

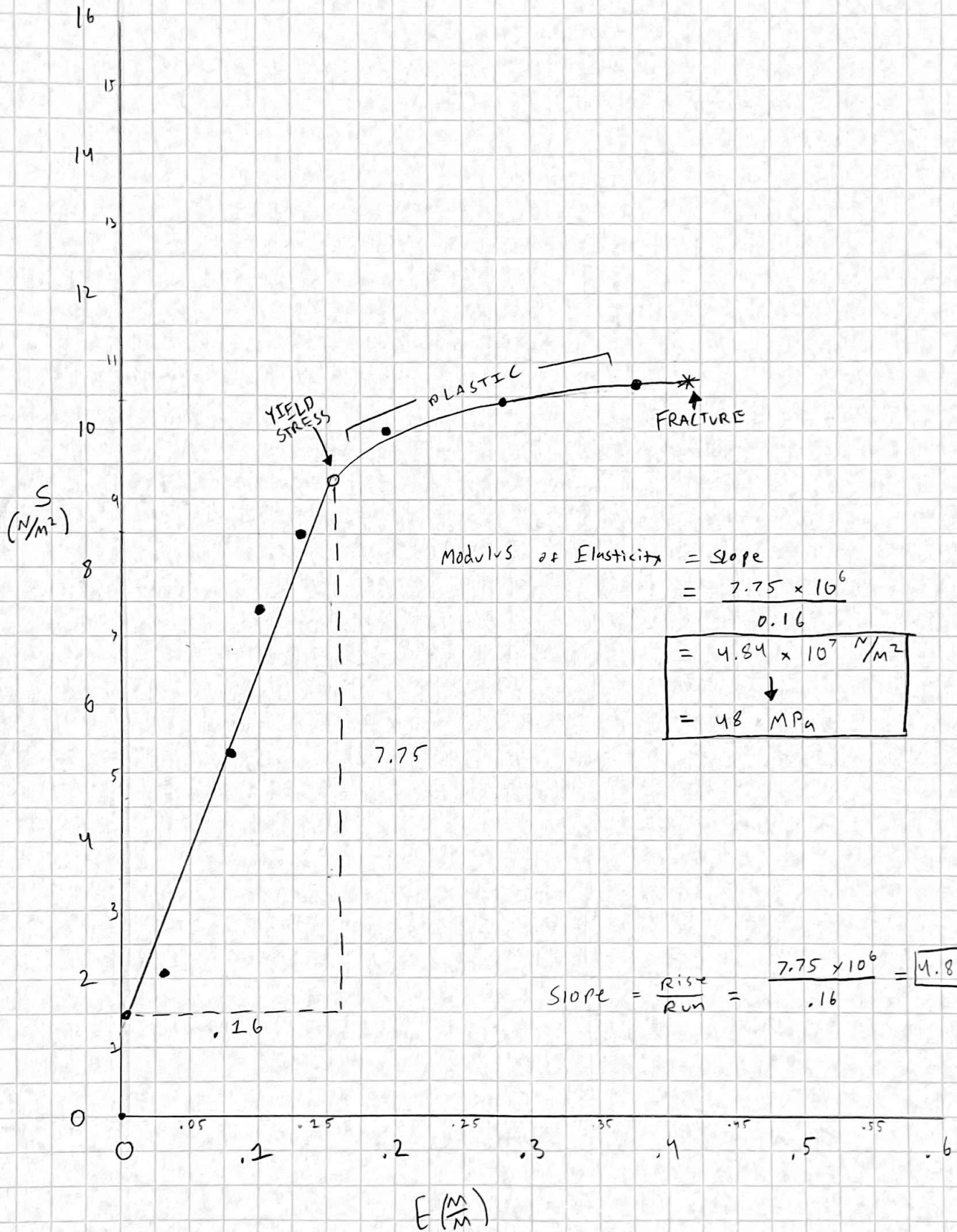
Sol Stirling

MARCH 13, 2024

ENGI STRESS-STRAIN

VERKLAND STRETCH-TIE

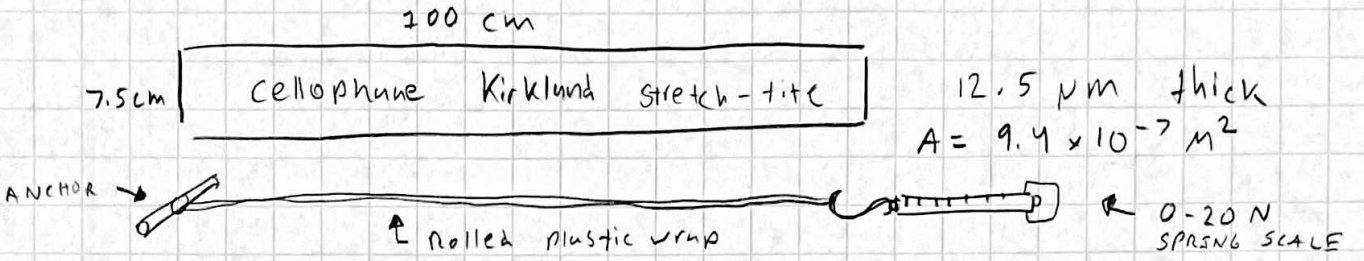
(MILLION)



MARCH 13, 2024

SOL STIRLING
POE - LAB WEEK

Engi Stress & Strain Diagram Lab



TEST # 1

F	L	Return	STRESS S N/m ²	STRAIN E (ΔL/L)
0N	.78m		0 N/m ²	0
2N	.805 →	.78	2.1×10^6 N/m ²	.032
5N	.84 →	.78	5.3×10^6 N/m ²	.076
7N	.86 →	.79	7.4×10^6 N/m ²	.1
8N	.88 →	.795	8.5×10^6 N/m ²	.128
10N	.93 →	.80	1×10^7 N/m ²	.14
13N	1.00 →	.815	1.4×10^7 N/m ²	.28
15N	1.08 →	.835	2.59×10^7 N/m ²	.38
* +15N	FAILURE			

NOTES

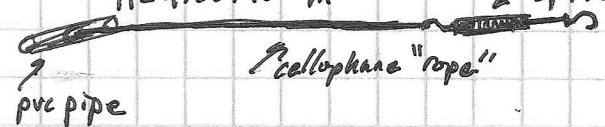
TEST # 2

F	L	RETURN
0N	.795 →	
2N	.77 →	
5N	.805 →	.75
7N	.84 →	.75
6N	.86 →	.76
10N	.91 →	.77
13N	1.02 →	.90
* -15N	Failure @ 1.07	

* TEST # 1 SNAPPED AT 1.09M, with roughly around over 15N of force*

* TEST # 2 SNAPPED AT 1.07M, with a little less than 15N of force*

100cm
 7.5cm Kirkland Signature stretch-tite® Cellophane Wrap $\approx 12.5 \times 10^{-6}$ m thick or 12.5 microns (microm)
 $A = 4.38 \times 10^{-7} \text{ m}^2$
 20 n SPRINGS scale



Test #1

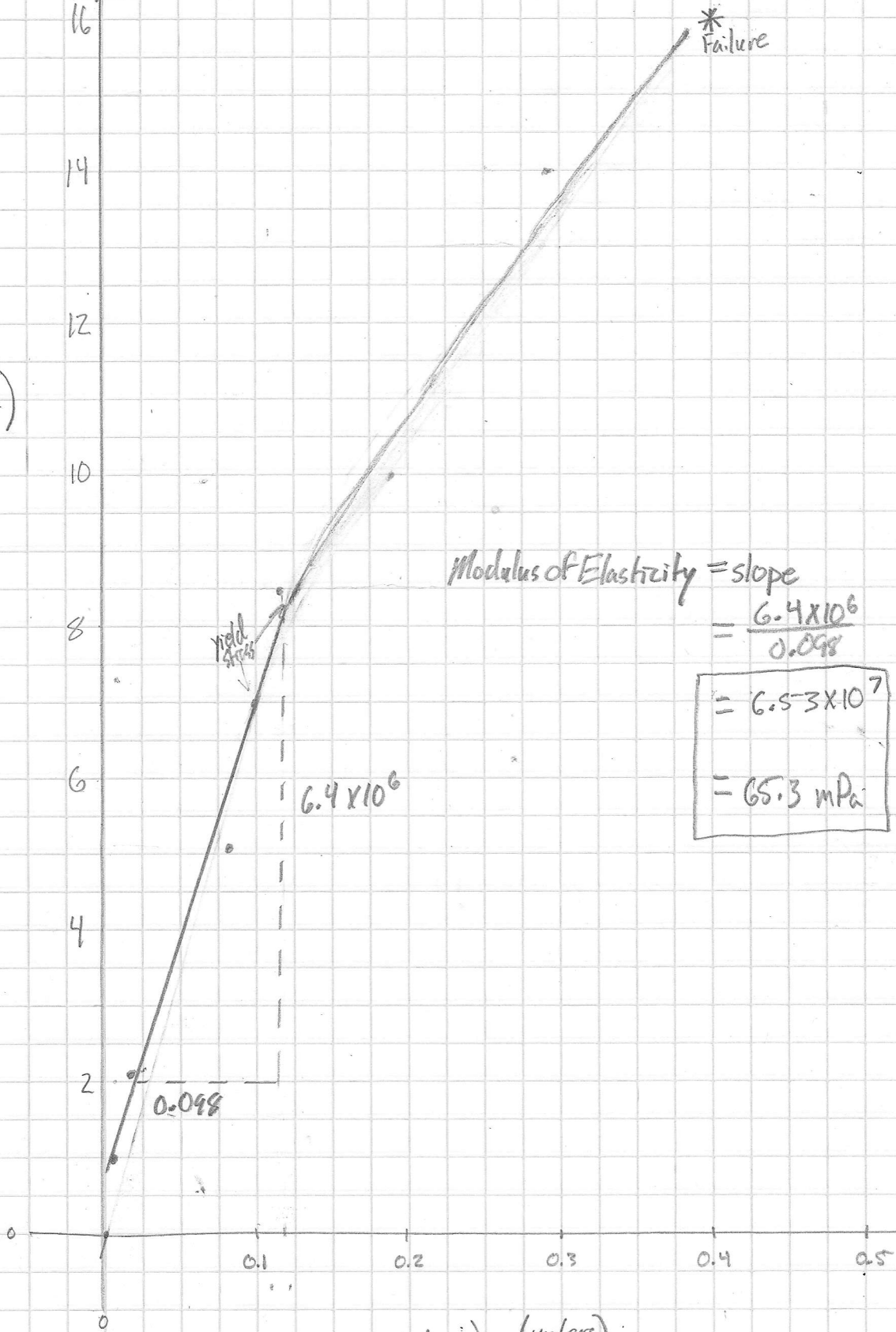
Force (N)	Length (cm)
0	0.78 → 0.78
2	0.905 → 0.78
5	0.84 → 0.78
7	0.86 → 0.78
8	0.88 → 0.785
10	0.93 → 0.80
13	1.0 → 0.825
15	1.08 → 0.835
+15	Failure

Force (N)	Stress σ (N/m ²)	Strain ϵ ($\frac{\Delta L}{L}$)
0	0 N/m ²	0
2	2.1×10^6 N/m ²	0.032
5	5.3×10^6 N/m ²	0.070
7	7.4×10^6 N/m ²	0.1
8	8.5×10^6 N/m ²	0.13
10	1.0×10^7 N/m ²	0.16
13	1.4×10^7 N/m ²	0.28
15	1.55×10^7 N/m ²	0.38

Test #2

Force (N)	Length (m)
0	0.745 → 0.745
2	0.77 → 0.745
5	0.805 → 0.755
7	0.8375 → 0.755
8	0.865 → 0.765
10	0.91 → 0.77
13	1.02 → 0.785
15	Failure @ 1.07

σ
(N/m^2)



Modulus of Elasticity = slope

$$= \frac{6.4 \times 10^6}{0.098}$$

$$= 6.53 \times 10^7$$

$$= 65.3 \text{ MPa}$$

ϵ ($\frac{\text{m}}{\text{m}}$) ($\frac{\text{meters}}{\text{meters}}$)