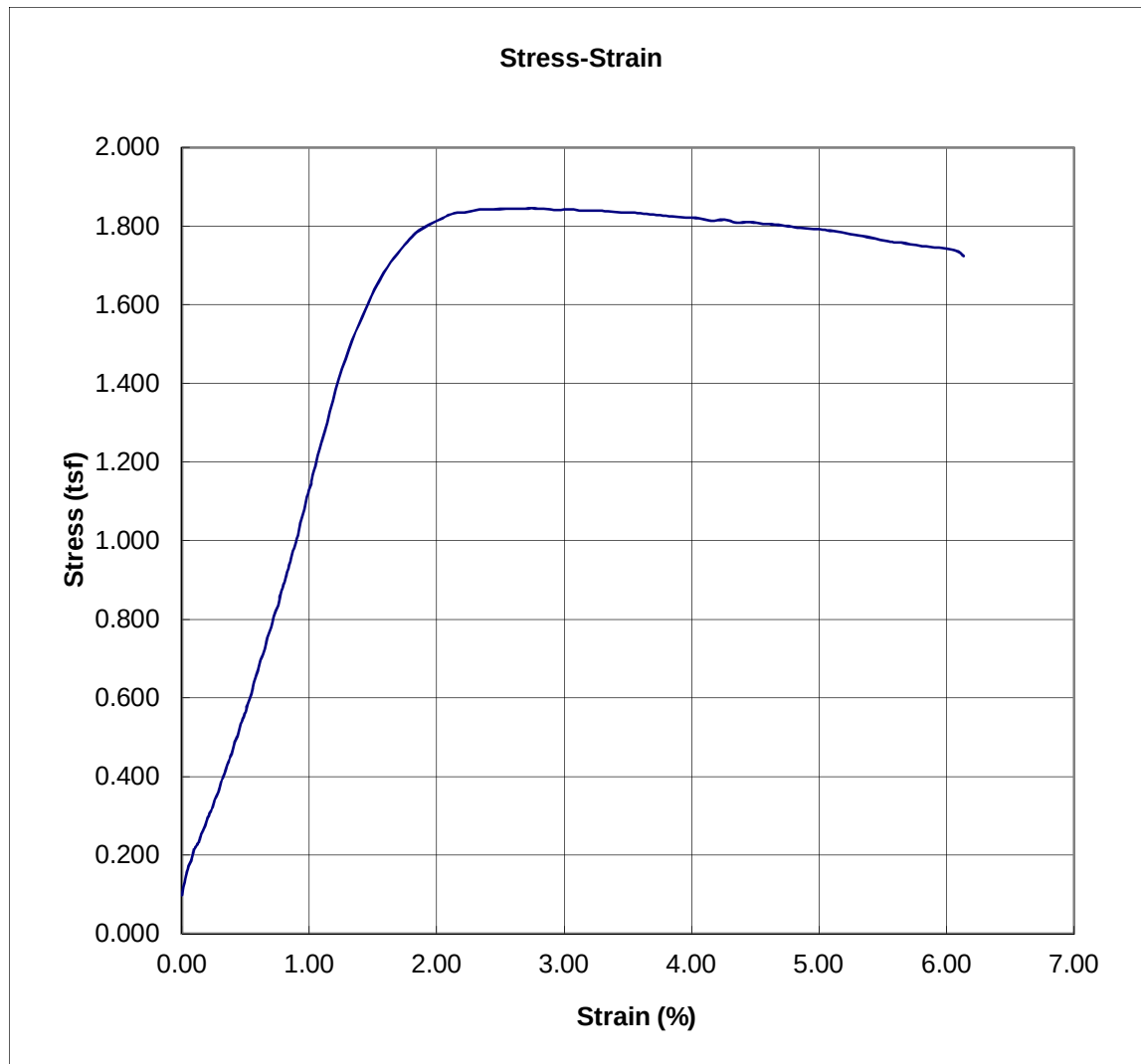
Peak Point	2.95	1.636
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2033
Depth: 14'-16'



Peak Point	3.15	1.775
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2033
Depth: 23'-25'



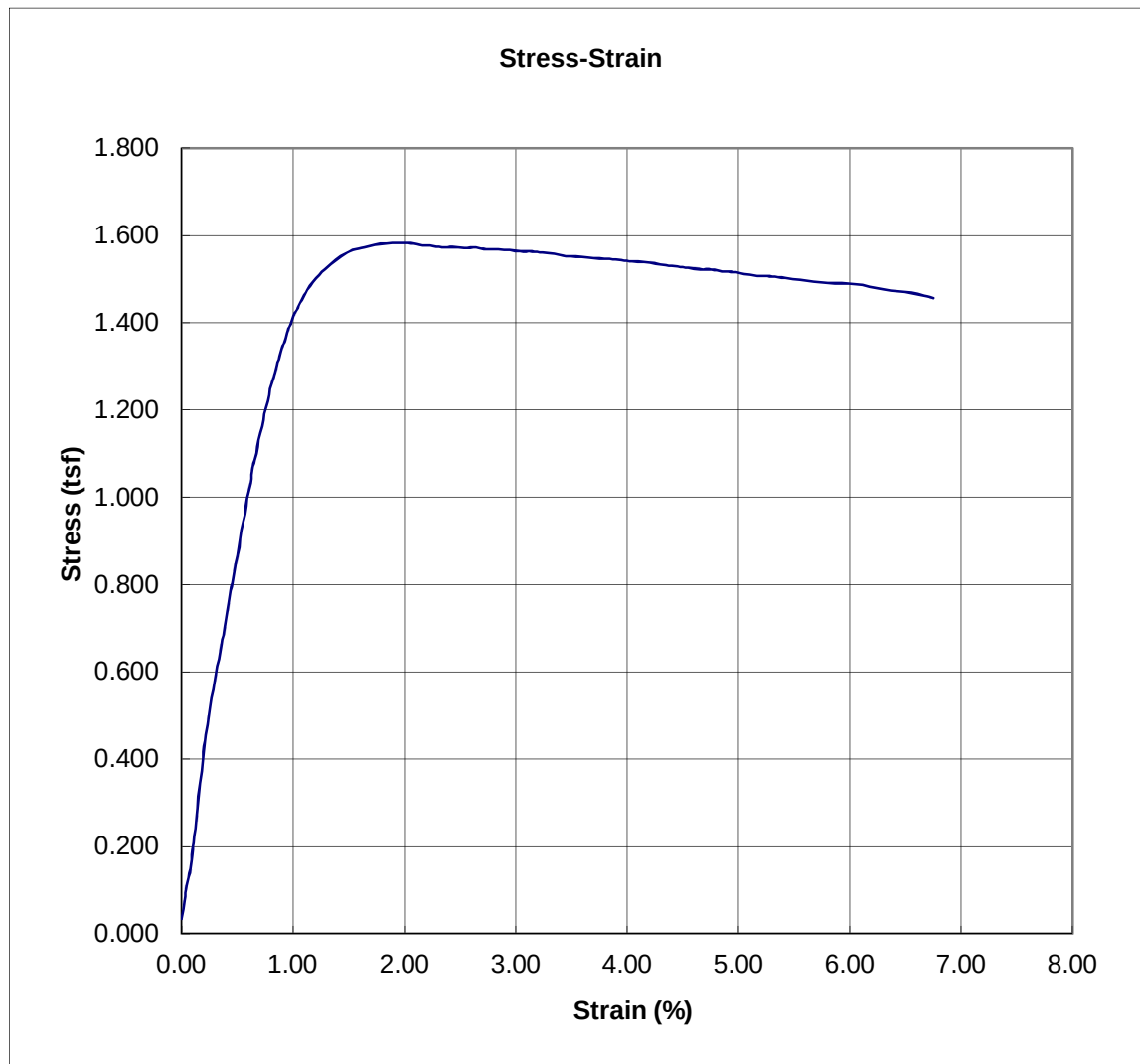
Peak Point	2.75	1.845
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2033
Depth: 33'-35'



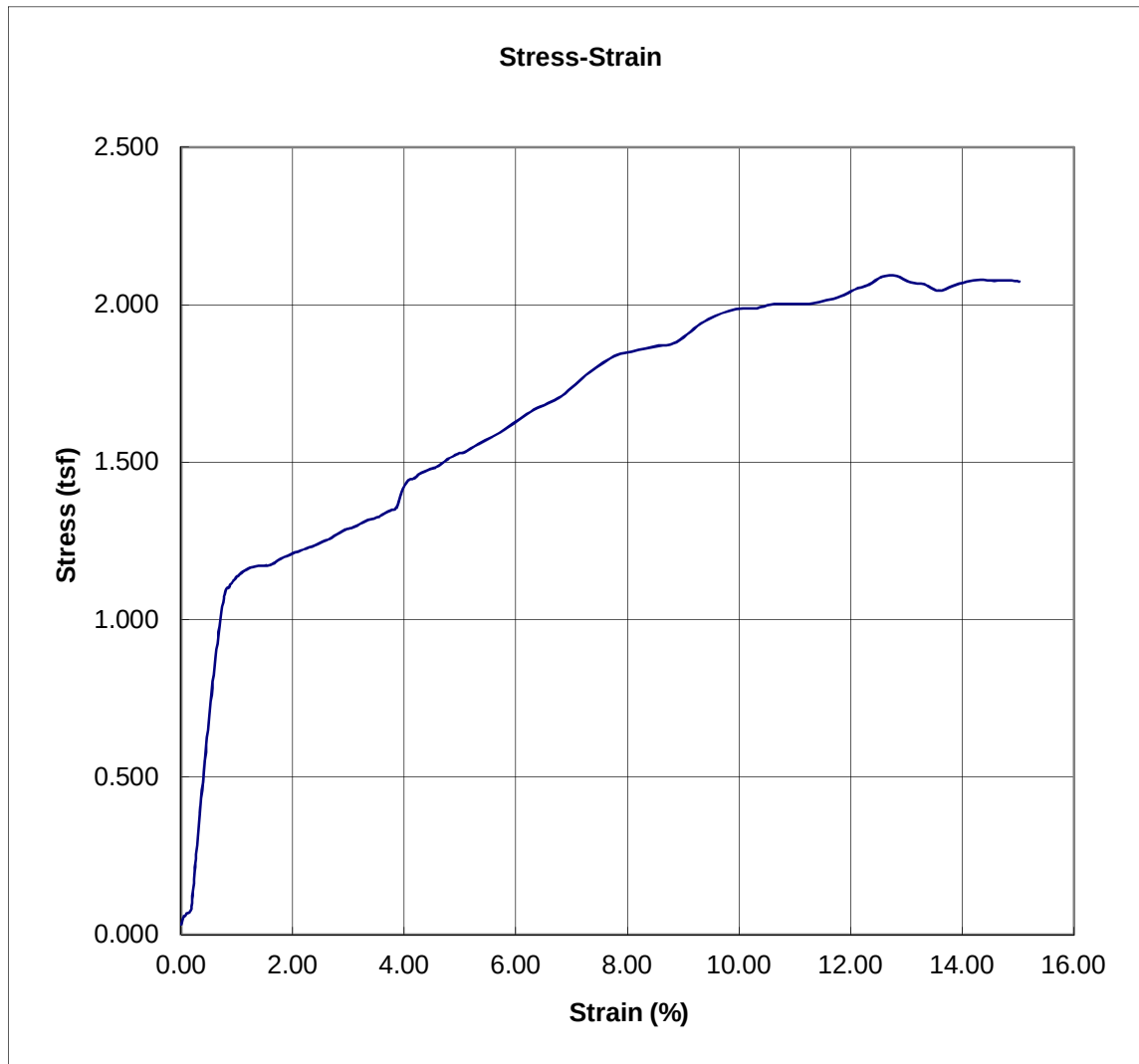
Peak Point	3.85	1.642
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2034
Depth: 14'-16'



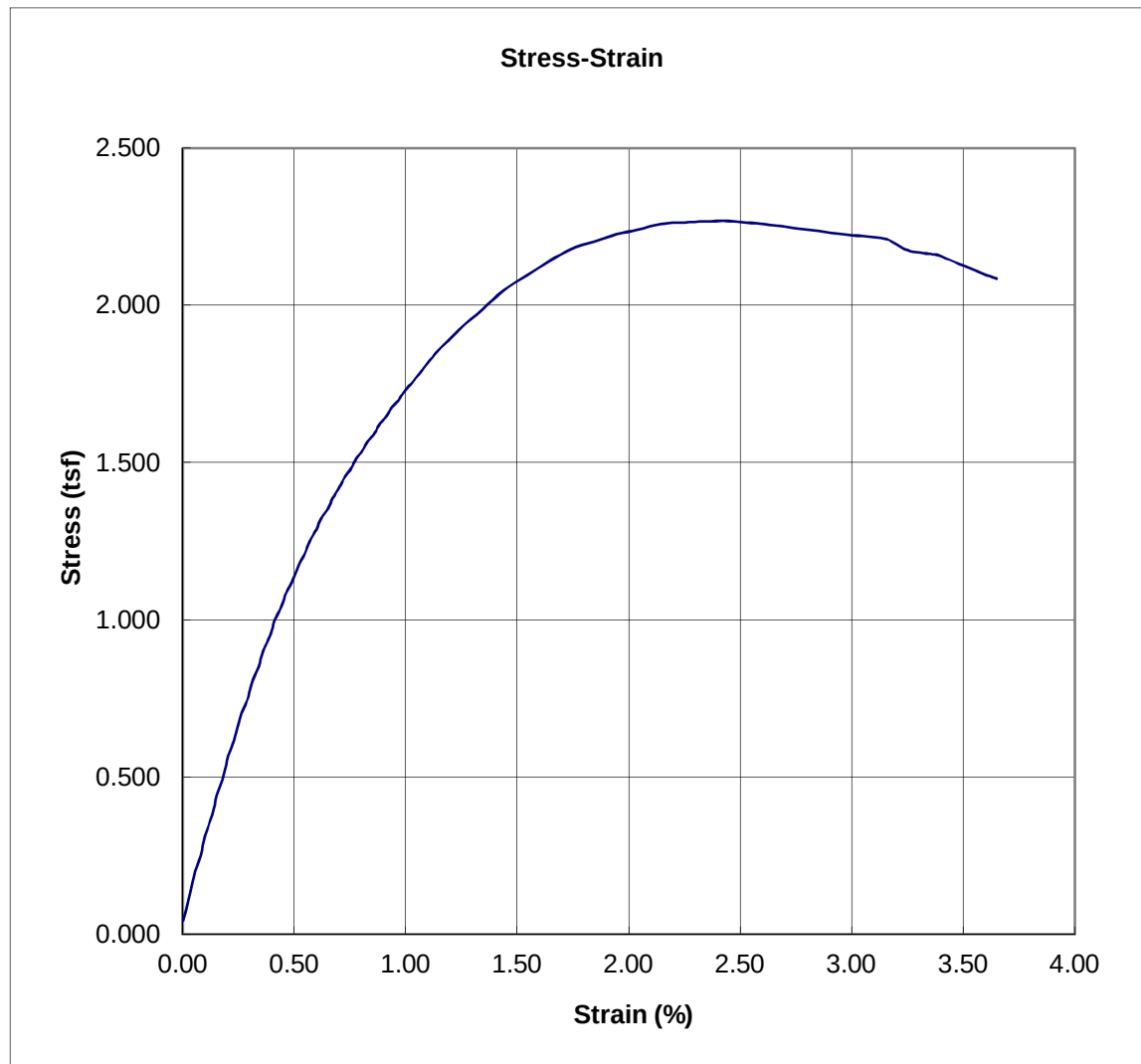
Peak Point	1.94	1.583
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2034
Depth: 23'-25'



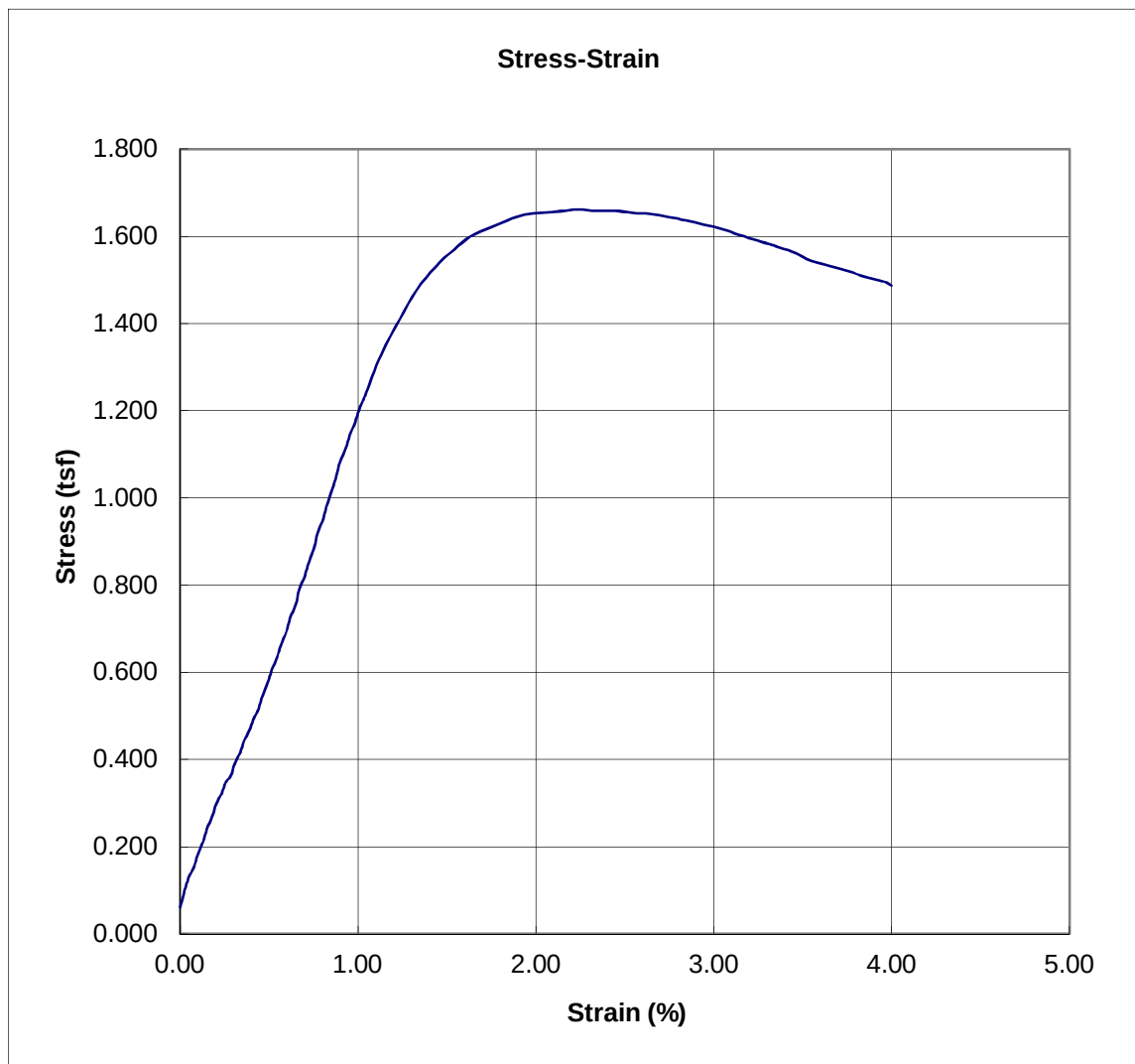
Peak Point	12.82	2.091
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2034
Depth: 33'-35'



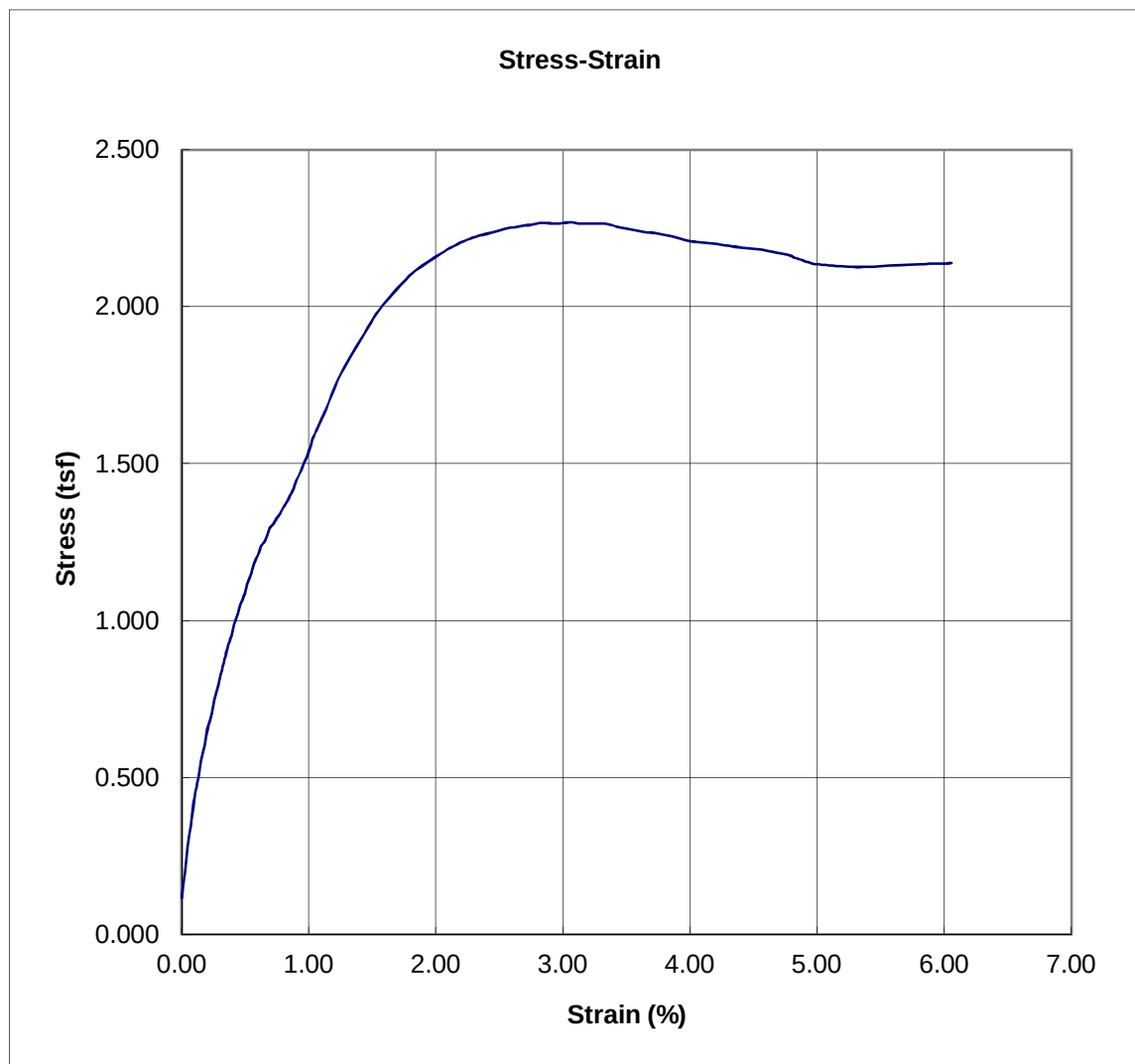
Peak Point	2.45	2.268
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2035
Depth: 14'-16'



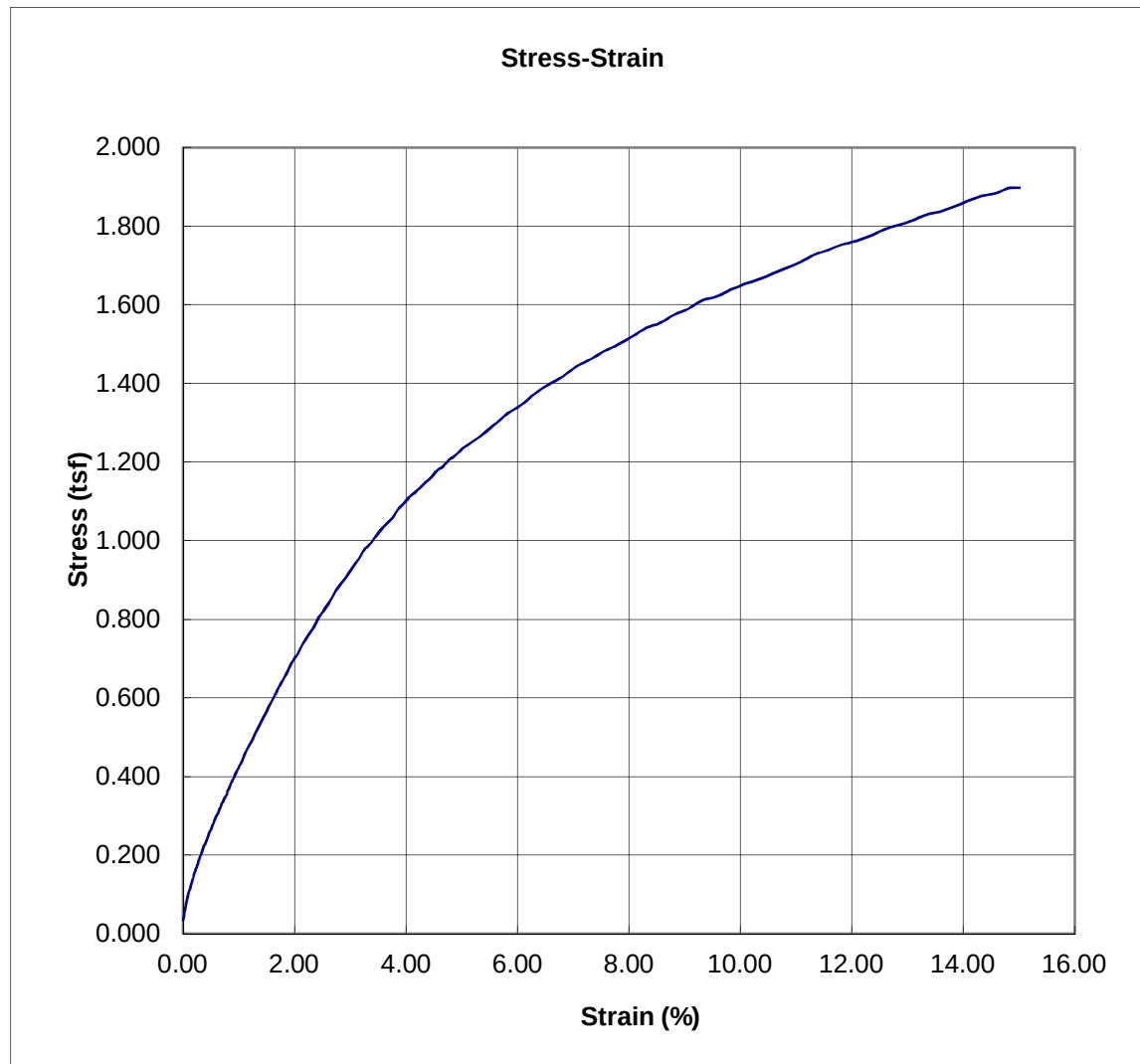
Peak Point	2.24	1.661
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2035
Depth: 23'-25'



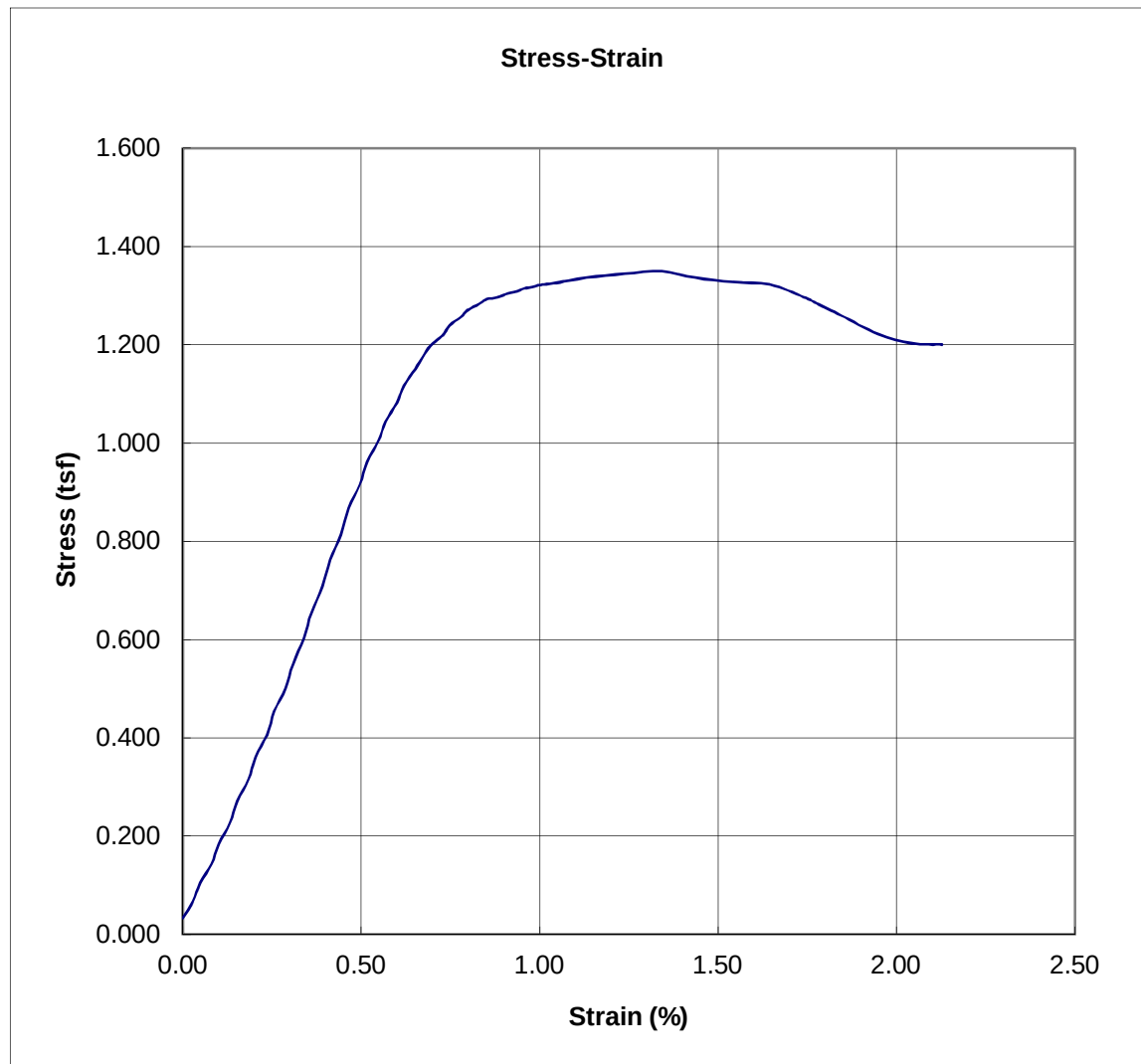
Peak Point	3.05	2.268
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2035
Depth: 33'-35'



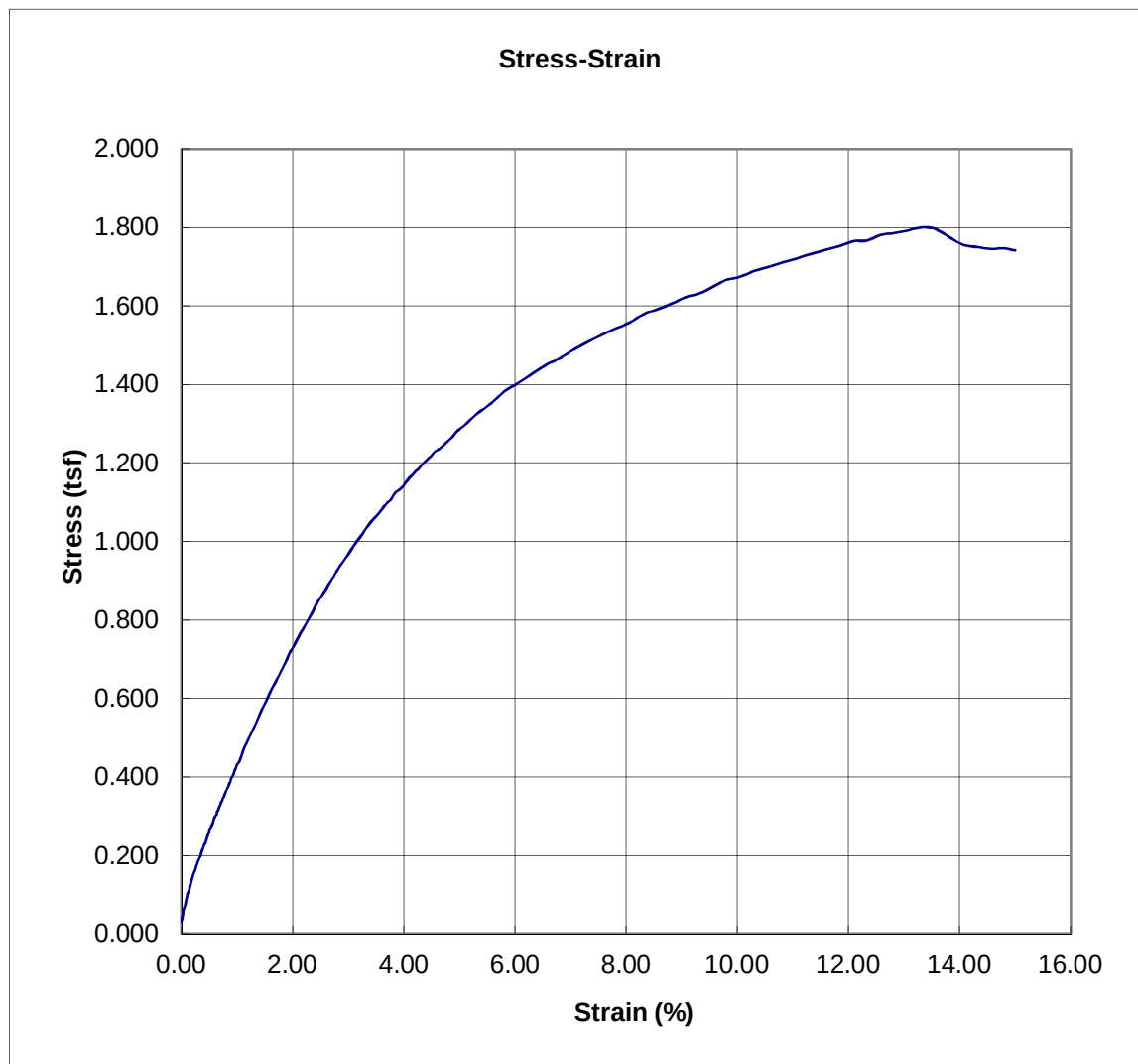
Peak Point	15.01	1.897
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2036
Depth: 16'-18'



Peak Point	1.34	1.349
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2036
Depth: 28'-30'



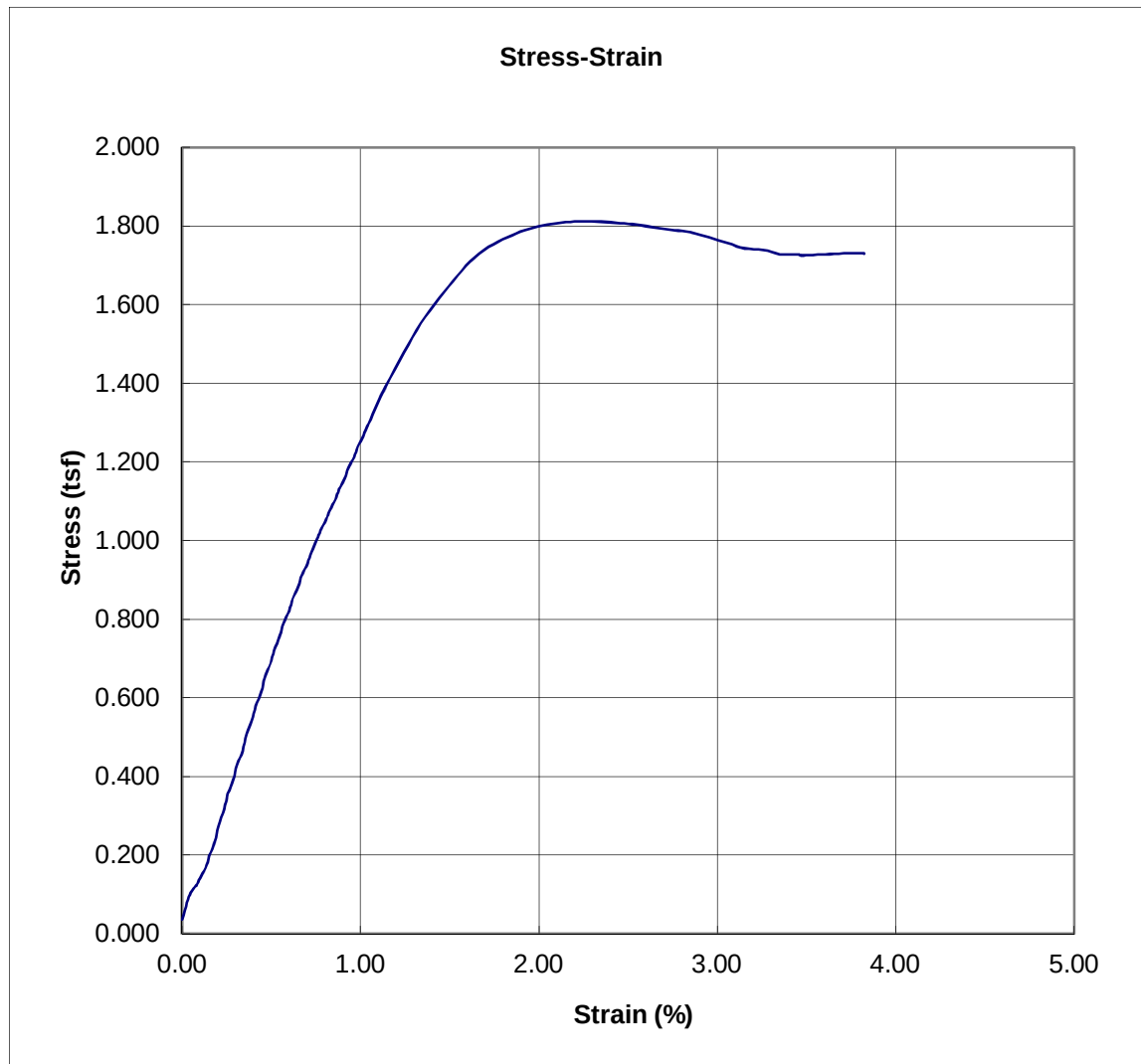
Peak Point	13.33	1.800
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2037
Depth: 12'-14'



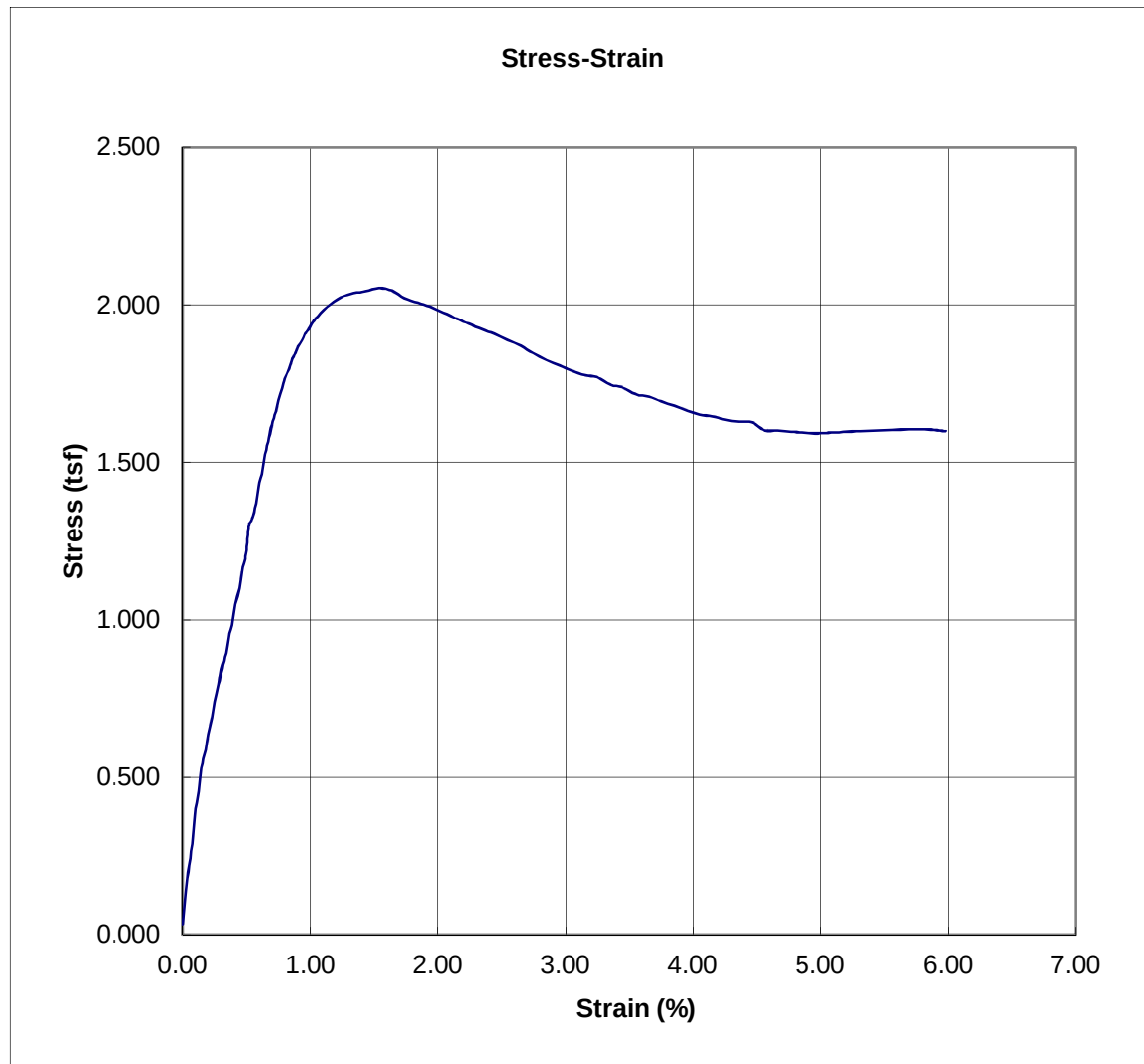
Peak Point	2.35	1.484
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2037
Depth: 18'-20'



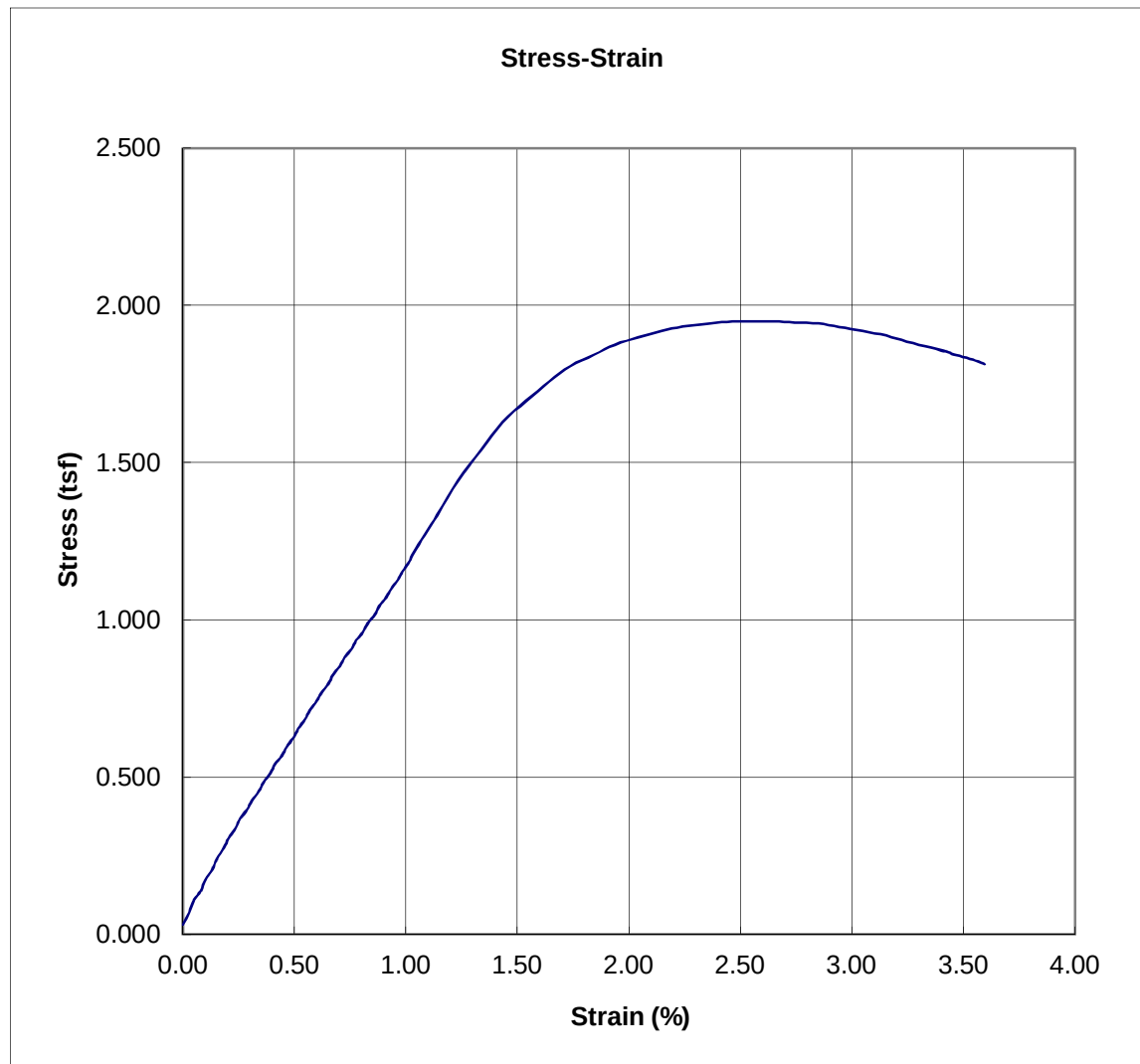
Peak Point	2.25	1.812
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2037
Depth: 23'-25'



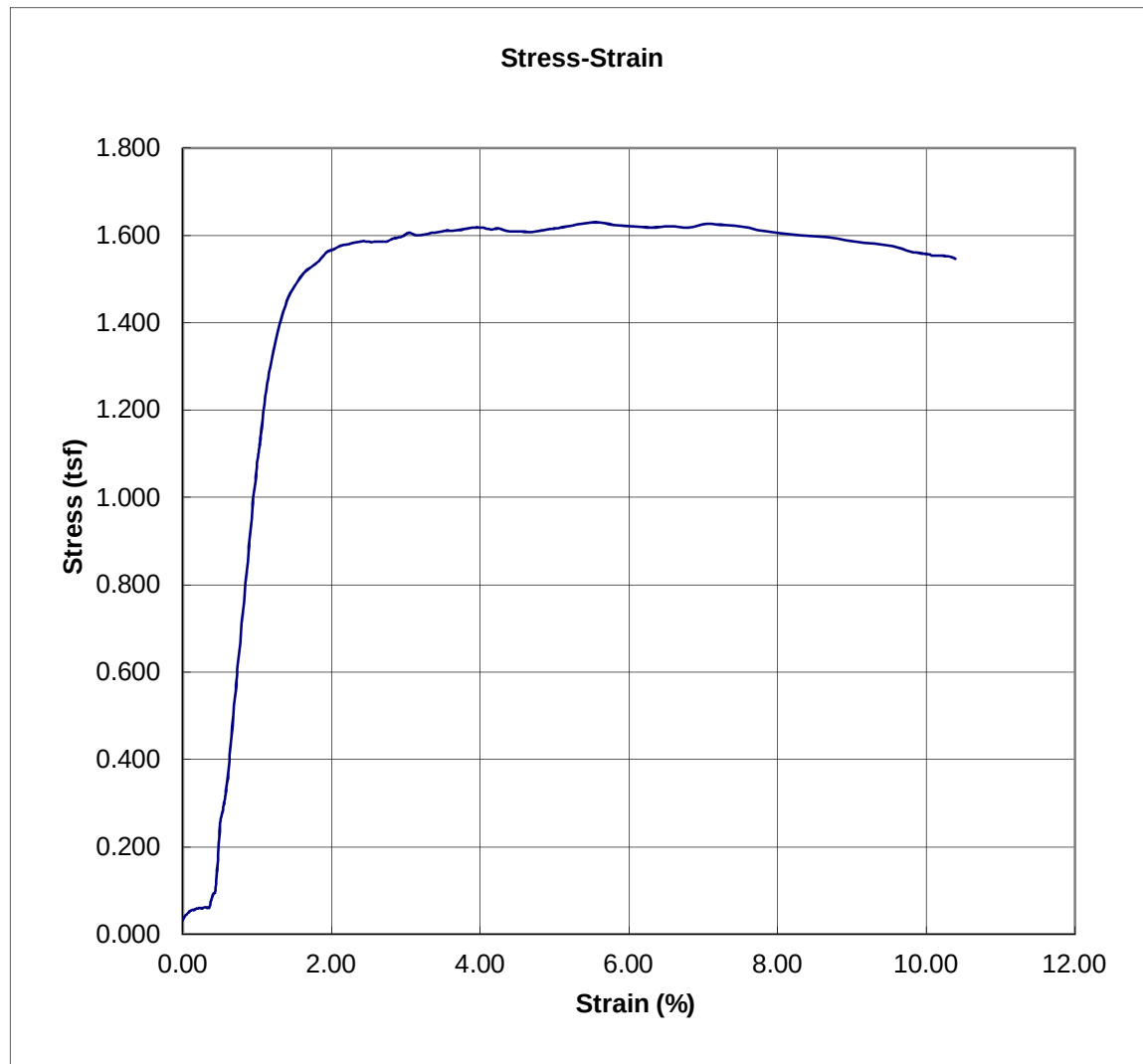
Peak Point	1.54	2.054
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2038
Depth: 12'-14'



Peak Point	2.55	1.949
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2038
Depth: 23'-25'



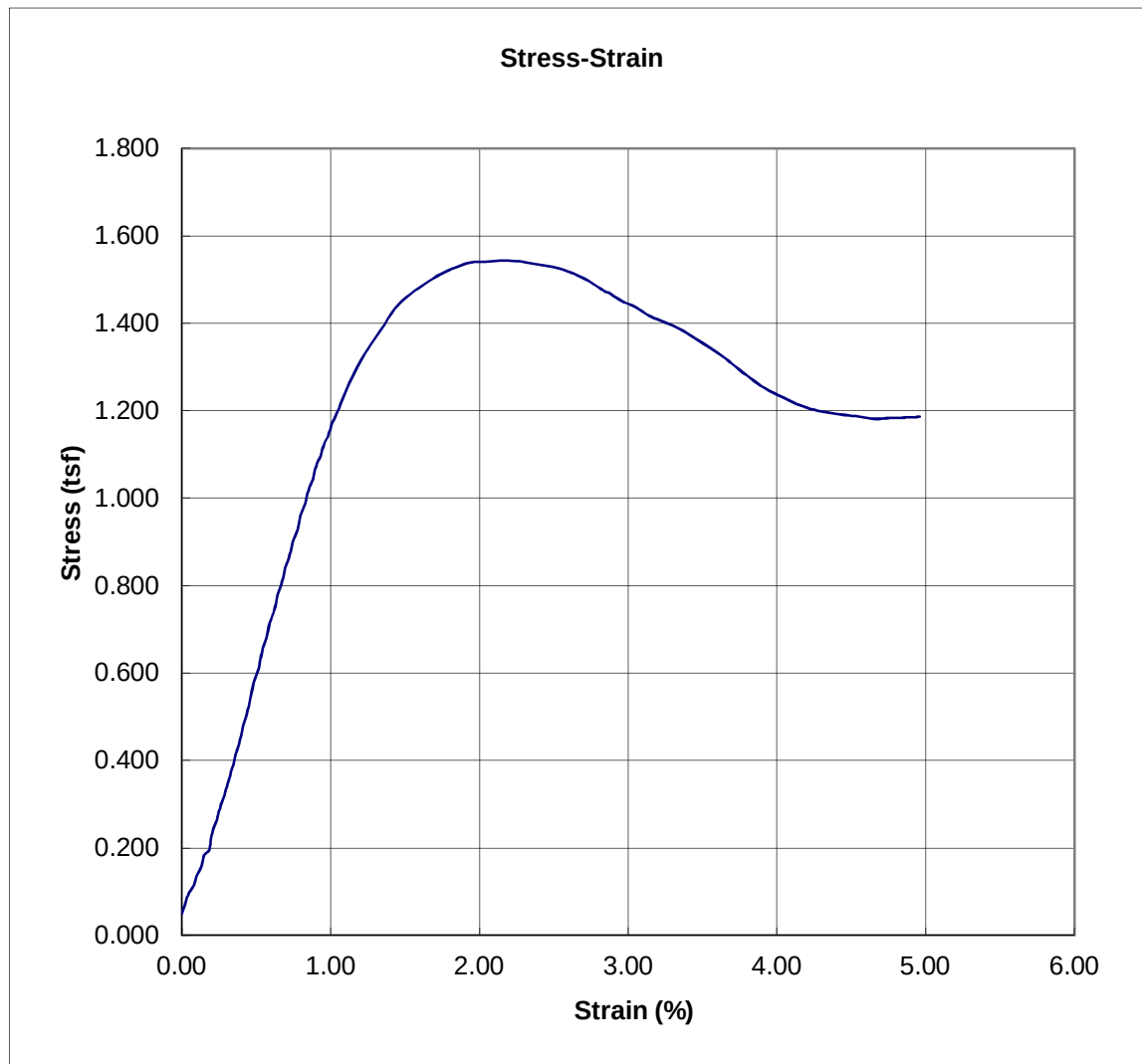
Peak Point	5.55	1.630
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2038
Depth: 33'-35'



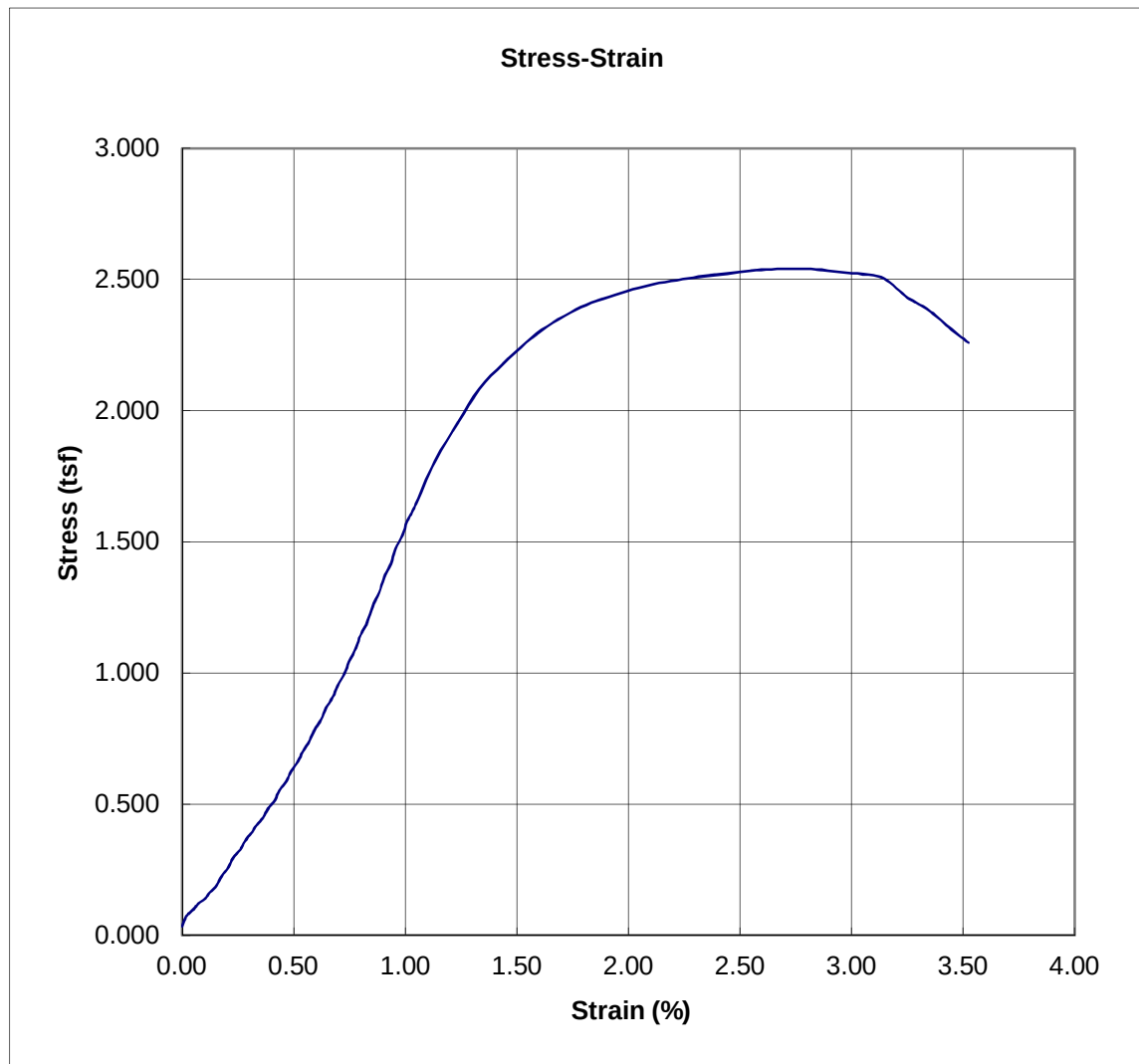
Peak Point	5.06	2.482
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2039
Depth: 10'-12'



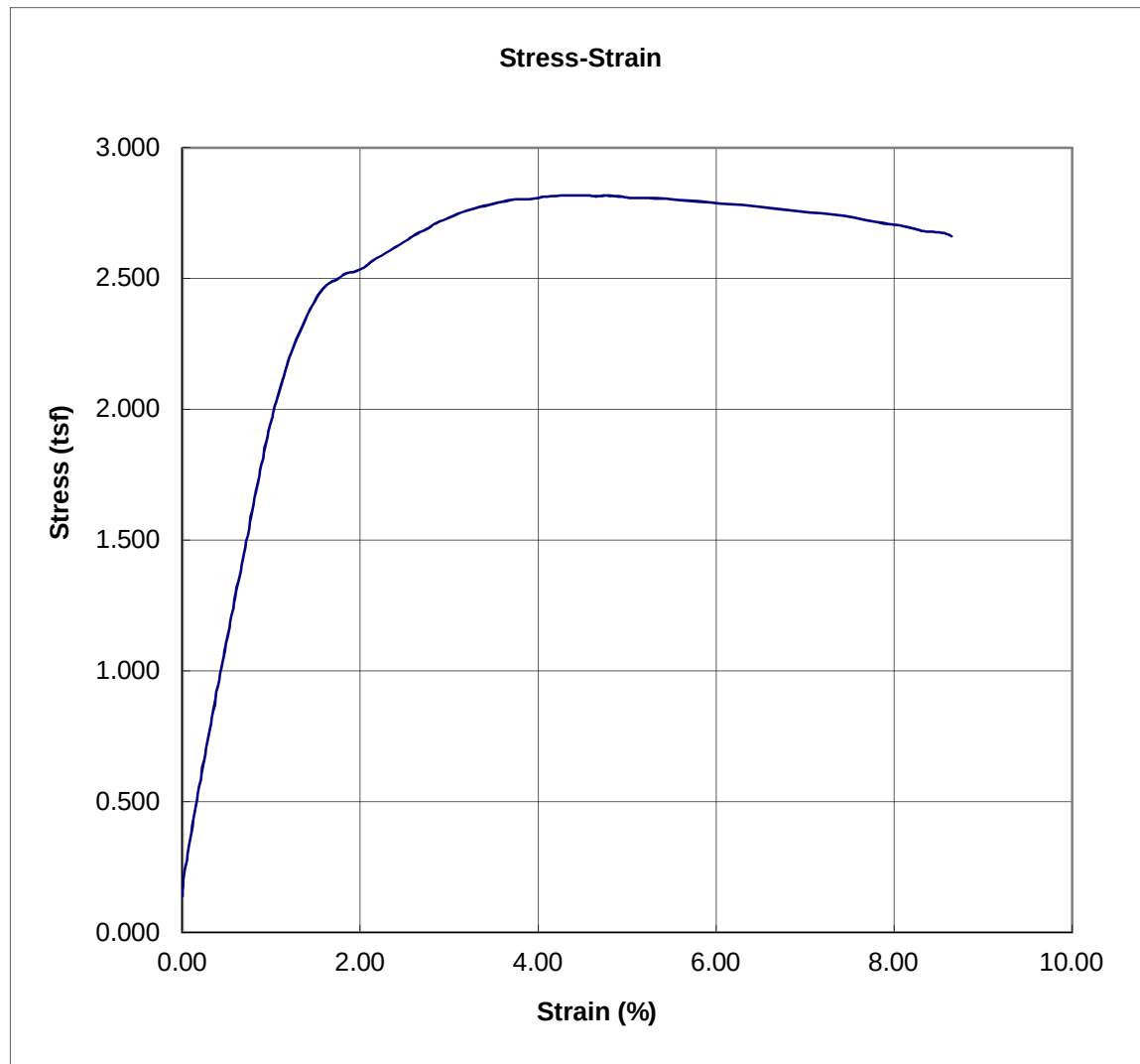
Peak Point	2.14	1.543
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2039
Depth: 16'-18'



Peak Point	2.75	2.541
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2039
Depth: 28'-30'



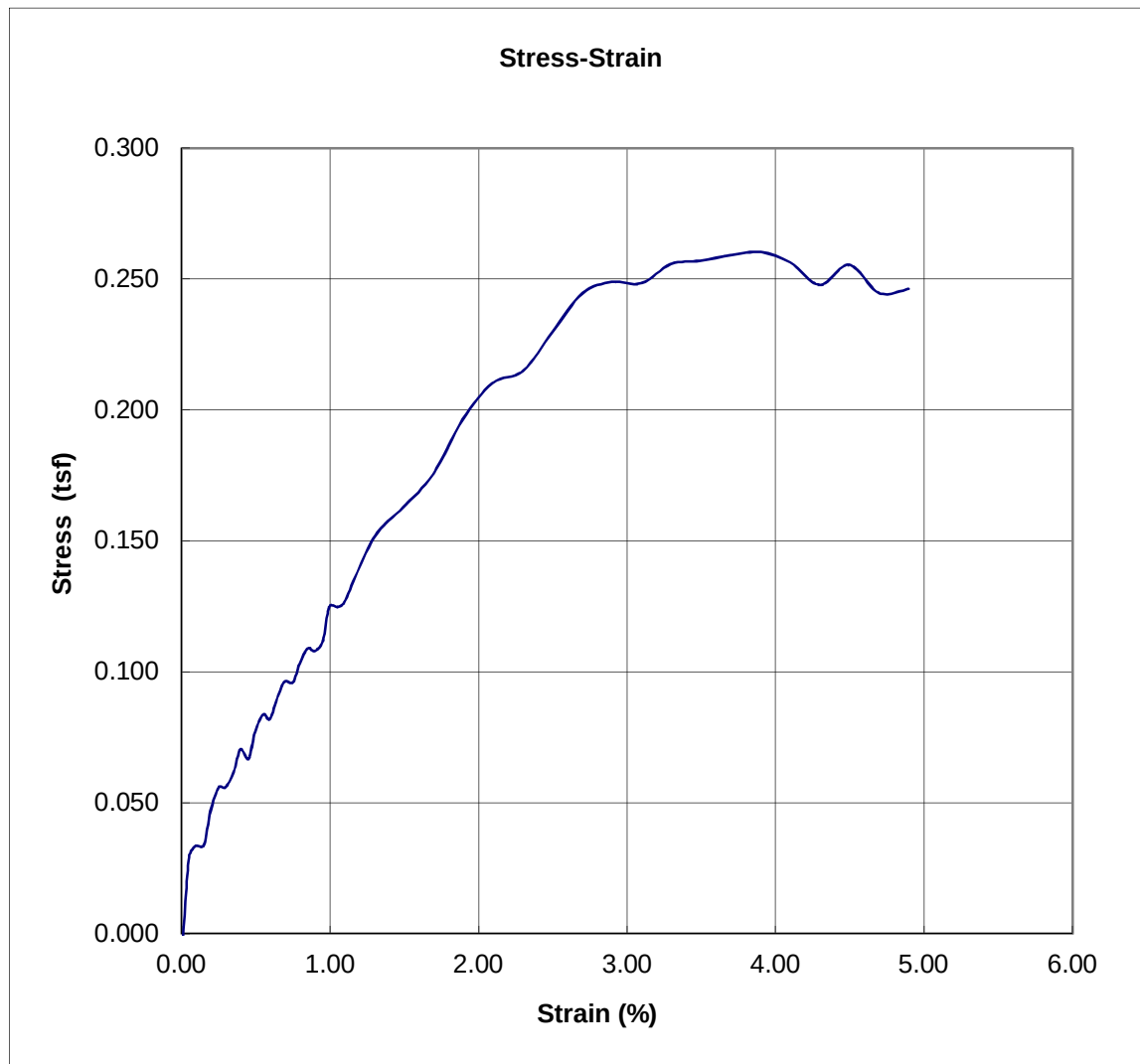
Peak Point	4.56	2.818
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2040
Depth: 18'-20'



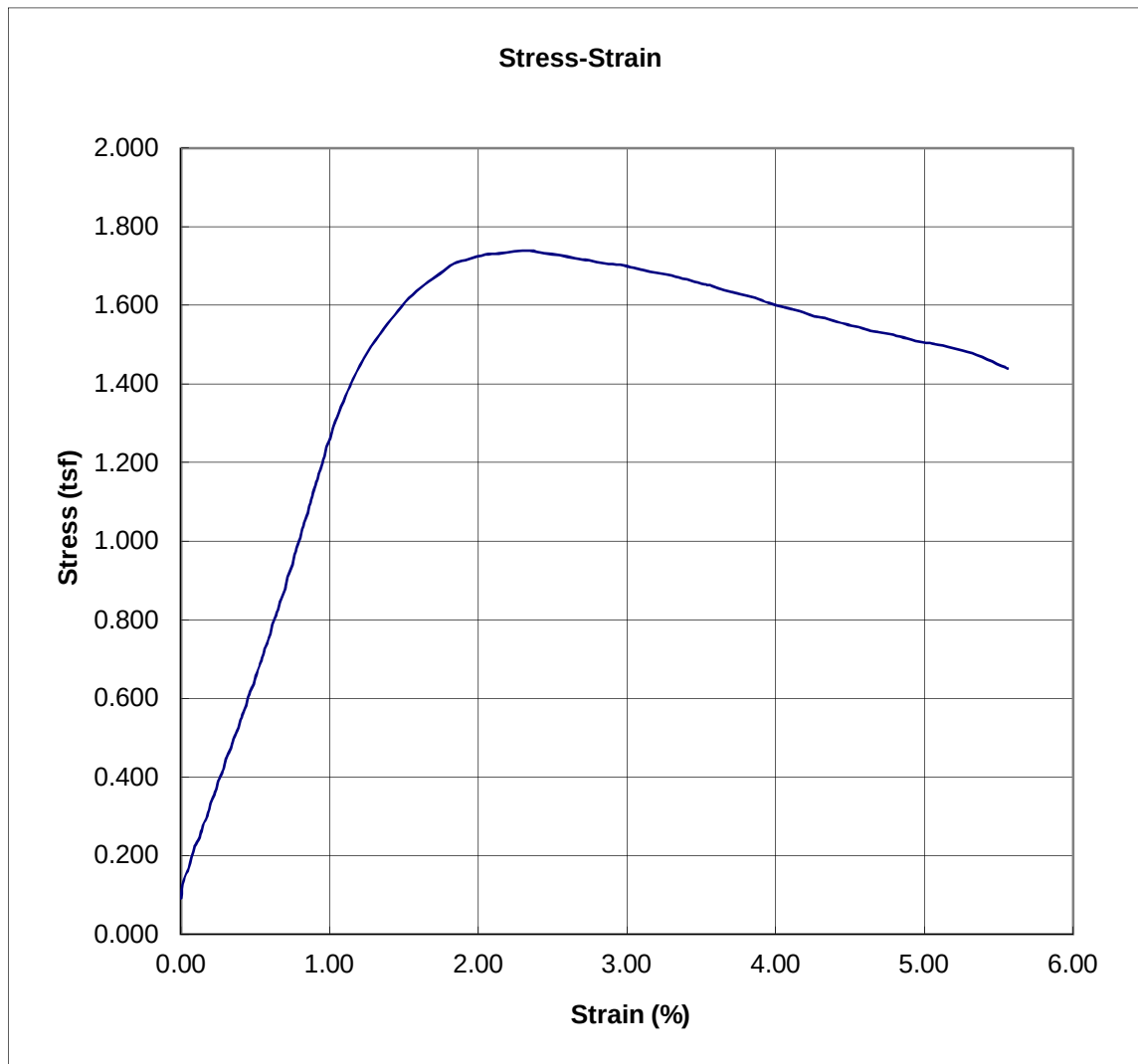
Peak Point	14.10	2.406
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2040
Depth: 38'-40'



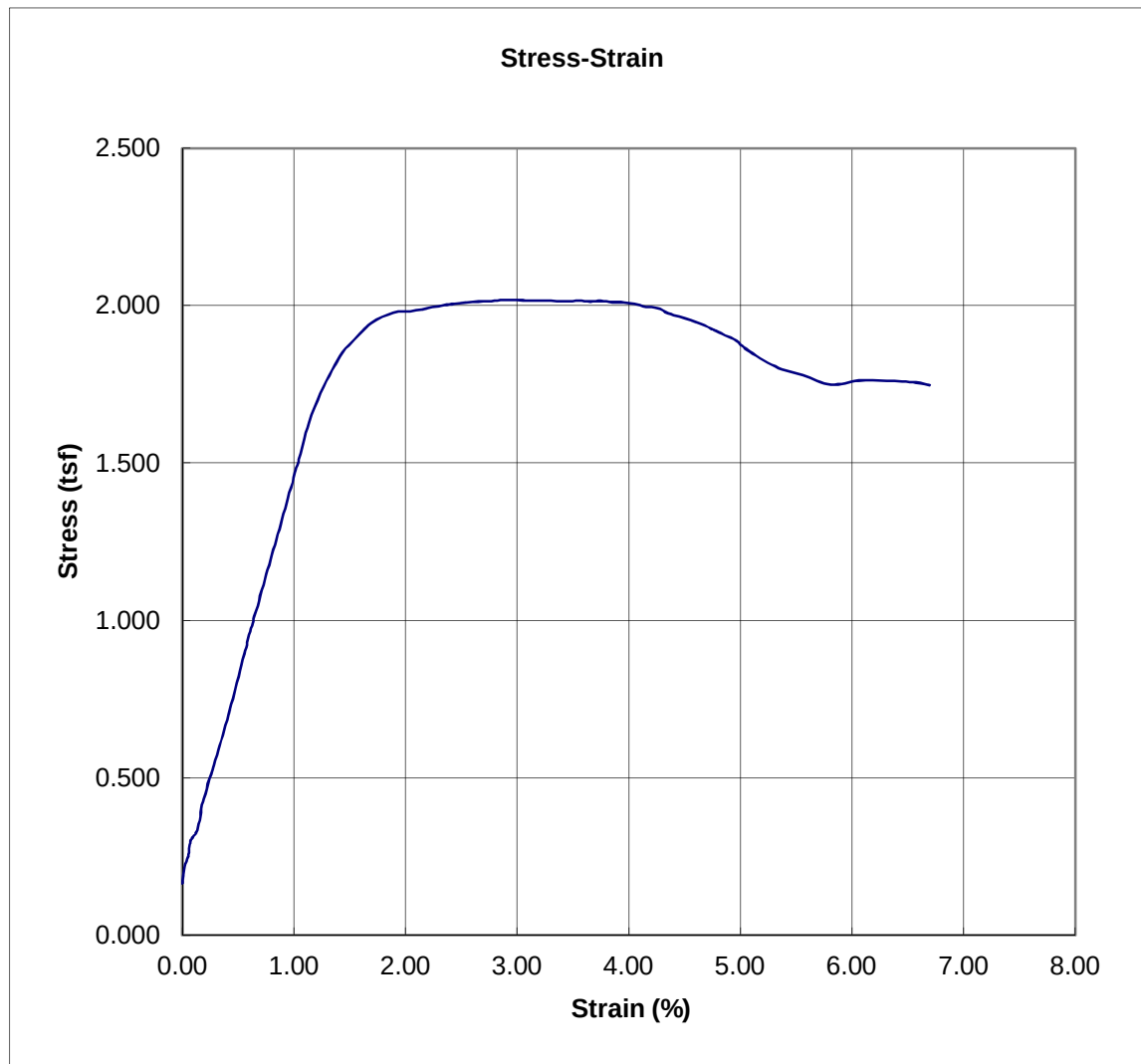
Peak Point	3.90	0.260
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2041
Depth: 12'-14'



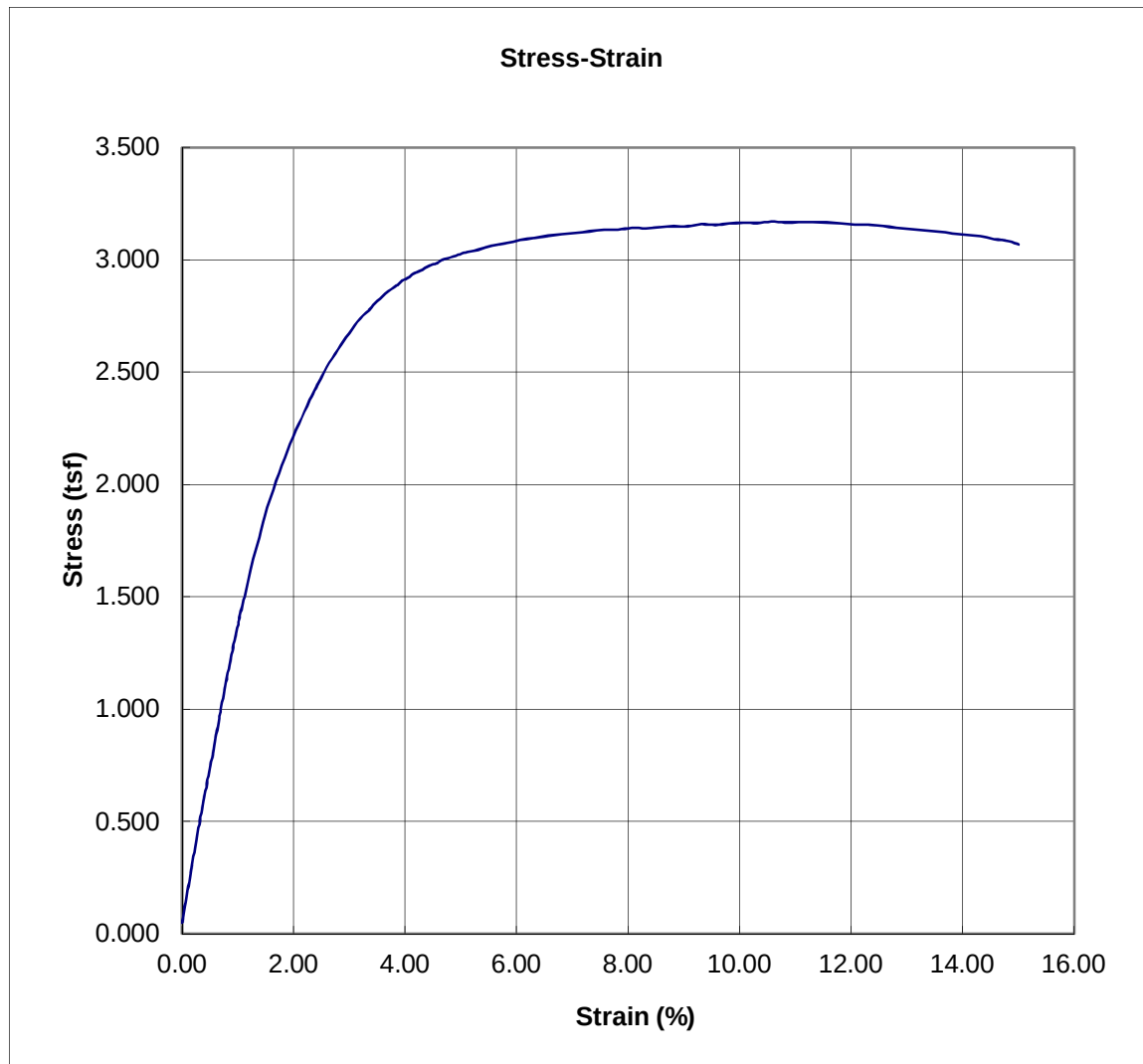
Peak Point	2.35	1.739
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2041
Depth: 18'-20'



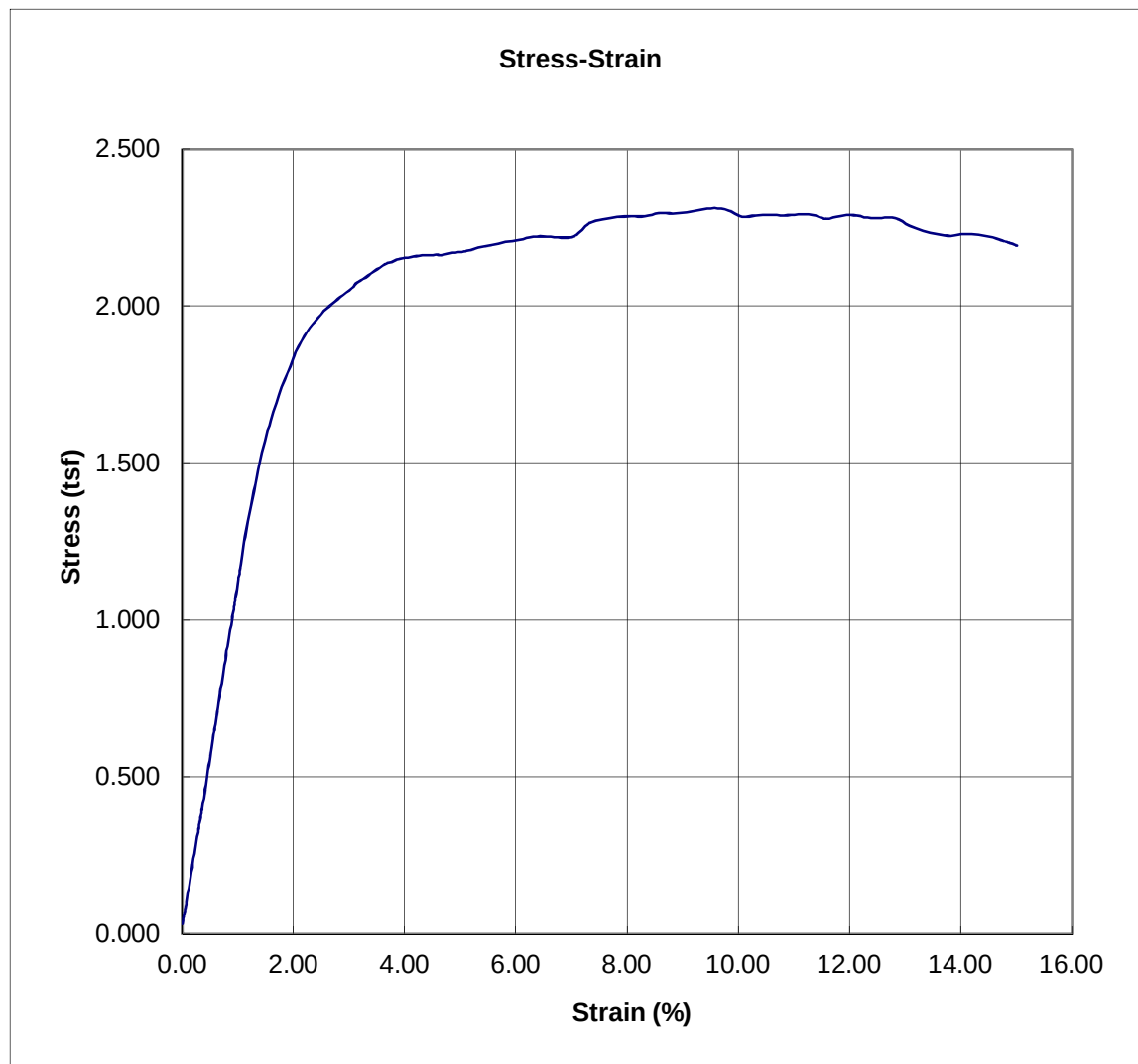
Peak Point	2.94	2.018
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2041
Depth: 23'-25'



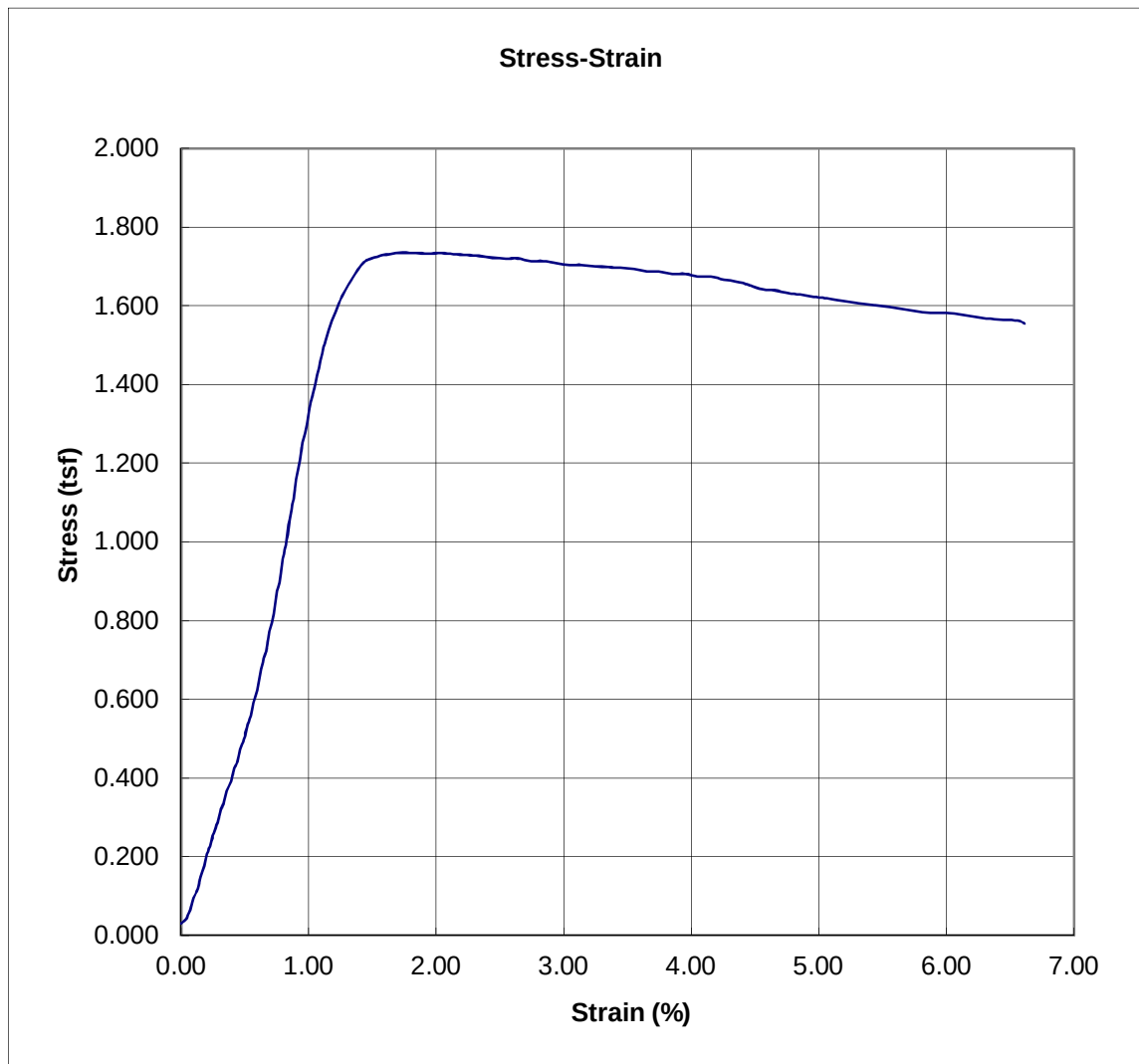
Peak Point	10.57	3.170
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2042
Depth: 12'-14'



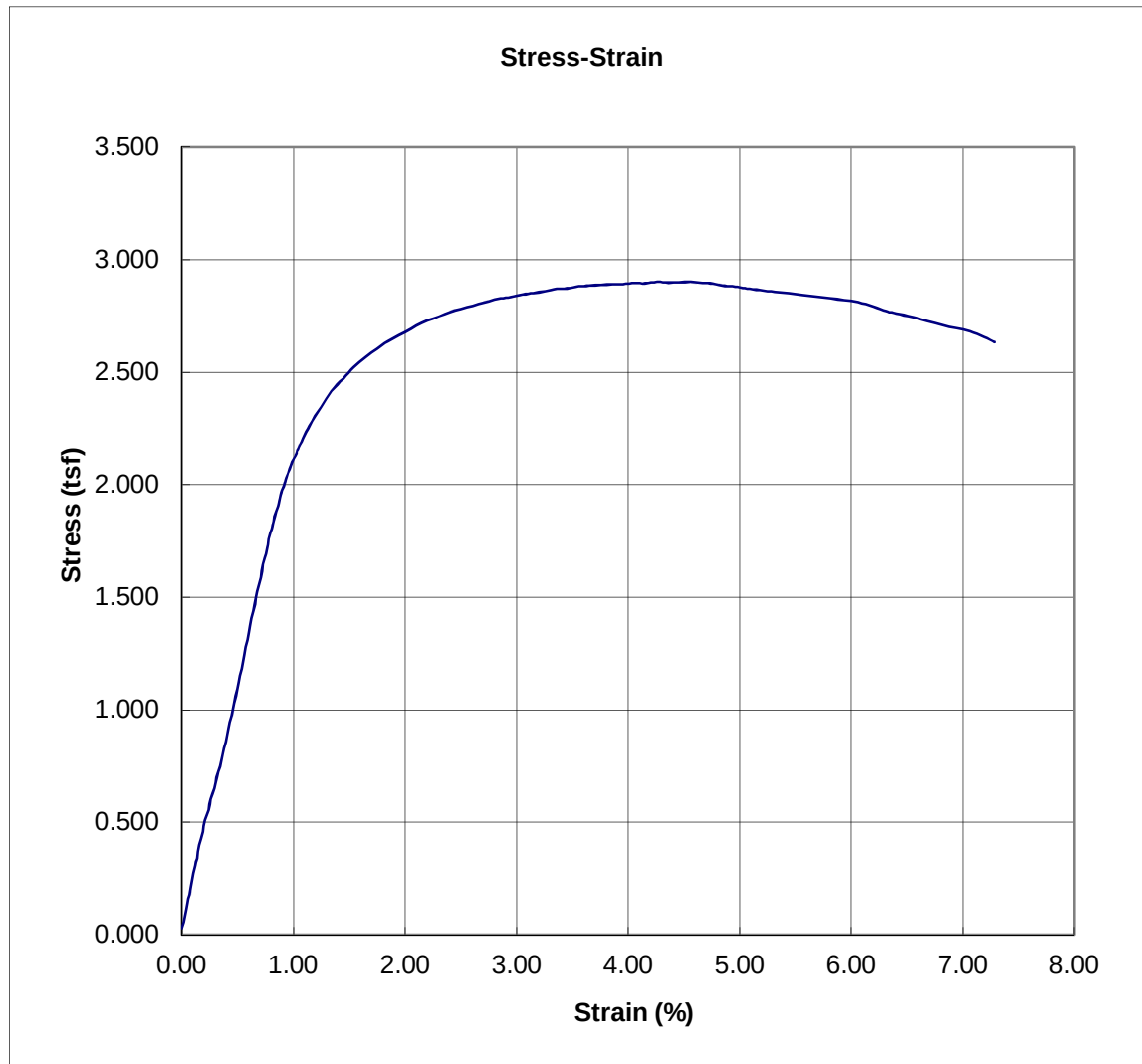
Peak Point	9.57	2.311
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2042
Depth: 18'-20'



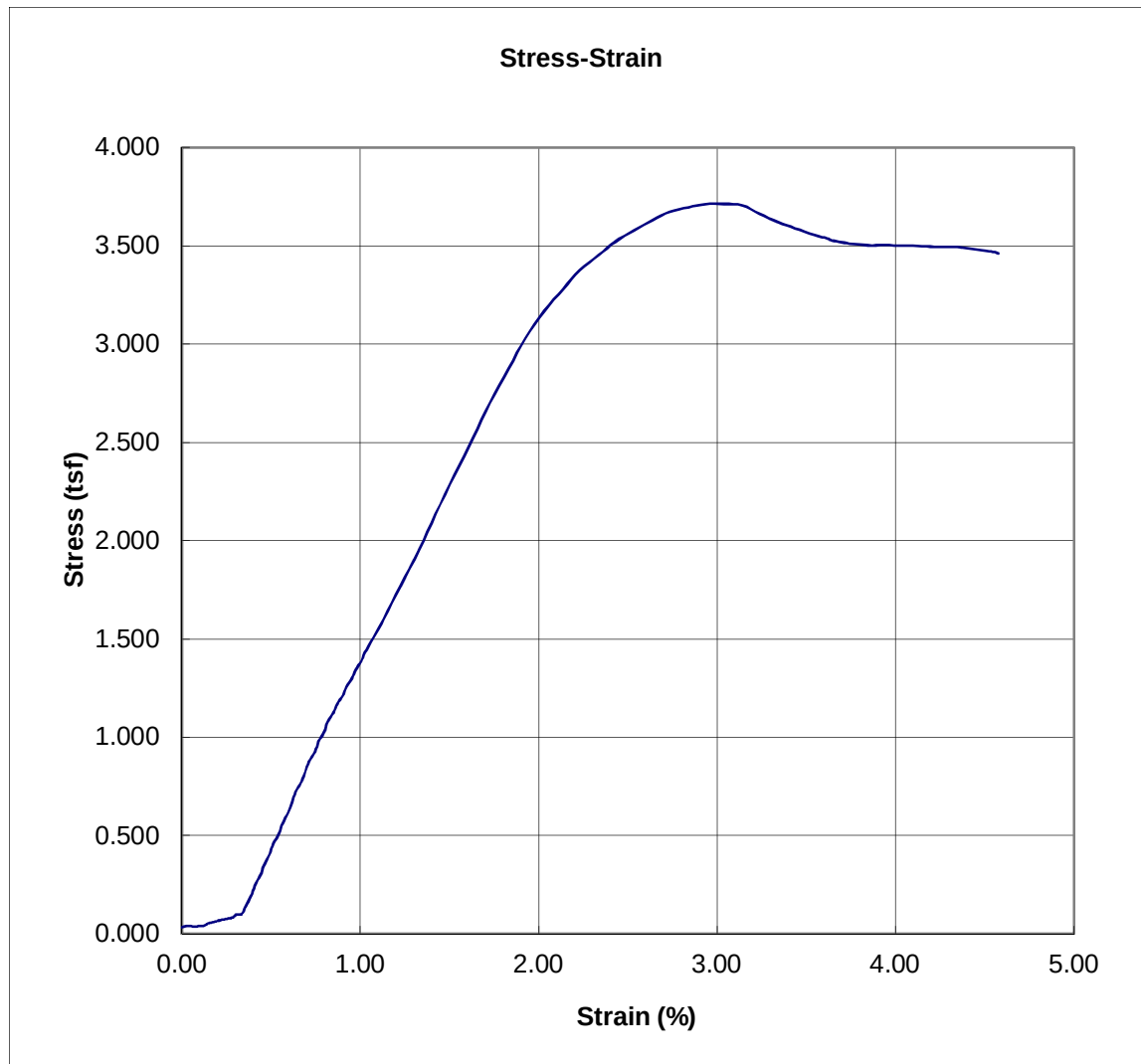
Peak Point	1.74	1.735
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2042
Depth: 28'-30'



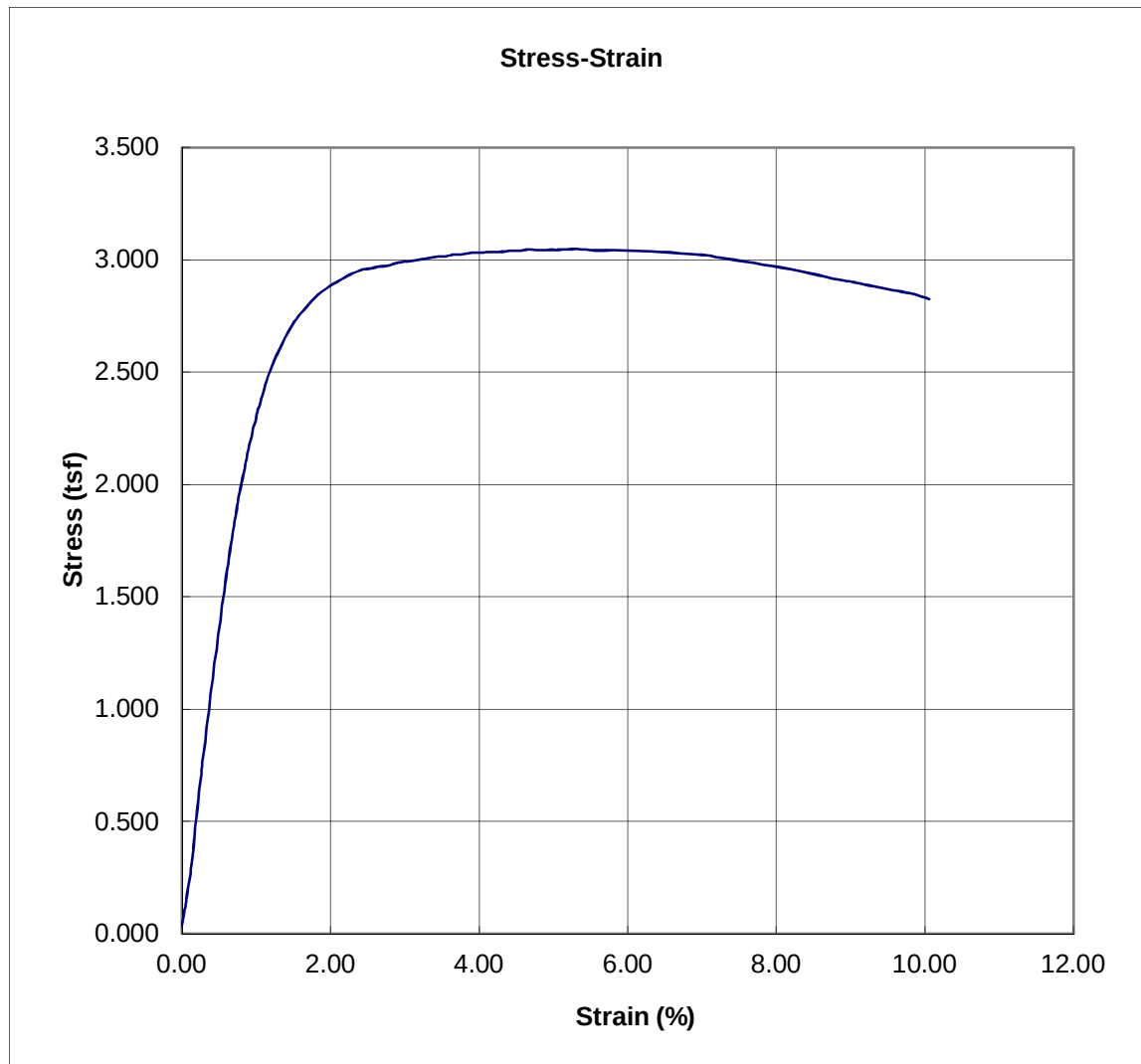
Peak Point	4.26	2.902
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2043
Depth: 16'-18'



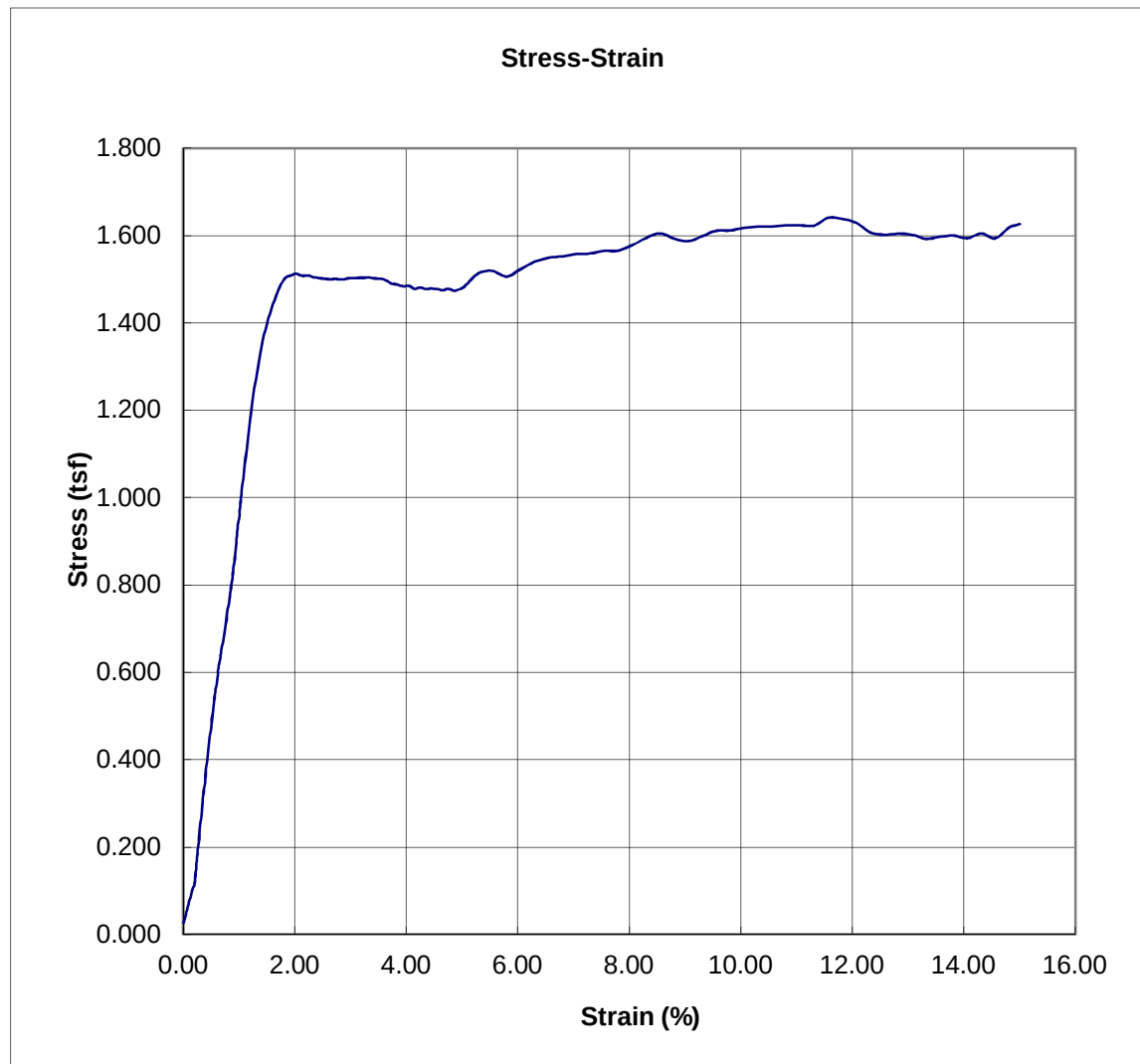
Peak Point	3.04	3.713
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2043
Depth: 23'-25'



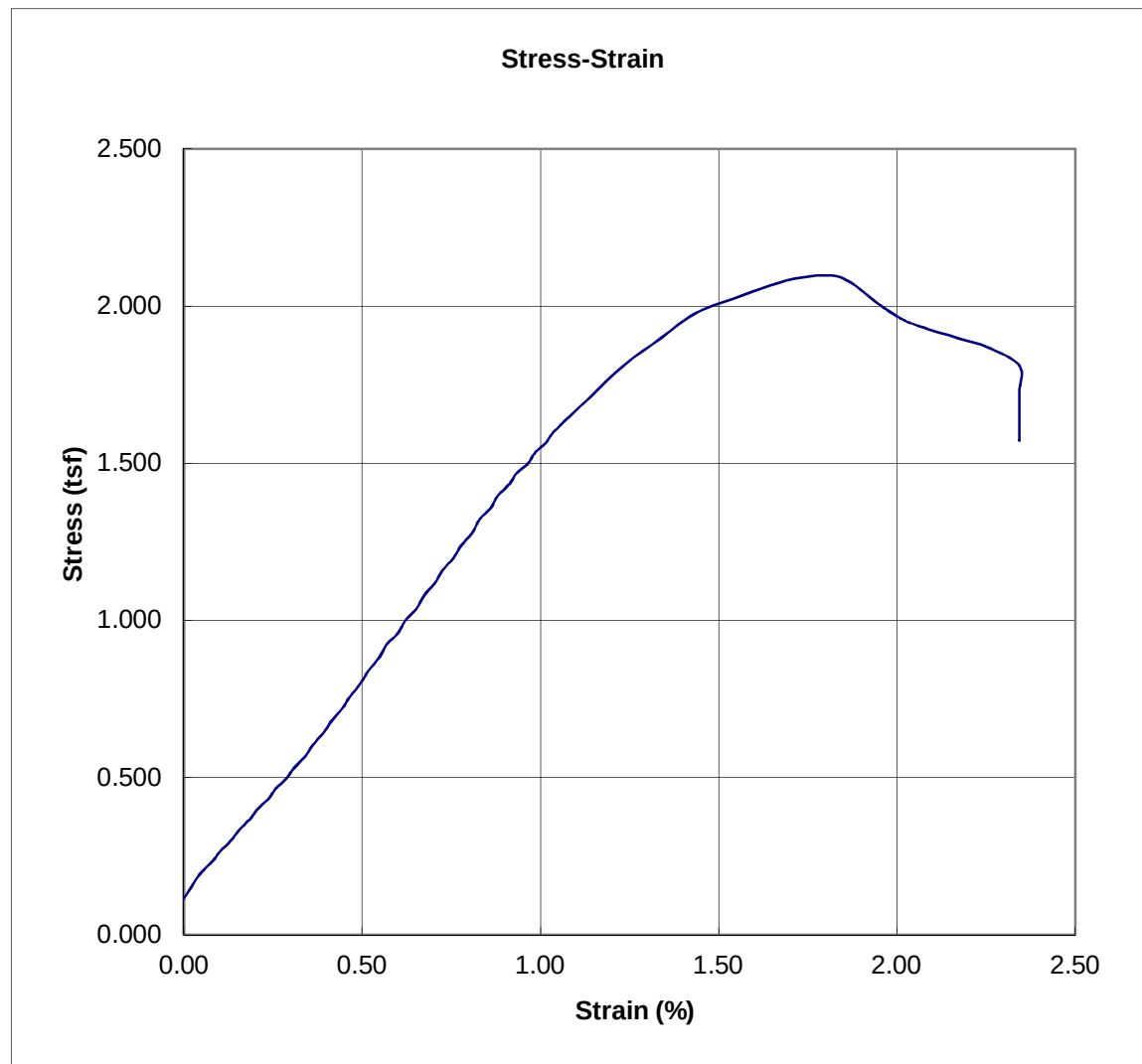
Peak Point	5.31	3.048
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2044
Depth: 23'-25'



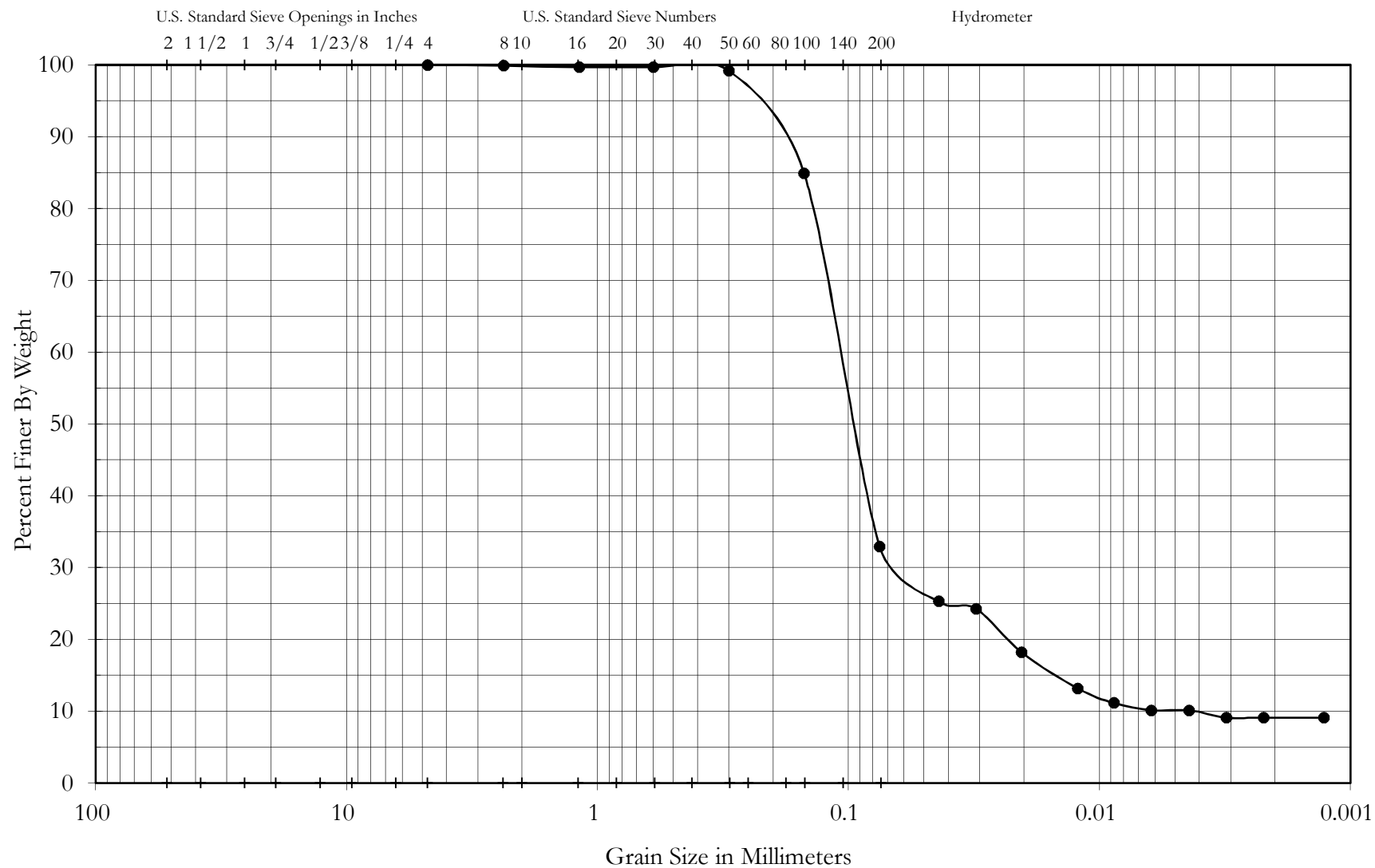
Peak Point	11.57	1.641
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Project Name: Houston Ship Channel Expansion Channel Improvement Project
Project No.: HG1910092.2.1
Boring No.: ECP-2044
Depth: 33'-35'



Peak Point	1.74	2.091
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APPENDIX H
SIEVE ANALYSIS TEST RESULTS



Sample Location

ECP-315,
103'-105'

D₅₀ & D₉₀

D₅₀ = 0.095 mm
D₉₀ = 0.18 mm

Classification

Silty Sand (SM)

HVJ ASSOCIATES, INC.

**GRAIN SIZE ANALYSIS CURVE
ASTM D6913**

PROJECT NO:

HG1910092.2.1

PLATE H-1a

SIEVE ANALYSIS DATA

Project: HSC Job No. HG1910092.2.1
 Boring No. ECP-315 Sample No. 27 Depth: 103'-105'
 Classification: Silty Sand (SM)

Tare No.	T19	Init Wt. - Tare	109.93	% Ret. 67.11
Tare Wt.	7.95	Dry Wt. after test	81.72	% Pass #200 32.89
Init. Dry Wt.	117.88	Wt. Ret. on #200	73.77	

Sieve Size/No.	Sieve Size (mm)	Weight Ret.	% Retained	% Passing
4	4.76	0.00	0.00	100.00
8	2.36	0.13	0.12	99.88
16	1.180	0.34	0.31	99.69
30	0.600	0.35	0.32	99.68
50	0.300	0.90	0.82	99.18
100	0.150	16.65	15.15	84.85
200	0.075	73.77	67.11	32.89
	0.044			25.28
	0.031			24.27
	0.020			18.20
	0.012			13.14
	0.009			11.12
	0.006			10.11
	0.004			10.11
	0.003			9.10
	0.002			9.10
	0.001			9.10

Equipment: Oven (425) Scale (167) Shaker (438)

Tested by: KC Computed by: KC Checked: SW

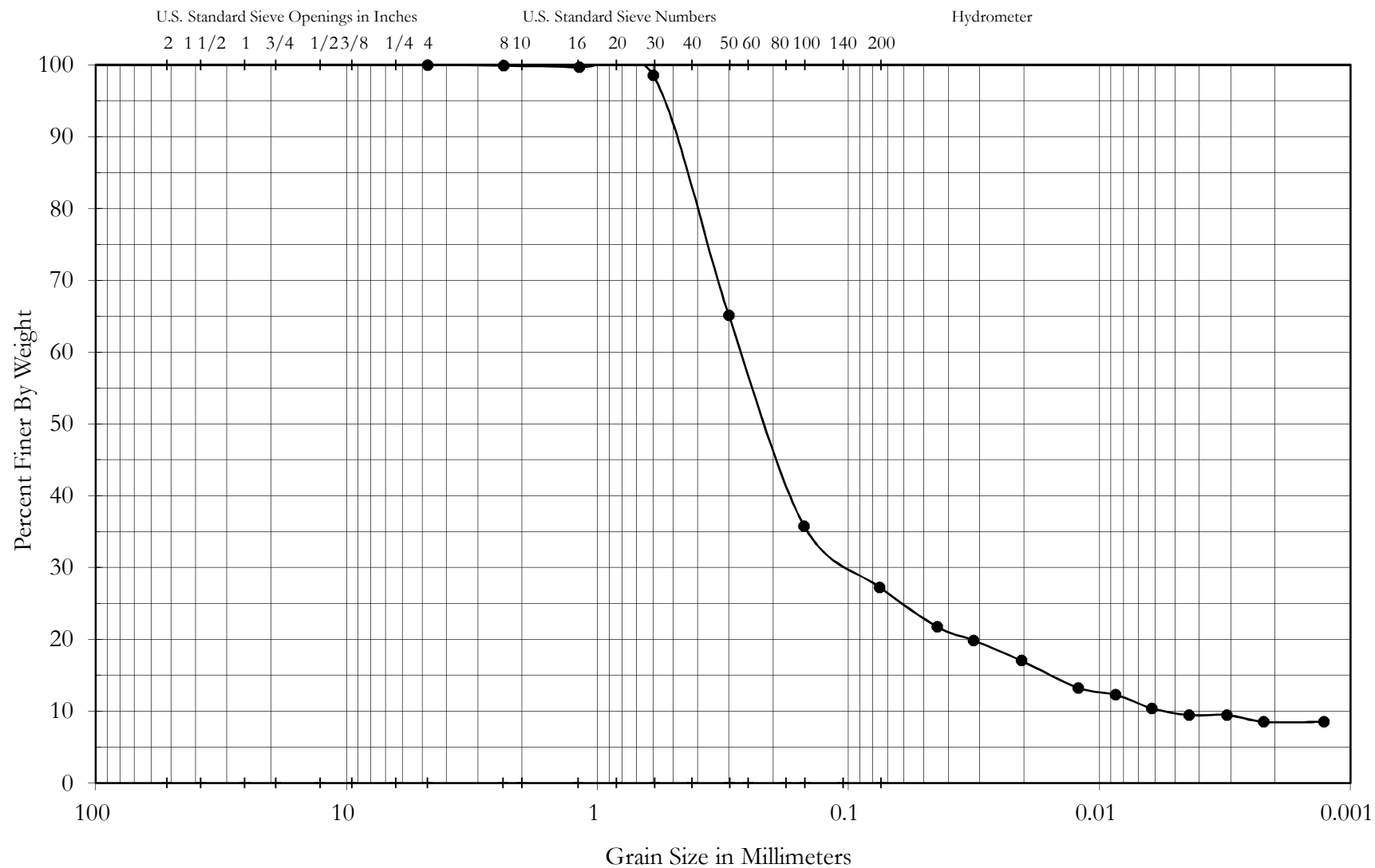
HYDROMETER ANALYSIS

Project Name:	HSC	Boring No.	ECP-315
Project No.	HG1910092.2.1	Sample No.	26
Date Tested:	7/15/2020	Sample Depth	103'-105'
Technician:	KC	Calc. <u>KC</u>	Checked by: <u>SW</u>

Hydrometer No.	385
Tare No.	164
Wet Soil + Tare	50.69
Dry Soil + Tare	47.29
Tare	29.59
Hydrosopic Corr. Factor	0.839
Correction Factor	1
Mass for Sieve	117.69

Air Dry Mass of Soil	117.69
Corr. Mass of Soil	98.73
Mass Ret. on #10	0.21
% Passing No. 10 Sieve	99.82
Dry Mass after Wash. & Sieve	78.98
% Passing No. 200 Sieve	32.89
Amt of NA metaphosphate (g)	5
Specific Gravity (assumed)	2.77

Date	Time	Elapsed Time (min)	Hydro. Rdg.	Temp	Comp. Corr.	Corr. Hydro. Rdg.	K	L	D	% Finer N	% Finer Total Sample
07/15	06:31:00	1	30	22.2	5	25	0.0129	11.4	0.044	25.32	25.28
07/15	06:32:00	2	29	22.2	5	24	0.0129	11.5	0.031	24.31	24.27
07/15	06:35:00	5	23	22.2	5	18	0.0129	12.5	0.020	18.23	18.20
07/15	06:45:00	15	18	22.2	5	13	0.0129	13.3	0.012	13.17	13.14
07/15	07:00:00	30	16	22.2	5	11	0.0129	13.7	0.009	11.14	11.12
07/15	07:30:00	60	15	22.2	5	10	0.0129	13.8	0.006	10.13	10.11
07/15	08:30:00	120	15	22.2	5	10	0.0129	13.8	0.004	10.13	10.11
07/15	10:30:00	240	14	22.2	5	9	0.0129	14.0	0.003	9.12	9.10
07/15	14:30:00	480	14	22.2	5	9	0.0129	14.0	0.002	9.12	9.10
07/16	06:30:00	1440	14	22.2	5	9	0.0129	14.0	0.001	9.12	9.10



Sample Location

ECP-315,
113'-115'

D₅₀ & D₉₀

D₅₀ = 0.25 mm
D₉₀ = 0.49 mm

Classification

Silty Sand (SM)

HVJ ASSOCIATES, INC.

**GRAIN SIZE ANALYSIS CURVE
ASTM D6913**

PROJECT NO:

HG1910092.2.1

PLATE H-2a

SIEVE ANALYSIS DATA

Project: HSC Job No. HG1910092.2.1
 Boring No. ECP-315 Sample No. 29 Depth: 113'-115'
 Classification: Silty Sand (SM)

Tare No.	D	Init Wt. - Tare	113.63	% Ret. 72.75
Tare Wt.	7.88	Dry Wt. after test	90.55	% Pass #200 27.25
Init. Dry Wt.	121.51	Wt. Ret. on #200	82.67	

Sieve Size/No.	Sieve Size (mm)	Weight Ret.	% Retained	% Passing
4	4.76	0.00	0.00	100.00
8	2.36	0.13	0.11	99.89
16	1.180	0.40	0.35	99.65
30	0.600	1.68	1.48	98.52
50	0.300	39.60	34.85	65.15
100	0.150	72.99	64.23	35.77
200	0.075	82.67	72.75	27.25
	0.044			21.74
	0.032			19.85
	0.020			17.02
	0.012			13.23
	0.009			12.29
	0.006			10.40
	0.004			9.45
	0.003			9.45
	0.002			8.51
	0.001			8.51

Equipment: Oven (425) Scale (167) Shaker (438)

Tested by: KC Computed by: KC Checked: SW

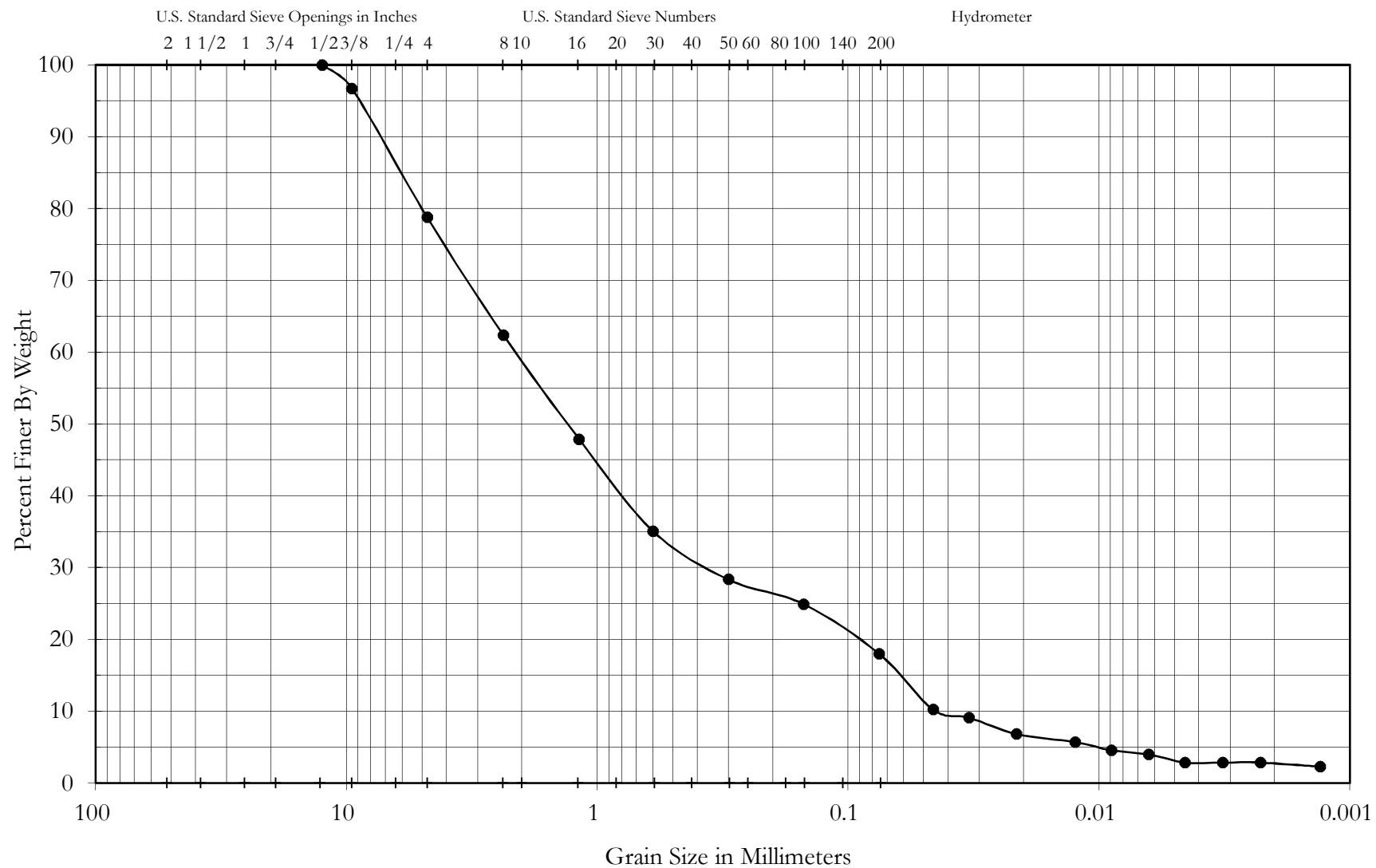
HYDROMETER ANALYSIS

Project Name:	HSC	Boring No.	ECP-315
Project No.	HG1910092.2.1	Sample No.	29
Date Tested:	7/16/2020	Sample Depth	113'-115'
Technician:	KC	Calc. <u>KC</u>	Checked by: <u>SW</u>

Hydrometer No.	384
Tare No.	A32
Wet Soil + Tare	61.03
Dry Soil + Tare	56.95
Tare	31.07
Hydrosopic Corr. Factor	0.864
Correction Factor	1
Mass for Sieve	122.22

Air Dry Mass of Soil	122.22
Corr. Mass of Soil	105.58
Mass Ret. on #10	0.24
% Passing No. 10 Sieve	99.80
Dry Mass after Wash. & Sieve	88.91
% Passing No. 200 Sieve	27.25
Amt of NA metaphosphate (g)	5
Specific Gravity (assumed)	2.77

Date	Time	Elapsed Time (min)	Hydro. Rdg.	Temp	Comp. Corr.	Corr. Hydro. Rdg.	K	L	D	% Finer N	% Finer Total Sample
07/16	07:01:00	1	28	22.2	5	23	0.0129	11.7	0.044	21.79	21.74
07/16	07:02:00	2	26	22.2	5	21	0.0129	12.0	0.032	19.89	19.85
07/16	07:05:00	5	23	22.2	5	18	0.0129	12.5	0.020	17.05	17.02
07/16	07:15:00	15	19	22.2	5	14	0.0129	13.2	0.012	13.26	13.23
07/16	07:30:00	30	18	22.2	5	13	0.0129	13.3	0.009	12.31	12.29
07/16	08:00:00	60	16	22.2	5	11	0.0129	13.7	0.006	10.42	10.40
07/16	09:00:00	120	15	22.2	5	10	0.0129	13.8	0.004	9.47	9.45
07/16	11:00:00	240	15	22.2	5	10	0.0129	13.8	0.003	9.47	9.45
07/16	15:00:00	480	14	22.2	5	9	0.0129	14.0	0.002	8.52	8.51
07/17	07:00:00	1440	14	22.2	5	9	0.0129	14.0	0.001	8.52	8.51



Sample Location

ECP-317,
14'-16'

D₅₀ & D₉₀

D₅₀ = 1.40 mm
D₉₀ = 7.50 mm

Classification

Silty Sand with Gravel (SM)

HVJ ASSOCIATES, INC.

**GRAIN SIZE ANALYSIS CURVE
ASTM D6913**

PROJECT NO:

HG1910092.2.1

PLATE H-3a

SIEVE ANALYSIS DATA

Project: HSC Job No. HG1910092.2.1
 Boring No. ECP-317 Sample No. 8 Depth: 14'-16'
 Classification: Silty sand with Gravel (SM)

Tare No.	Z	Init Wt. - Tare	134.14	% Ret. 82.05
Tare Wt.	7.81	Dry Wt. after test	117.87	% Pass #200 17.95
Init. Dry Wt.	141.95	Wt. Ret. on #200	110.06	

Sieve Size/No.	Sieve Size (mm)	Weight Ret.	% Retained	% Passing
1/2"	12.5	0.00	0.00	100.00
3/8"	9.5	4.40	3.28	96.72
4	4.76	28.50	21.25	78.75
8	2.36	50.54	37.68	62.32
16	1.180	69.94	52.14	47.86
30	0.600	87.10	64.93	35.07
50	0.300	96.15	71.68	28.32
100	0.150	100.75	75.11	24.89
200	0.075	110.06	82.05	17.95
	0.046			10.20
	0.033			9.07
	0.021			6.80
	0.012			5.67
	0.009			4.53
	0.006			3.97
	0.005			2.83
	0.003			2.83
	0.002			2.83
	0.001			2.27

Equipment: Oven (425) Scale (167) Shaker (438)

Tested by: KC Computed by: KC Checked: SW

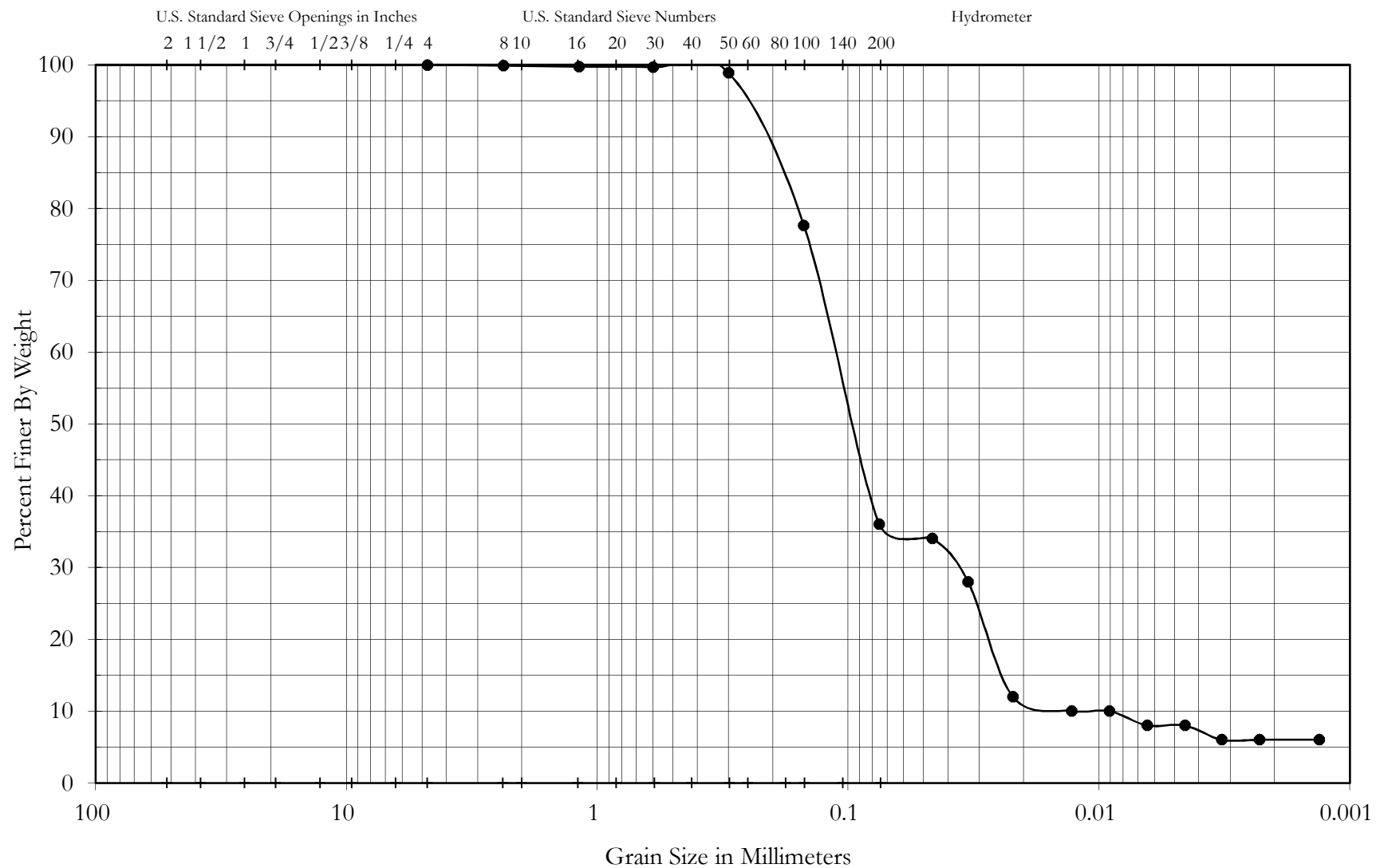
HYDROMETER ANALYSIS

Project Name:	ECP-317	Boring No.	ECP-317
Project No.	HG1910092.2.1	Sample No.	8
Date Tested:	7/15/2020	Sample Depth	14'-16'
Technician:	KC	Calc. <u>kc</u>	Checked by: <u>SW</u>

Hydrometer No.	384
Tare No.	701
Wet Soil + Tare	63.4
Dry Soil + Tare	60.85
Tare	30.33
Hydroscopic Corr. Factor	0.923
Correction Factor	1
Mass for Sieve	117.78

Air Dry Mass of Soil	117.78
Corr. Mass of Soil	108.70
Mass Ret. on #10	45.21
% Passing No. 10 Sieve	61.61
Dry Mass after Wash. & Sieve	96.64
% Passing No. 200 Sieve	17.95
Amt of NA metaphosphate (g)	5
Specific Gravity (assumed)	2.77

Date	Time	Elapsed Time (min)	Hydro. Rdg.	Temp	Comp. Corr.	Corr. Hydro. Rdg.	K	L	D	% Finer N	% Finer Total Sample
07/15	06:31:00	1	23	22.2	5	18	0.0129	12.5	0.046	16.56	10.20
07/15	06:32:00	2	21	22.2	5	16	0.0129	12.9	0.033	14.72	9.07
07/15	06:35:00	5	17	22.2	5	12	0.0129	13.5	0.021	11.04	6.80
07/15	06:45:00	15	15	22.2	5	10	0.0129	13.8	0.012	9.20	5.67
07/15	07:00:00	30	13	22.2	5	8	0.0129	14.2	0.009	7.36	4.53
07/15	07:30:00	60	12	22.2	5	7	0.0129	14.3	0.006	6.44	3.97
07/15	08:30:00	120	10	22.2	5	5	0.0129	14.7	0.005	4.60	2.83
07/15	10:30:00	240	10	22.2	5	5	0.0129	14.7	0.003	4.60	2.83
07/15	14:30:00	480	10	22.2	5	5	0.0129	14.7	0.002	4.60	2.83
07/16	06:30:00	1440	9	22.2	5	4	0.0129	14.8	0.001	3.68	2.27



Sample Location

ECP-318,
16'-18'

D₅₀ & D₉₀

D₅₀ = 0.097 mm
D₉₀ = 0.21 mm

Classification

Silty Sand (SM)

HVJ ASSOCIATES, INC.

**GRAIN SIZE ANALYSIS CURVE
ASTM D6913**

PROJECT NO:

HG1910092.2.1

PLATE H-4a

SIEVE ANALYSIS DATA

Project: HSC Job No. HG1910092.2.1
 Boring No. ECP-318 Sample No. 9 Depth: 16'-18'
 Classification: Silty Sand (SM)

Tare No.	T14	Init Wt. - Tare	103.62	% Ret. 63.98
Tare Wt.	7.97	Dry Wt. after test	74.27	% Pass #200 36.02
Init. Dry Wt.	111.59	Wt. Ret. on #200	66.30	

Sieve Size/No.	Sieve Size (mm)	Weight Ret.	% Retained	% Passing
4	4.76	0.00	0.00	100.00
8	2.36	0.11	0.11	99.89
16	1.180	0.24	0.23	99.77
30	0.600	0.32	0.31	99.69
50	0.300	1.13	1.09	98.91
100	0.150	23.15	22.34	77.66
200	0.075	66.30	63.98	36.02
	0.046			34.02
	0.033			28.02
	0.022			12.01
	0.013			10.01
	0.009			10.01
	0.006			8.01
	0.005			8.01
	0.003			6.00
	0.002			6.00
	0.001			6.00

Equipment: Oven (425) Scale (167) Shaker (438)

Tested by: KC Computed by: KC Checked: SW

HYDROMETER ANALYSIS

Project Name:	HSC	Boring No.	ECP-318
Project No.	HG1910092.2.1	Sample No.	9
Date Tested:	7/16/2020	Sample Depth	16-18'
Technician:	KC	Calc. <u>KC</u>	Checked by: <u>SW</u>

Hydrometer No.	385
Tare No.	A4
Wet Soil + Tare	69.32
Dry Soil + Tare	62.15
Tare	30.9
Hydroscopic Corr. Factor	0.813
Correction Factor	1
Mass for Sieve	61.32

Air Dry Mass of Soil	61.32
Corr. Mass of Soil	49.88
Mass Ret. on #10	0.11
% Passing No. 10 Sieve	99.82
Dry Mass after Wash. & Sieve	39.23
% Passing No. 200 Sieve	36.02
Amt of NA metaphosphate (g)	5
Specific Gravity (assumed)	2.77

Date	Time	Elapsed Time (min)	Hydro. Rdg.	Temp	Comp. Corr.	Corr. Hydro. Rdg.	K	L	D	% Finer N	% Finer Total Sample
07/16	07:01:00	1	22	22.2	5	17	0.0129	12.7	0.046	34.08	34.02
07/16	07:02:00	2	19	22.2	5	14	0.0129	13.2	0.033	28.07	28.02
07/16	07:05:00	5	11	22.2	5	6	0.0129	14.5	0.022	12.03	12.01
07/16	07:15:00	15	10	22.2	5	5	0.0129	14.7	0.013	10.02	10.01
07/16	07:30:00	30	10	22.2	5	5	0.0129	14.7	0.009	10.02	10.01
07/16	08:00:00	60	9	22.2	5	4	0.0129	14.8	0.006	8.02	8.01
07/16	09:00:00	120	9	22.2	5	4	0.0129	14.8	0.005	8.02	8.01
07/16	11:00:00	240	8	22.2	5	3	0.0129	15.0	0.003	6.01	6.00
07/16	15:00:00	480	8	22.2	5	3	0.0129	15.0	0.002	6.01	6.00
07/17	07:00:00	1440	8	22.2	5	3	0.0129	15.0	0.001	6.01	6.00