CAPE/SURF Material Testing

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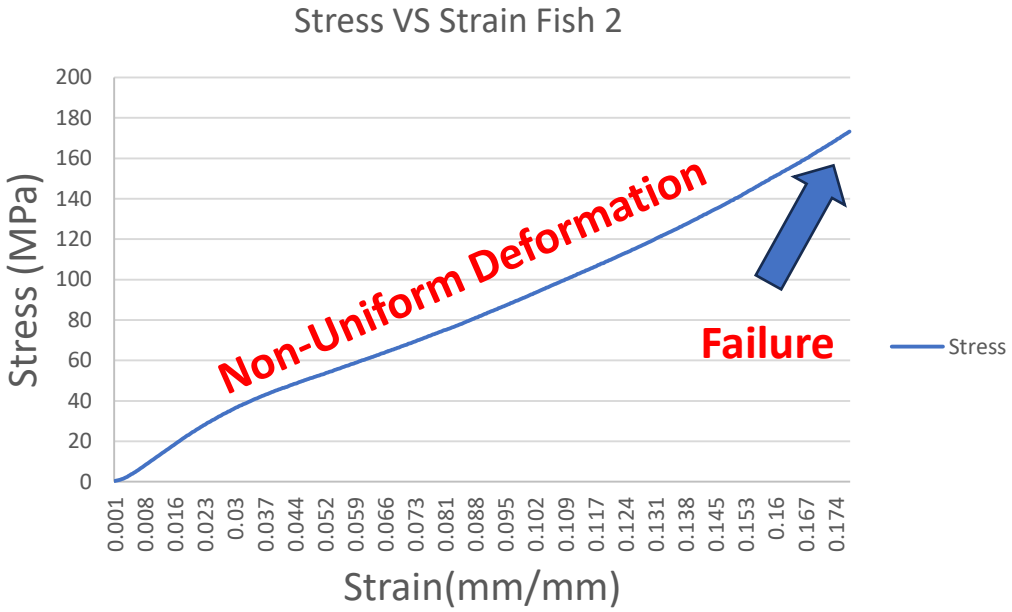
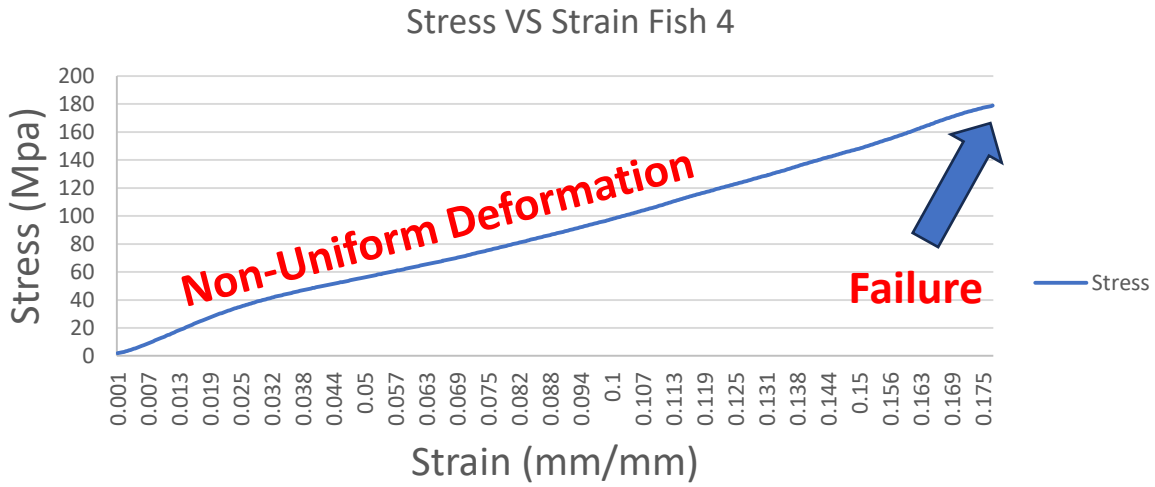
Fishing Line – ASTM 638 Custom

Specimen	Diameter (mm)	Peak Load (N)	Peak Stress (Mpa)	Strain at Break (mm/mm)	Modulous (Mpa)	Peak Tensile Strength (kg)
1	0.87	161.433	213.3	0.18	1537.025	16.46
2	0.87	218.728	289	0.275	1197.212	22.30
3	0.87	168.866	223.1	0.198	1684.785	17.21
4	0.87	136.141	179.9	0.179	1402.404	13.88
5	0.87	187.986	248.4	0.221	1238.299	19.16
Average		174.631	230.7	0.211	1411.945	17.80
Standard Deviation		28	36	0	182	3

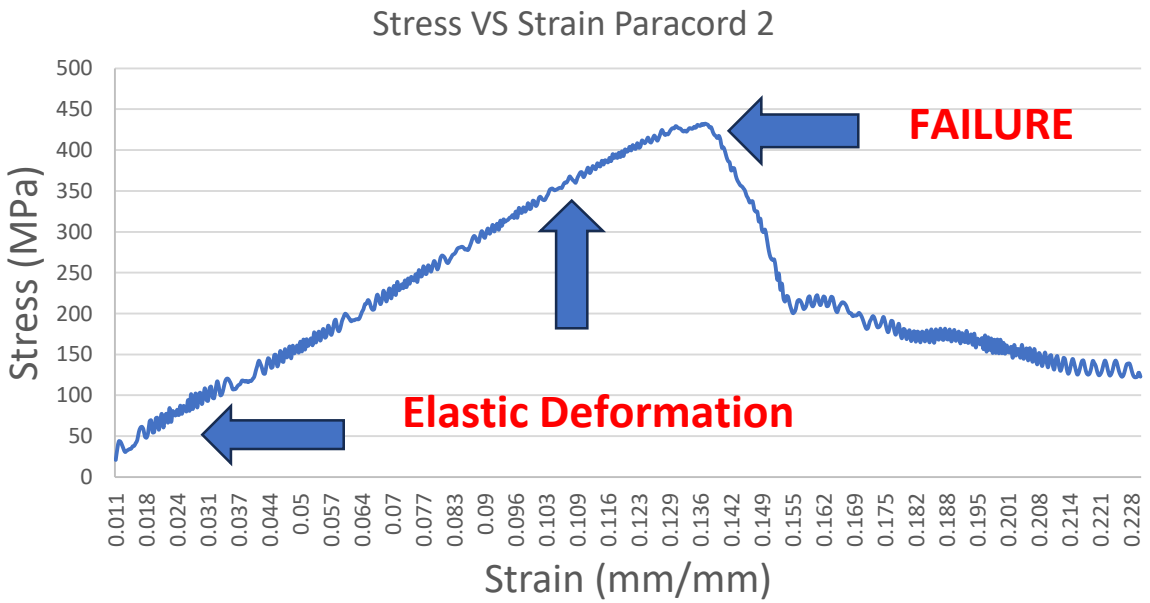


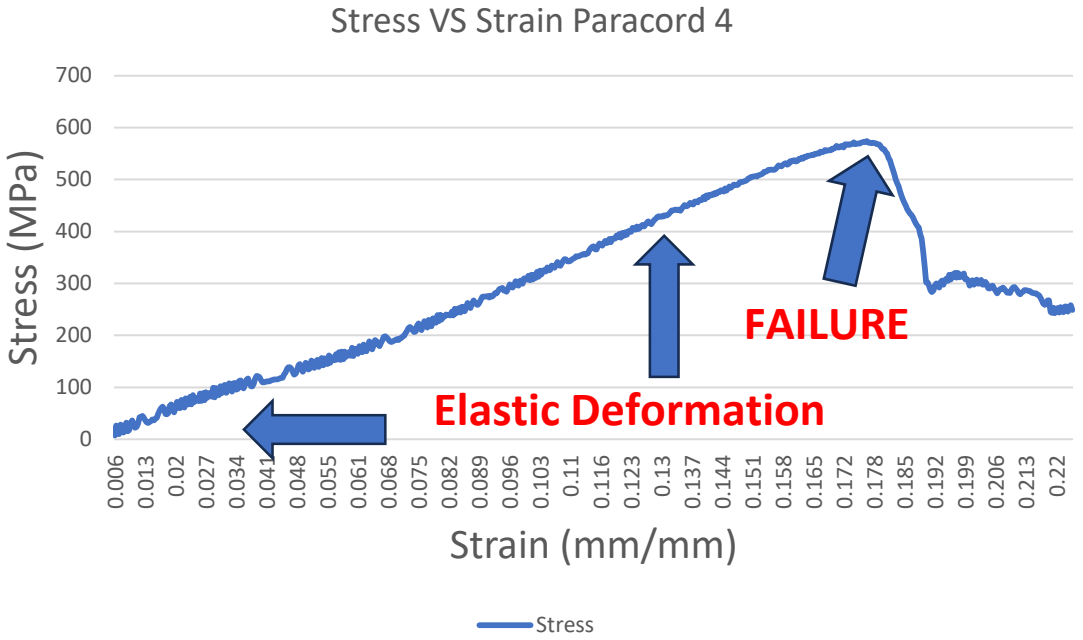


* Testing conducted after sample was submerged in LN2 for 1 week.*

Paracord – ASTM 638 Custom

Specimen	Diameter (mm)	Peak Load (N)	Peak Stress (Mpa)	Strain at Break (mm/mm)	Modulous (Mpa)	Peak Tensile Strength (kg)
1	1.65	1448.611	532.1	0.168	2881.458	147.67
2	1.65	1177.135	432.4	0.137	3292.658	119.99
3	1.65	1270.586	466.7	0.184	3284.312	129.52
4	1.65	1562.527	573.9	0.177	3121.560	159.28
5	1.65	1491.021	547.7	****	2644.076	151.99
Average		1389.976	510.6	0.167	3044.813	141.69
Standard Deviation		144	53	0	250	15





Further testing showed that majority of strength came from mantle, not inner braids!

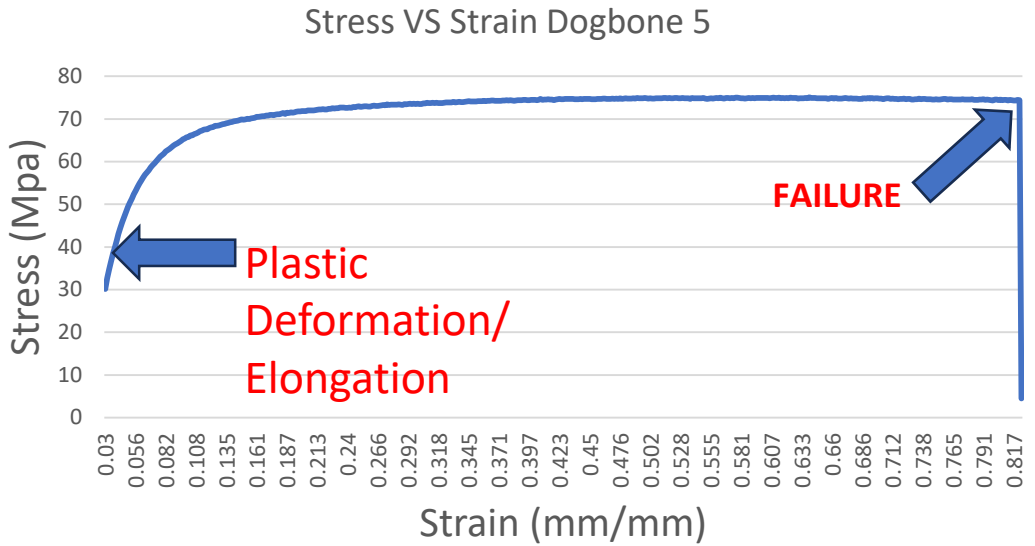
* Testing conducted after sample was submerged in LN2 for 1 week.*

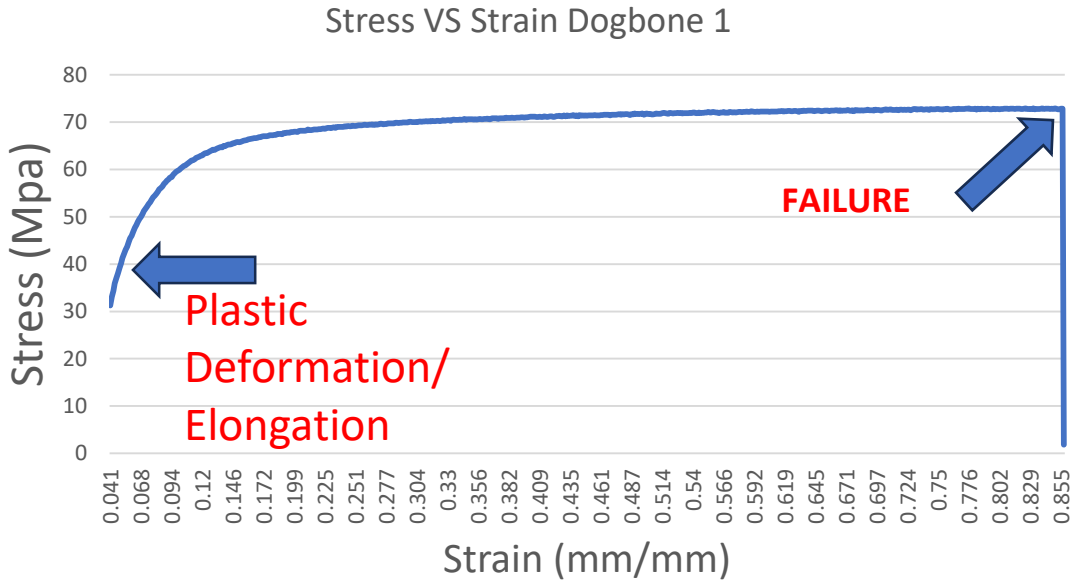
(DuPont) Delrin Dogbones – ASTM 638

Specimen	Avg. Thickness (mm)	Avg. Width (mm)	Peak Load (N)	Peak Stress (Mpa)	Peak Tensile Strength (kg)
1	3.197	12.863	2998.316	72.911	305.64
2	3.197	12.857	3078.205	74.889	313.78
3	3.197	12.86	3077.712	74.953	313.73
4	3.197	12.857	3077.959	74.883	313.76
5	3.19	12.833	3071.794	75.037	313.13
Average			3060.797	74.535	312.01
Standard Deviation			31	1	3

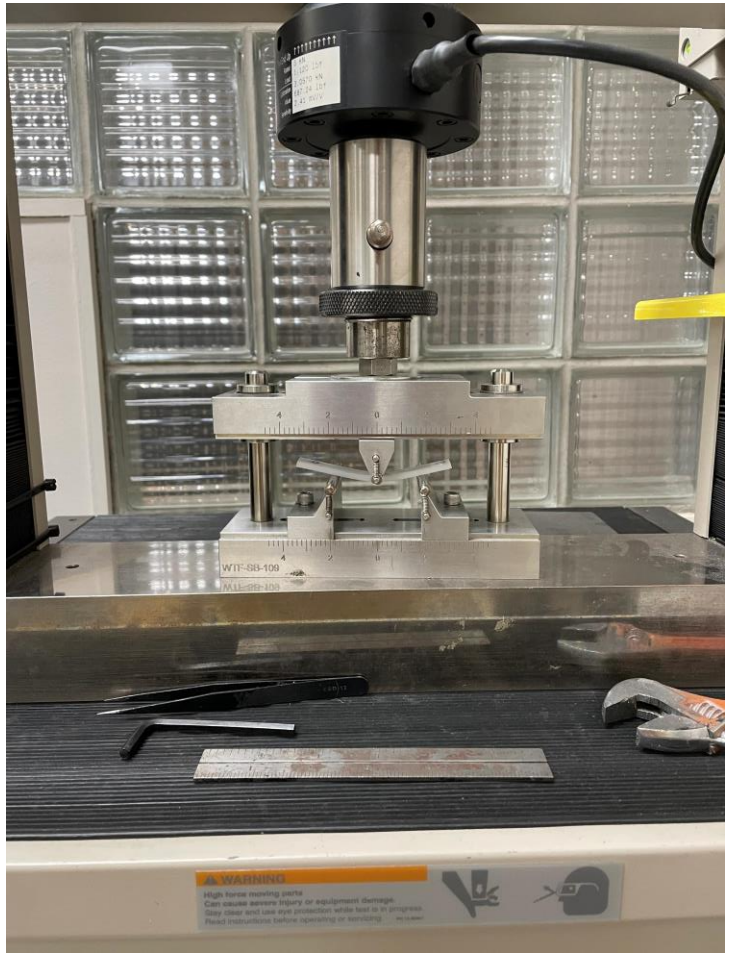
* Testing conducted after sample was submerged in LN2 for 2 Days

Note consistency of peak loads and peak stresses





(DuPont) Delrin Flexural – ASTM 790



- Note: (3.19 x 13.70 x 51.05 mm) Delrin was too pliable for ASTM 790 flexural testing to be viable.
- Testing conducted after sample was submerged in LN2 for 2 days.

Summary

- Paracord factor of safety per one strand ~7
- 3 strand configuration factor of safety ~21
- Paracord has elastic deformation until failure (Sudden Failure)
- Delrin reaches plastic deformation quickly
- Delrin is highly ductile
- Fishing line deforms unpredictably until sudden failure