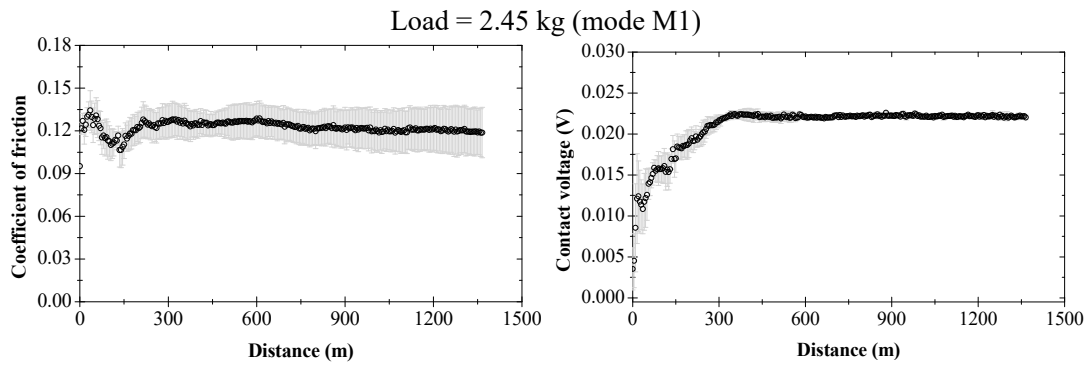
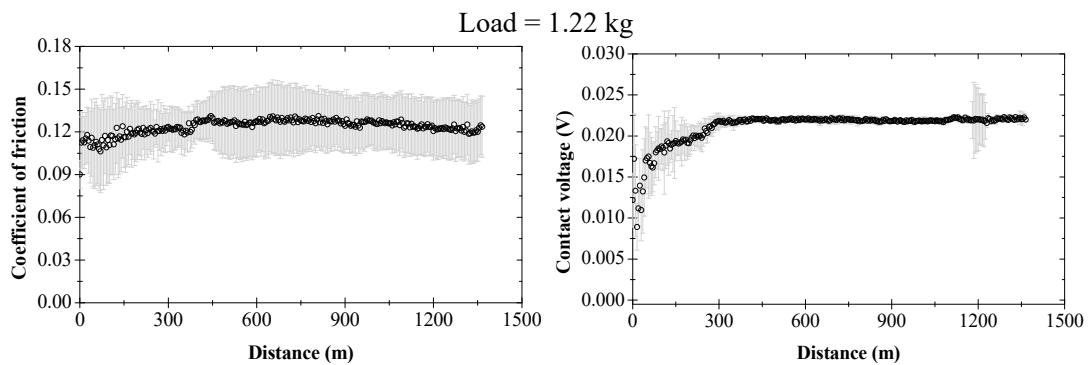


Supplementary Material

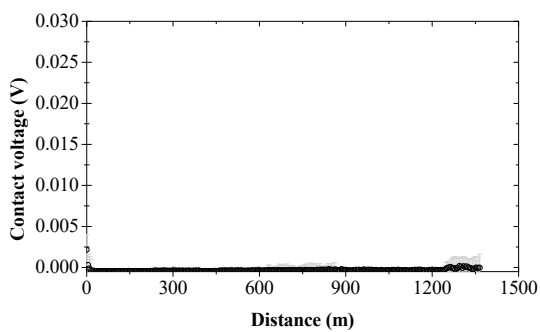
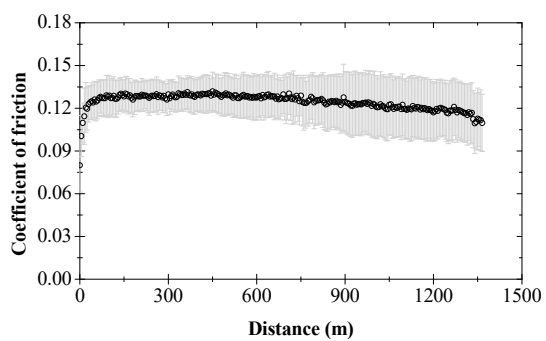
I. Coefficient of friction and contact voltage

Statistical results of the coefficient of friction and contact voltage for various blends and loads are given below. Error bars indicate one standard deviation above and below each data point representing the average of five measurements obtained from 50 m sliding distance intervals.

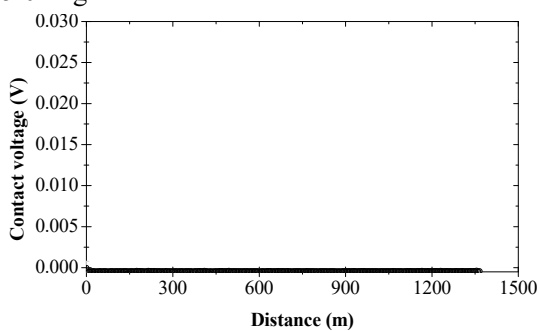
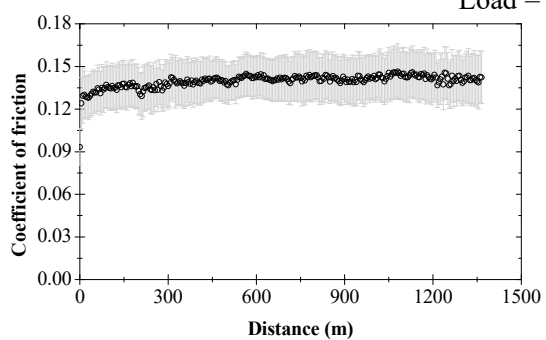
Blend 1 (base oil)



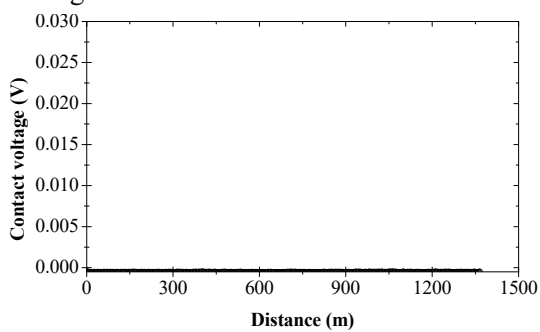
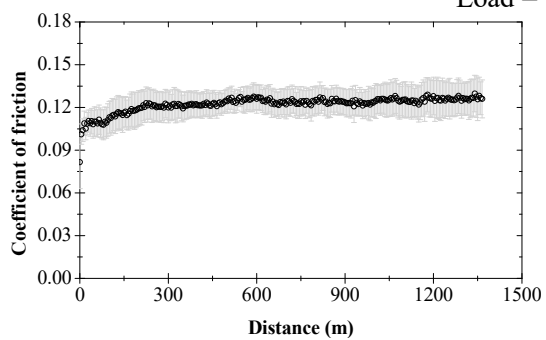
Load = 2.45 kg (mode M2)



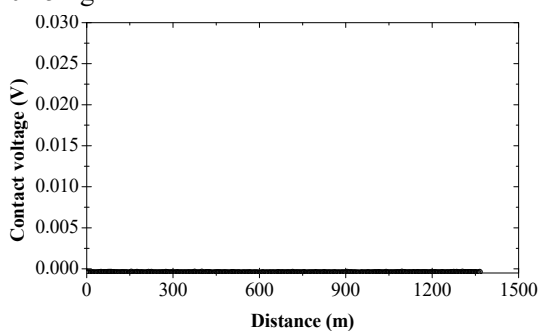
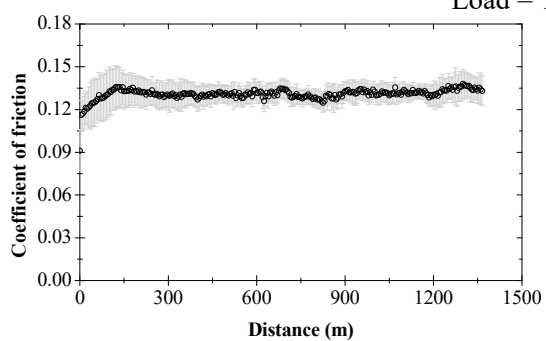
Load = 5.02 kg



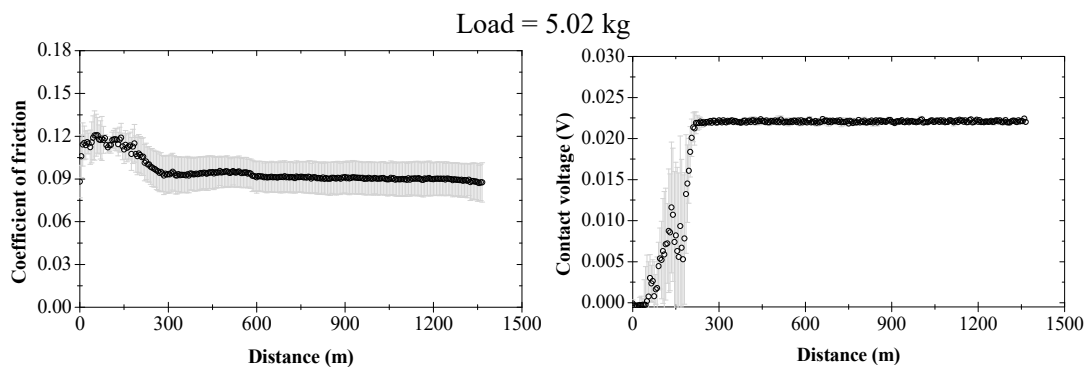
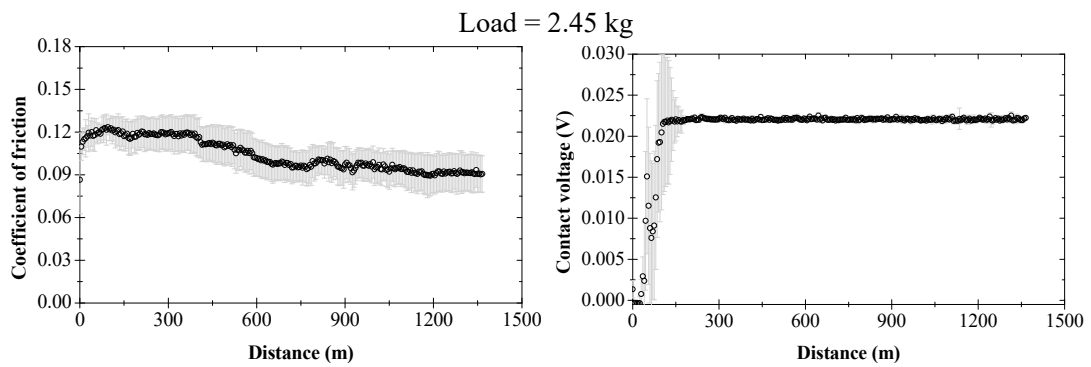
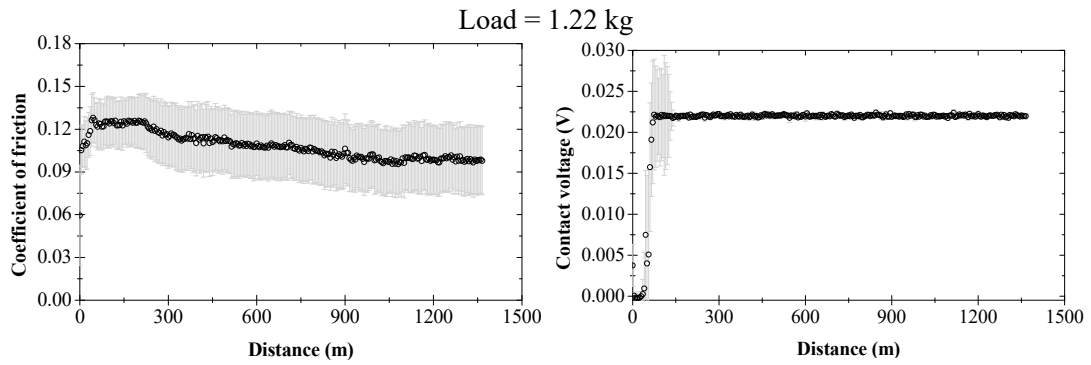
Load = 7.49 kg

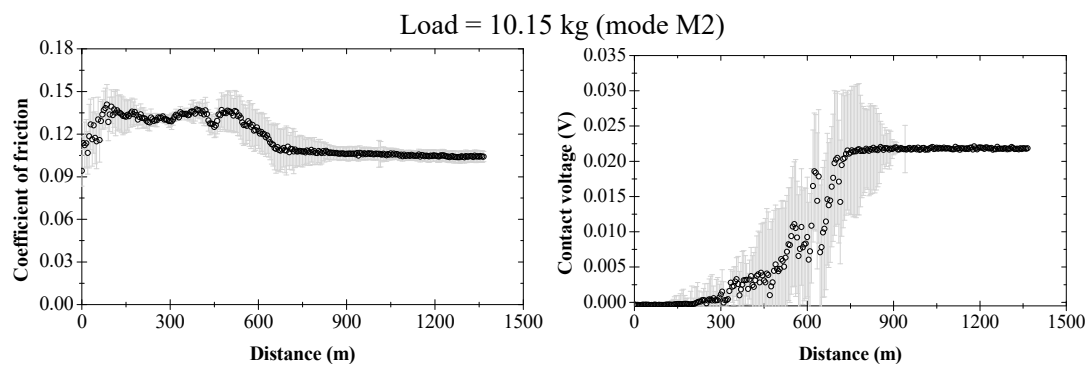
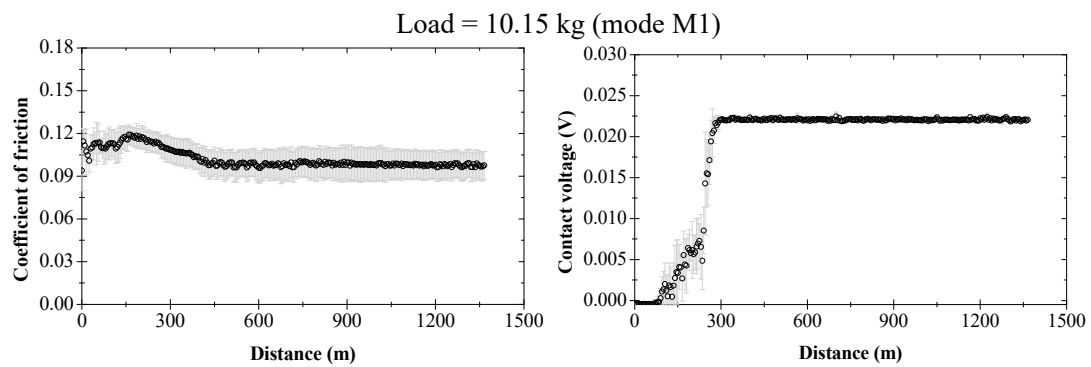
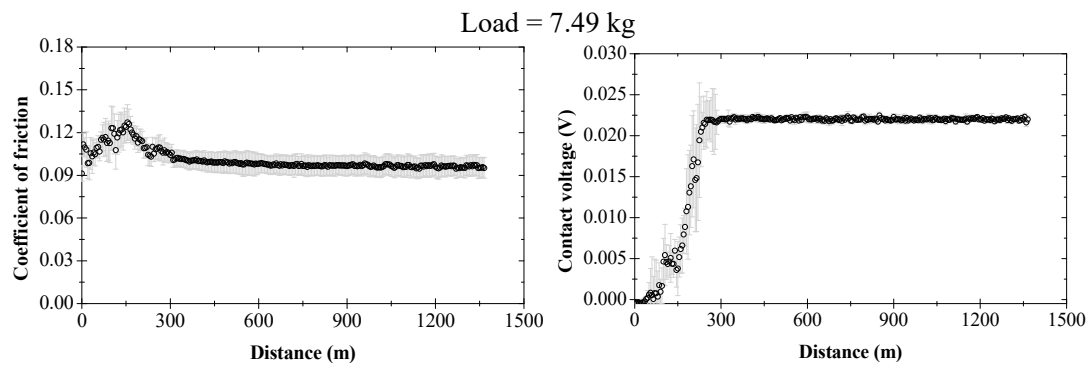


Load = 10.15 kg

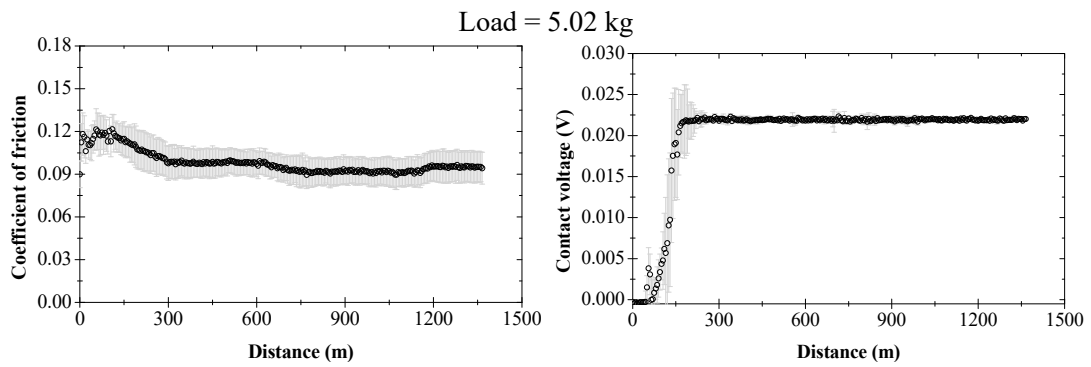
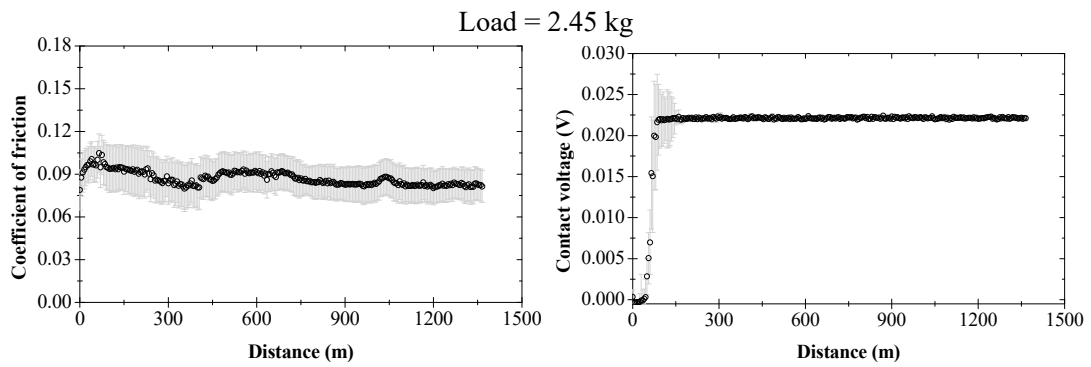
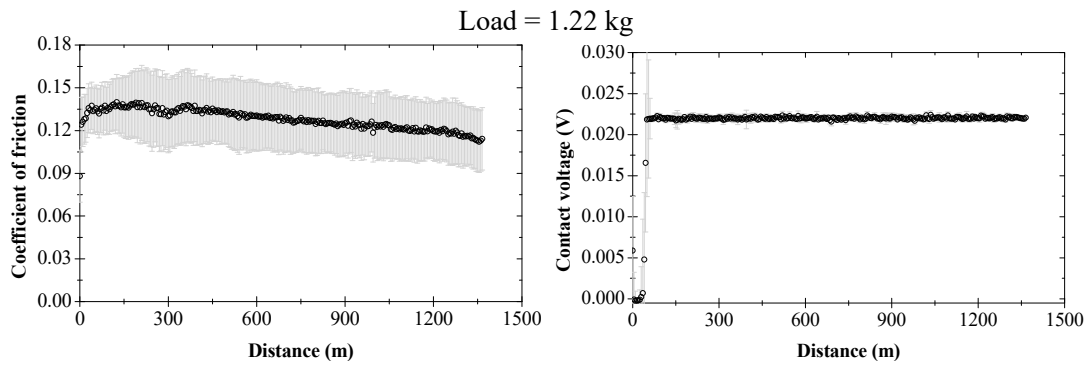


Blend 2 (base oil + 0.05% ZDDP)

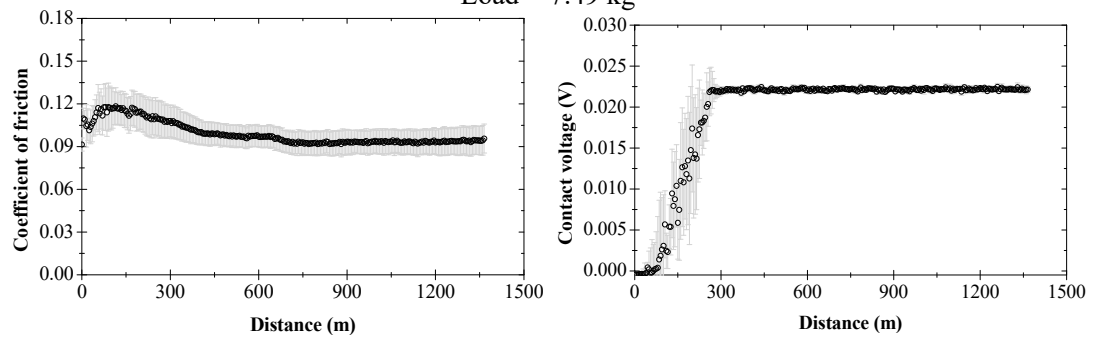




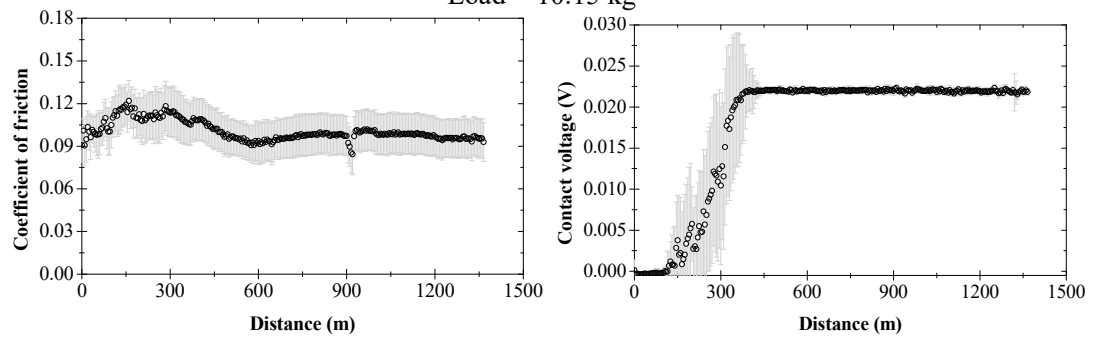
Blend 3 (base oil + 0.08% ZDDP)



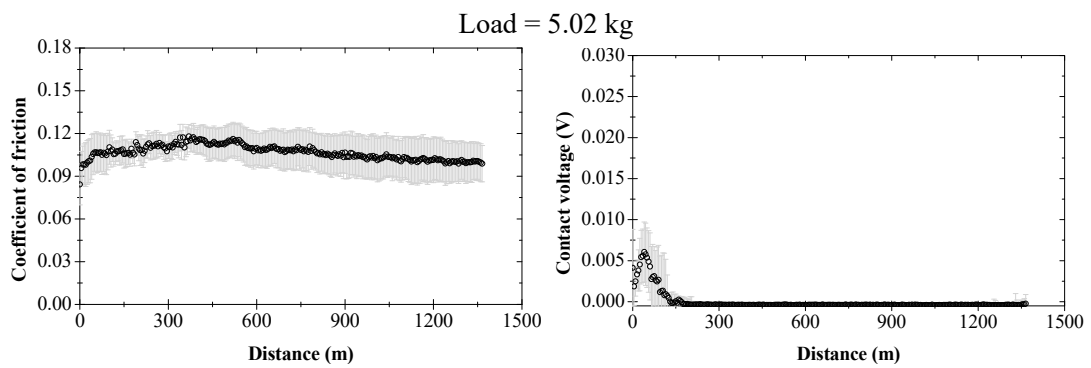
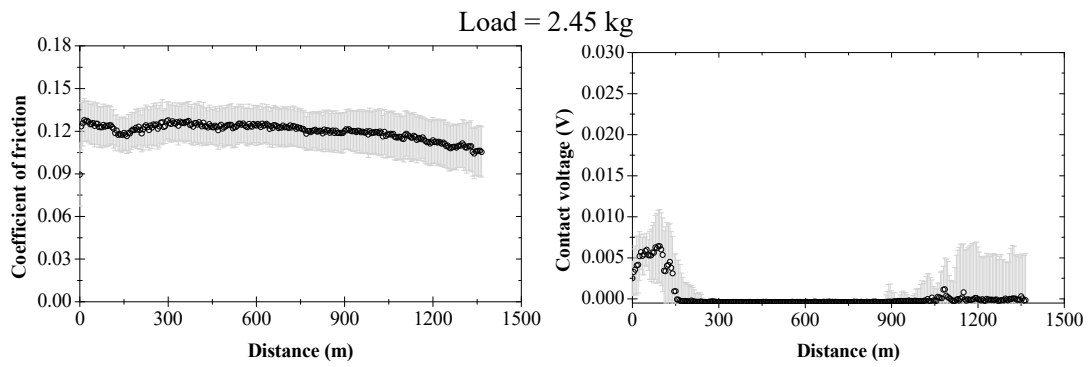
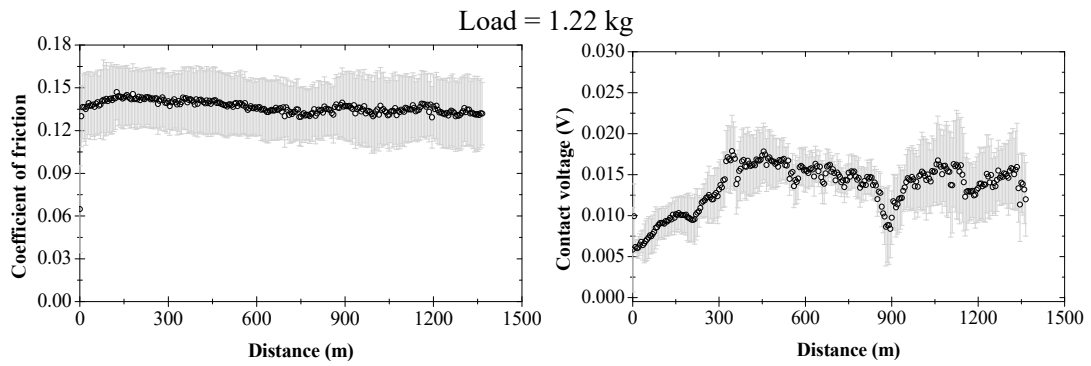
Load = 7.49 kg

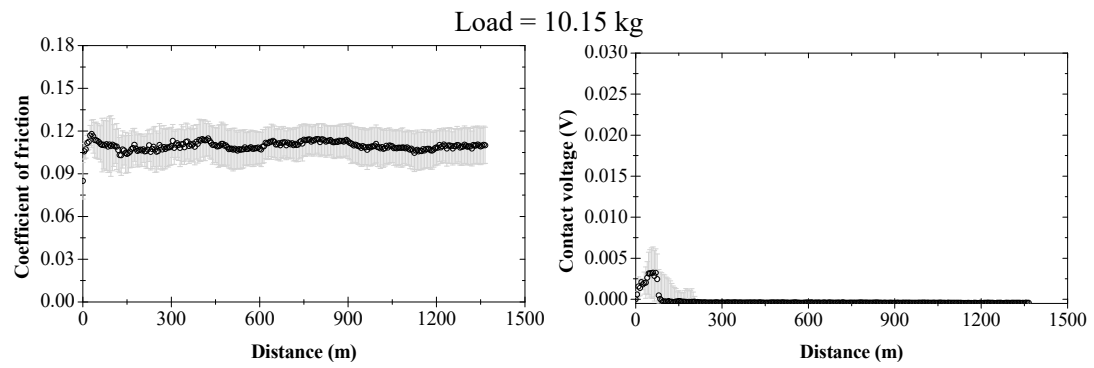
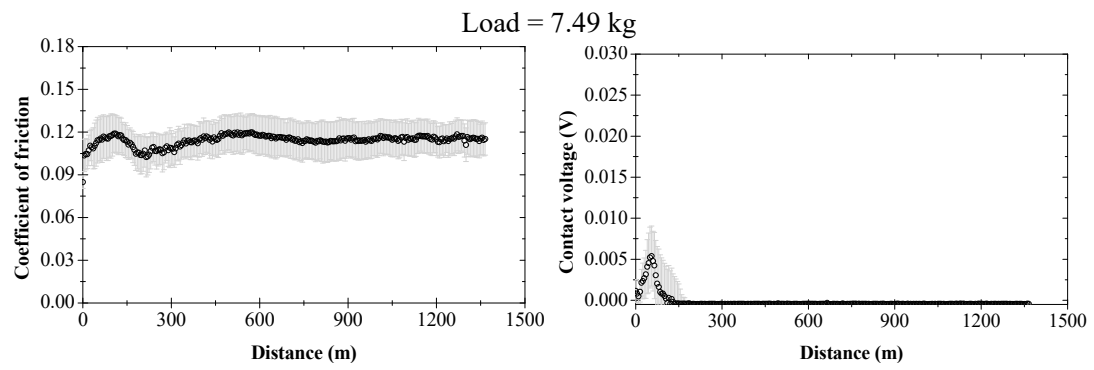


Load = 10.15 kg

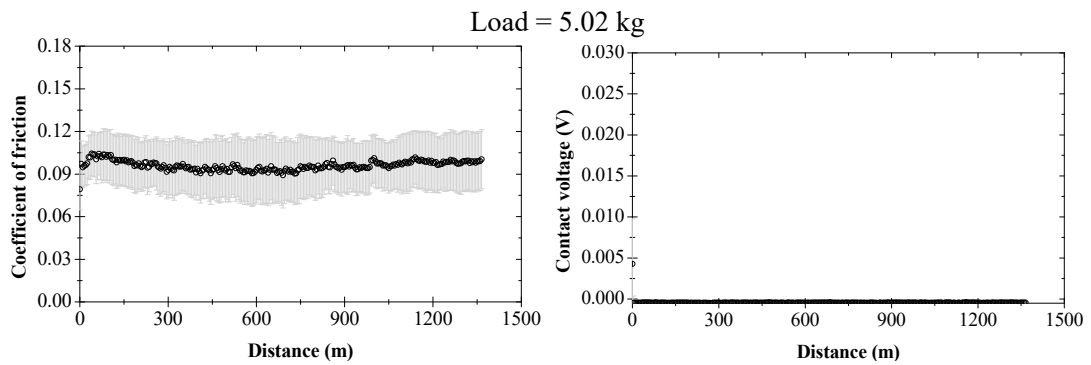
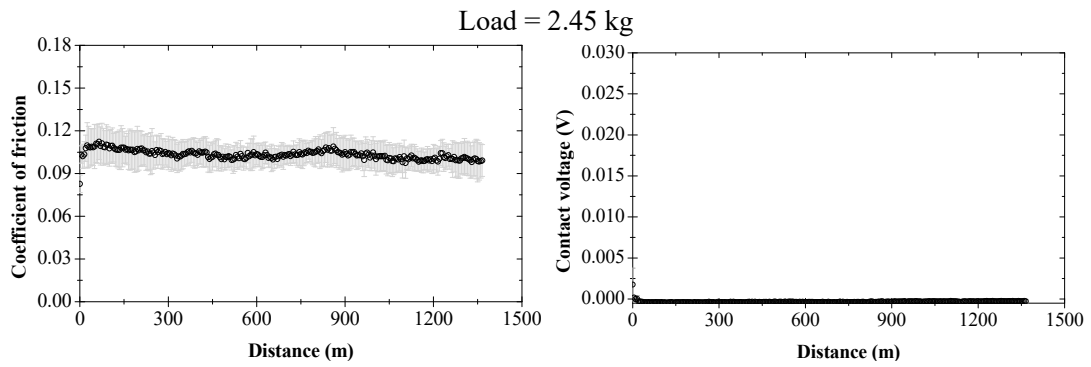
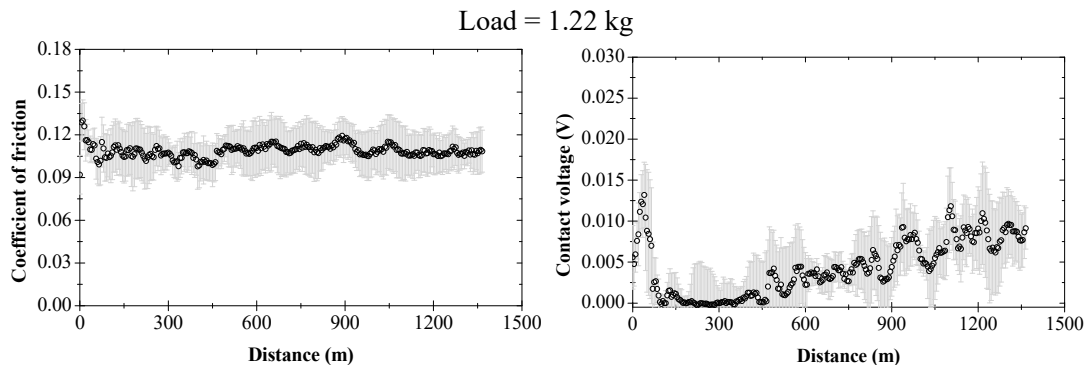


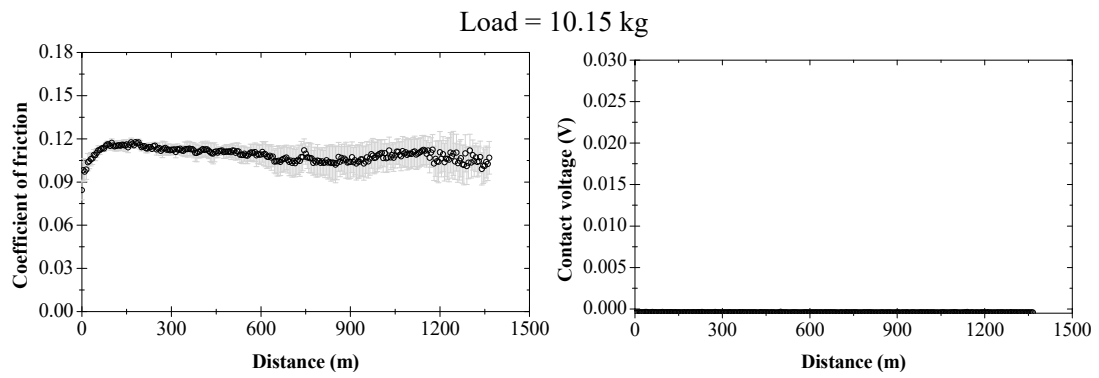
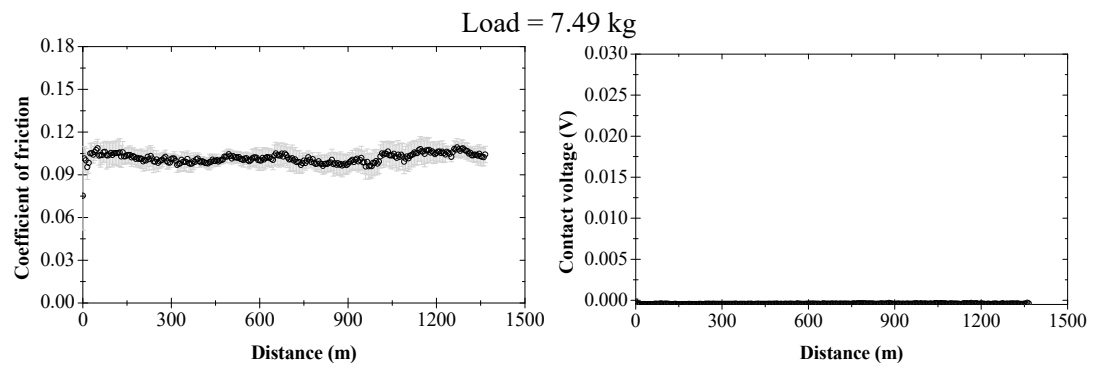
Blend 4 (base oil + 0.1% dispersant A)



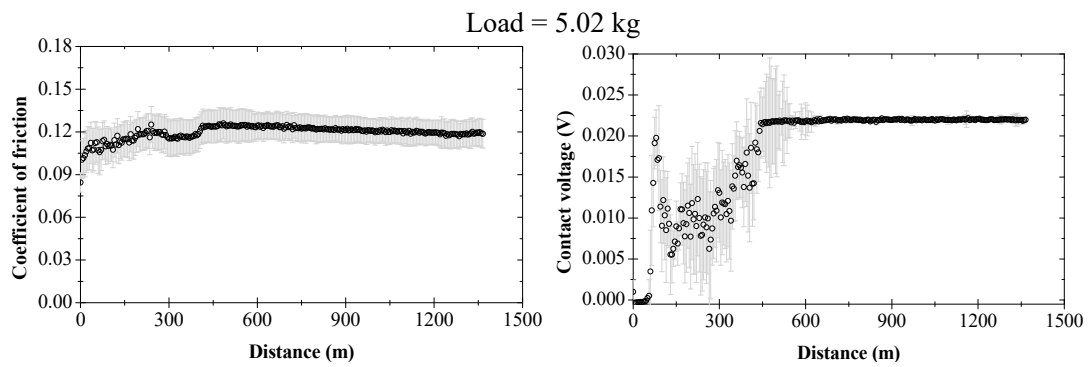
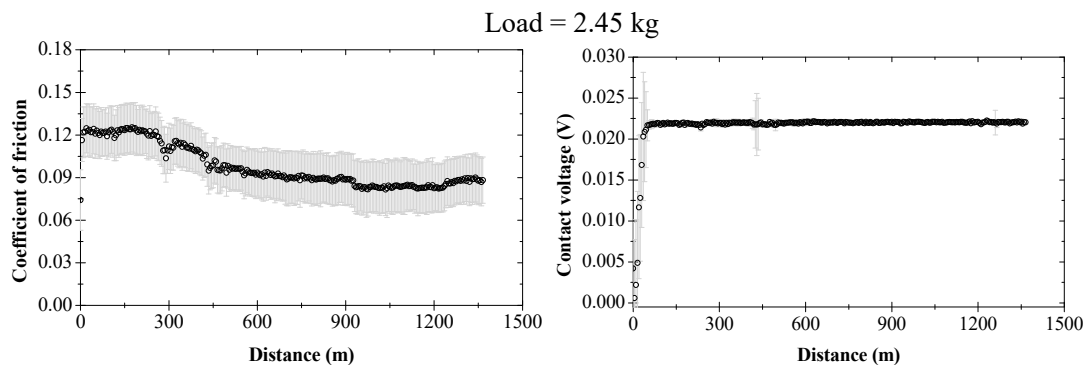
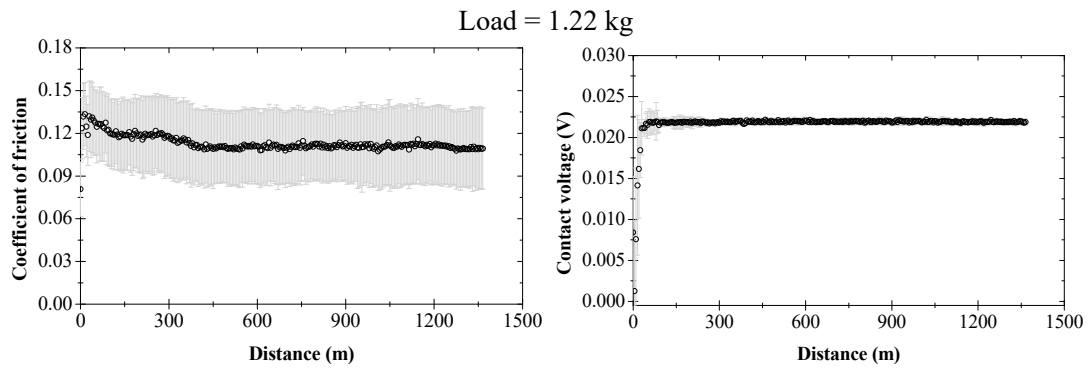


Blend 5 (base oil + 0.1% dispersant B)

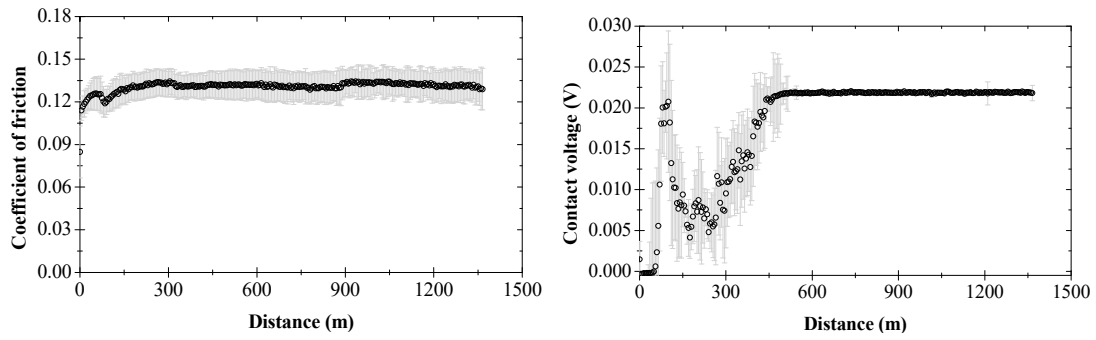




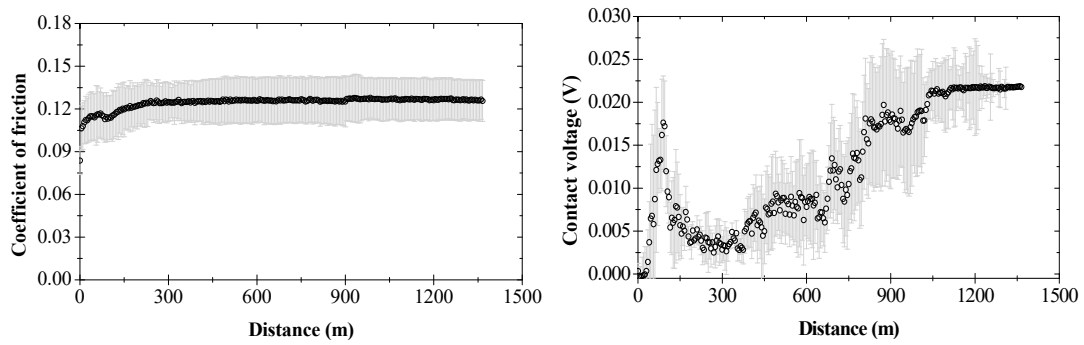
Blend 6 (base oil + 0.05% ZDDP + 0.1% dispersant A)



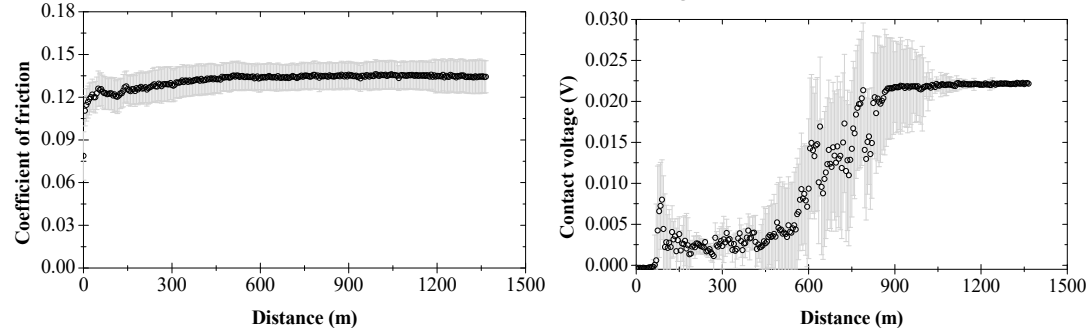
Load = 7.49 kg (mode M1)



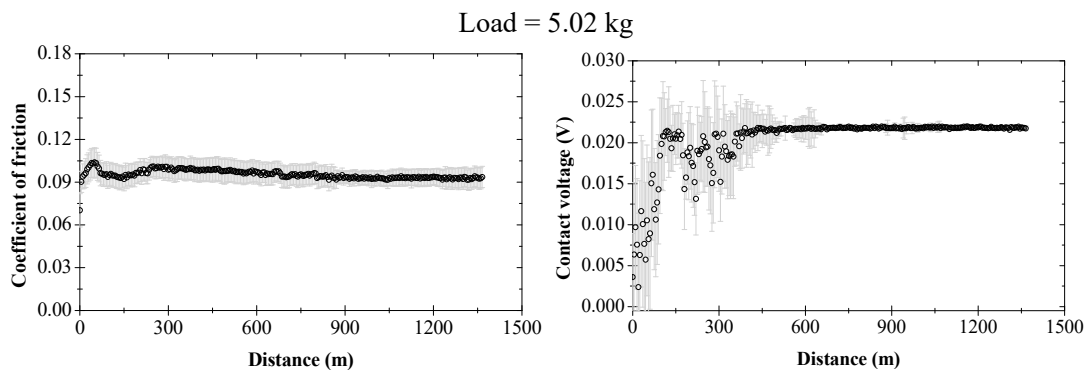
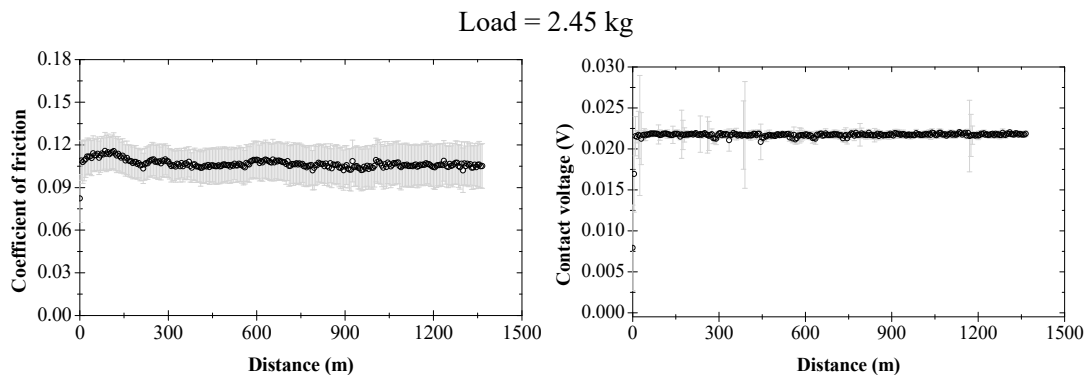
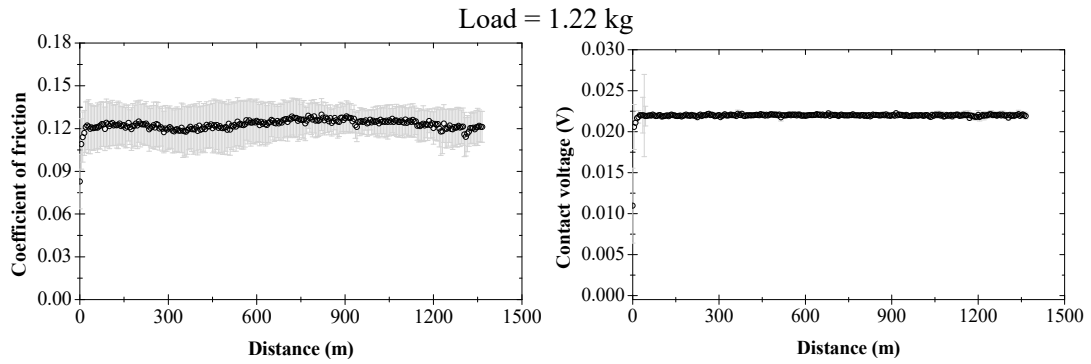
Load = 7.49 kg (mode M2)



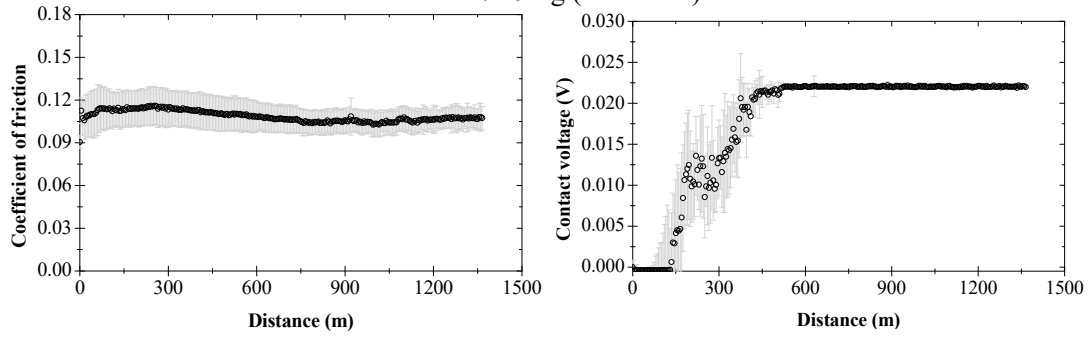
Load = 10.15 kg



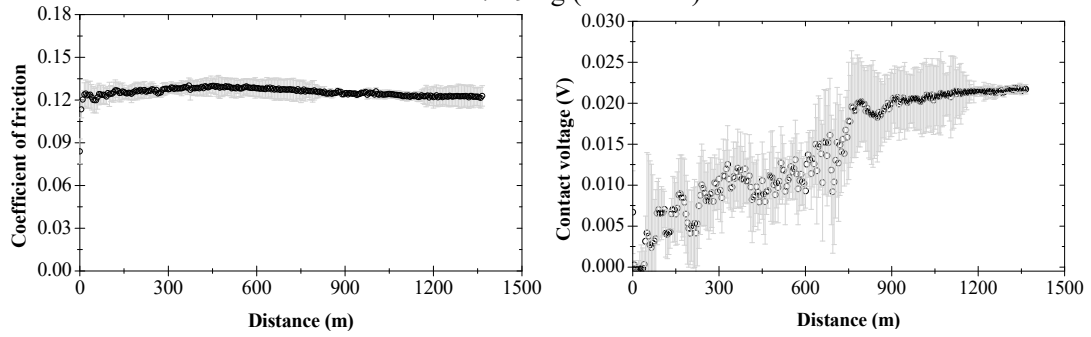
Blend 7 (base oil + 0.05% ZDDP + 0.1% dispersant B)



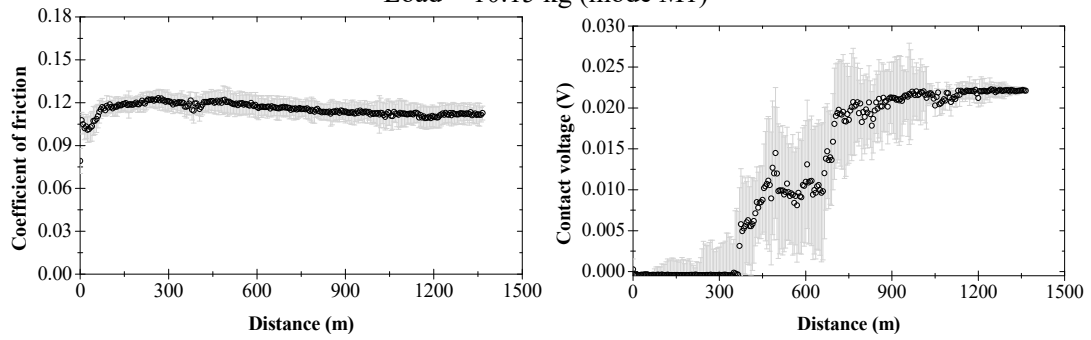
Load = 7.49 kg (mode M1)



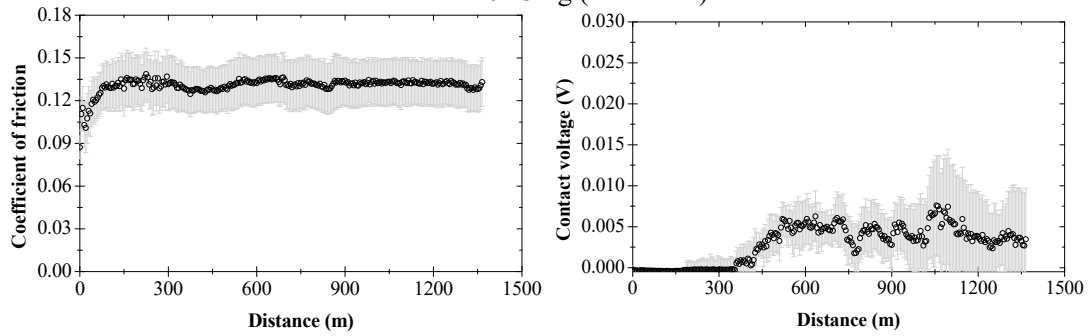
Load = 7.49 kg (mode M2)



Load = 10.15 kg (mode M1)



Load = 10.15 kg (mode M2)



II. Characteristic distances of the evolution of tribofilm formation

Statistical results of the incubation, transient (transition), and film formation (steady state) distances for tribofilm formation by different blends at various loads derived from contact voltage measurements are given below.

	Load (kg)	Mode	Incubation Distance (m)			Transition Distance (m)			Film Formation Distance (m)		
Blend 1	1.22	--	6.0	±	6.5	281.0	±	98.8	287.0	±	101.5
	2.45	1	2.5	±	5.0	300.0	±	16.8	302.5	±	11.9
		2	>1365			Unknown			No Steady State Film		
	5.02	--	>1365			Unknown			No Steady State Film		
	7.49	--	>1365			Unknown			No Steady State Film		
	10.15	--	>1365			Unknown			No Steady State Film		
Blend 2	1.22	--	30.0	±	14.6	56.0	±	35.6	86.0	±	42.3
	2.45	--	32.0	±	11.5	81.0	±	51.6	113.0	±	60.6
	5.02	--	70.0	±	60.4	134.0	±	57.7	204.0	±	46.7
	7.49	--	57.0	±	28.2	196.0	±	48.3	253.0	±	41.3
	10.15	1	103.8	±	31.2	181.3	±	24.3	285.0	±	10.8
		2	264.0	±	113.9	499.0	±	266.0	763.0	±	237.8
Blend 3	1.22	--	32.0	±	11.0	21.0	±	8.2	53.0	±	6.7
	2.45	--	35.0	±	13.7	69.0	±	40.4	104.0	±	42.3
	5.02	--	59.0	±	23.3	135.0	±	73.9	194.0	±	64.2
	7.49	--	56.0	±	24.6	195.0	±	34.8	251.0	±	47.1
	10.15	--	80.0	±	32.0	283.0	±	96.0	363.0	±	71.5
Blend 4	1.22	--	1.0	±	2.2	Unknown			No Steady State Film		
	2.45	--	>1365			Unknown			No Steady State Film		
	5.02	--	>1365			Unknown			No Steady State Film		
	7.49	--	>1365			Unknown			No Steady State Film		
	10.15	--	>1365			Unknown			No Steady State Film		
Blend 5	1.22	--	224.0	±	204.9	Unknown			No Steady State Film		
	2.45	--	>1365			Unknown			No Steady State Film		
	5.02	--	>1365			Unknown			No Steady State Film		
	7.49	--	>1365			Unknown			No Steady State Film		
	10.15	--	>1365			Unknown			No Steady State Film		
Blend 6	1.22	--	2.0	±	2.7	86.0	±	117.1	88.0	±	116.0
	2.45	--	10.0	±	10.0	42.0	±	12.0	52.0	±	16.4
	5.02	--	51.0	±	4.2	417.0	±	134.9	468.0	±	134.3
	7.49	1	47.5	±	15.5	431.3	±	51.2	478.8	±	61.2
		2	35.0	±	24.8	1043.8	±	196.5	1078.8	±	200.1
	10.15	--	67.0	±	9.7	849.0	±	189.3	916.0	±	194.0
Blend 7	1.22	--	0.0	±	0.0	20.0	±	18.4	20.0	±	18.4
	2.45	--	0.0	±	0.0	36.0	±	15.6	36.0	±	15.6
	5.02	--	11.0	±	16.7	374.0	±	226.3	385.0	±	238.1
	7.49	1	141.3	±	58.4	321.3	±	106.8	462.5	±	72.9
		2	40.0	±	26.8	970.0	±	250.4	1010.0	±	255.6
	10.15	1	364.0	±	207.3	646.0	±	218.9	1010.0	±	259.4
		2	315.0	±	122.2	Unknown			No Steady State Film		