



Developing confidence in critical state soil mechanics

5. Modified Cam Clay (MCC)

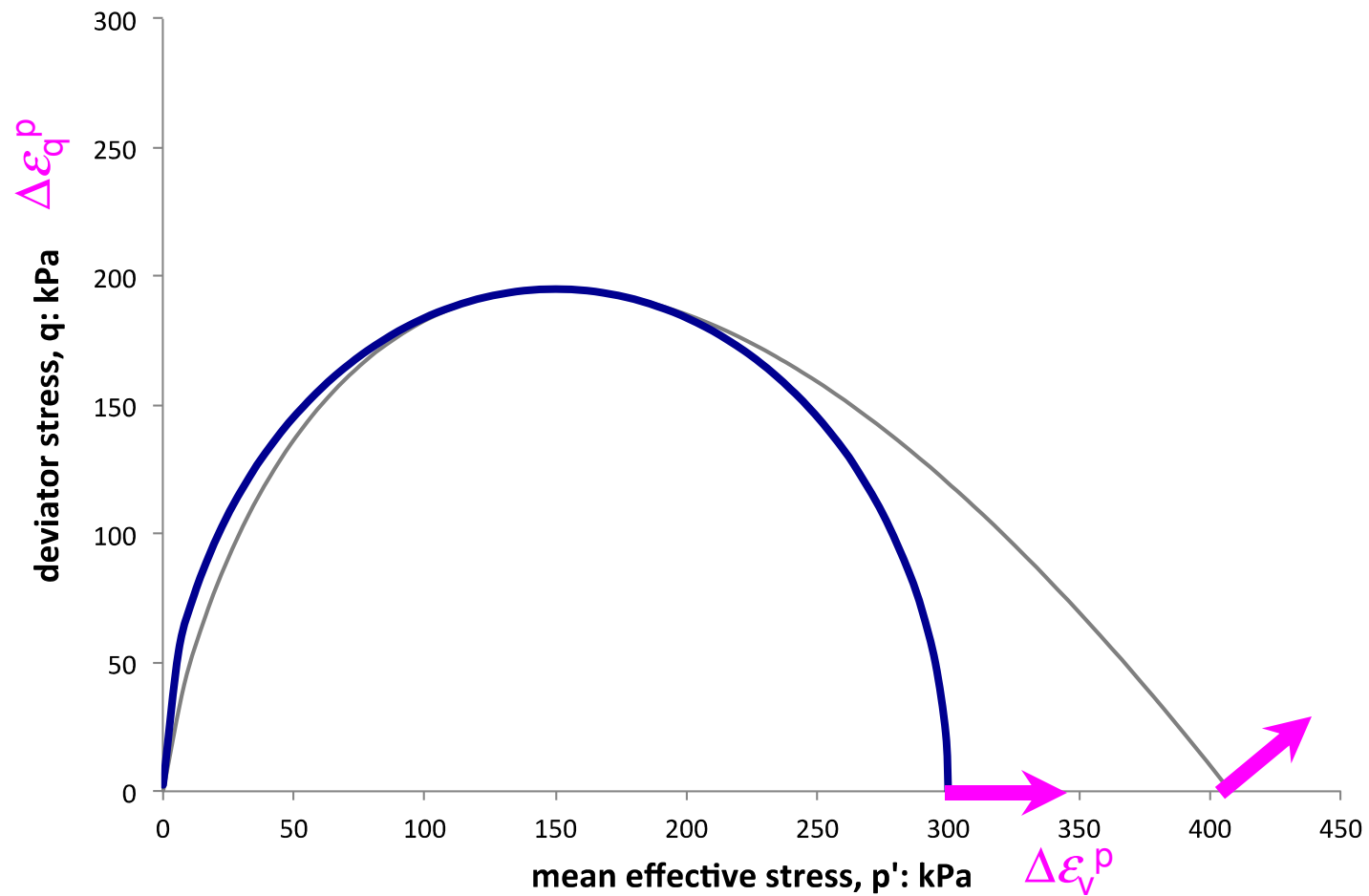
Mike Jefferies, PEng

Dr. Dawn Shuttle, PEng

January, 2015



Why Modified Cam Clay (MCC) ?



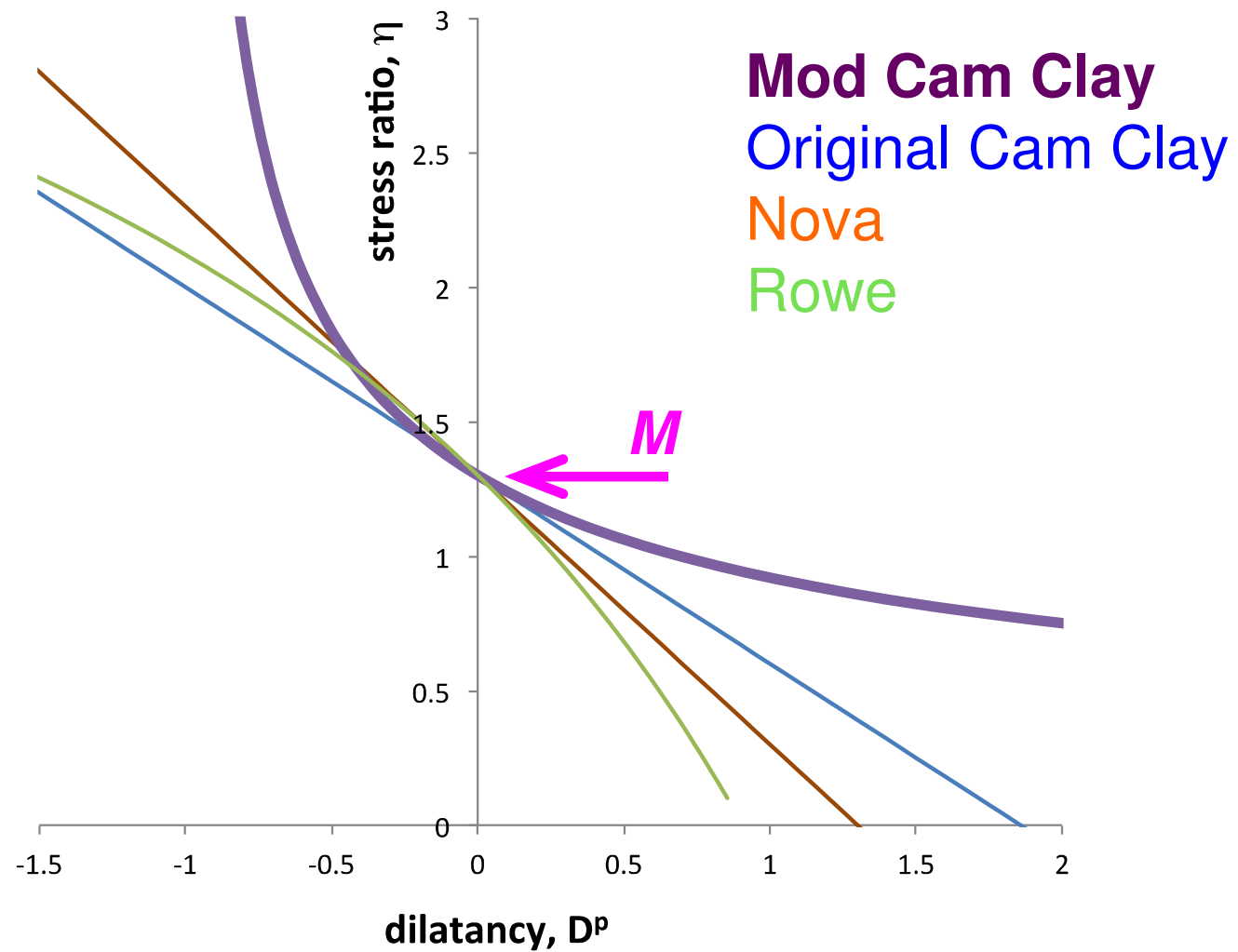


Modified vs Original Cam Clay

	OCC	MCC
Flowrule	$D^p = M - \eta$	$D^p = \frac{M^2 - \eta^2}{\eta^2}$
Yield Surface	$\frac{\eta}{M} = 1 - \ln\left(\frac{p}{p_c}\right)$	$\frac{\eta}{M} = \sqrt{\left(\frac{2p_c}{p} - 1\right)}$
Hardening	$\frac{\dot{p}_c}{p_c} = \frac{1+e}{\lambda - \kappa} \dot{\epsilon}_v^p$	$\frac{\dot{p}_c}{p_c} = \frac{1+e}{\lambda - \kappa} \dot{\epsilon}_v^p$

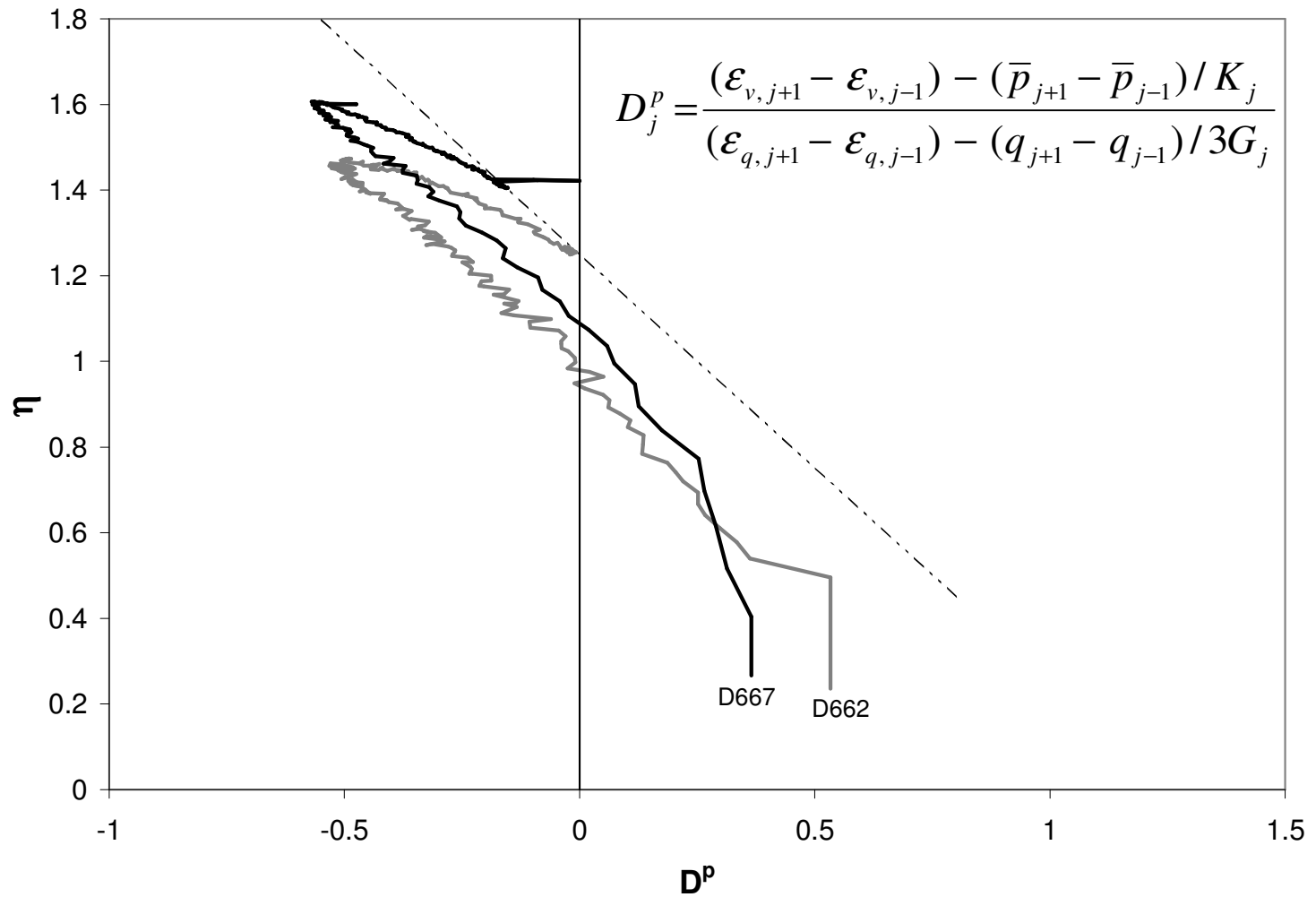


Stress dilatancy (= flowrule)





Stress dilatancy of Erksak sand





Implementing MCC

- Make copy of the OCC worksheet
 - Rename it MCC
- Change
 - Spacing ratio to 2
 - D^p equation to MCC dilation
 - η equation to MCC yield surface
- MCC is “pathological” on dilation
 - Must kludge the spreadsheet
 - Switch to incrementing volumetric strain for first $\sim 0.5\%$ strain
 - Thereafter revert to incrementing shear strain

Implementing MCC by modifying MCC sheet

ModCamClay_txl_u_mj.xlsx

60%

Search in Sheet

Calibri (Body) 12

Home Layout Tables Charts Formulas Data Review

E8

CONSTANTS		FOR PLOTTING		STEP 1: Get soil state variables		STEP 2: Apply Flowcurv		STEP 3: Use Hardening Law		STEP 4: Invisc. Consistency condition		STEP 5: Add in elasticity & update strains															
ep0_p	ep1	epV	ep	e	q	p	M	dp	dp	dp	eta	d_epV_e	d_ep0_e														
---	---	---	---	---	---	---	---	---	---	---	---	---	---														
---	---	---	---	---	---	---	---	---	---	---	---	---	---														
8	0.0000	0.00	0.00%	200.00	0.00	0.556	0.000	1981	62	100.00	1.28	0.00	100.00	0.0000	0.0000	103.733	0.0031	100.31	-1.9	98.13	0.143	28.42	135	-0.00003	0.0000	1.4348E-05	0.0000
9	0.0001	0.00	0.00%	198.13	28.43	0.556	0.000	1981	62	100.31	1.28	0.14	78.58	0.0000	0.0000	103.733	0.0031	100.62	-1.8	97.28	0.204	39.0	1453	-0.00003	0.0000	5.8168E-06	0.0000
10	0.0002	0.00	0.00%	196.28	39.95	0.556	0.000	1963	61	100.62	1.28	0.20	38.54	0.0000	0.0000	103.733	0.0031	100.94	-1.8	196.28	0.250	528306	-0.00003	0.0000	4.4196E-06	0.0000	
11	0.0003	0.00	0.00%	194.45	48.83	0.556	-0.001	1945	61	100.94	1.28	0.25	25.20	0.0000	0.0000	103.733	0.0031	101.25	-1.8	194.45	0.300	5580298	-0.00003	0.0000	3.6893E-06	0.0000	
12	0.0004	0.00	0.00%	192.64	55.80	0.556	-0.001	1936	60	101.25	1.28	0.30	18.52	0.0000	0.0000	103.733	0.0031	101.57	-1.8	190.84	0.325	6210024	-0.00003	0.0000	3.2181E-06	0.0000	
13	0.0005	0.00	0.00%	190.84	62.00	0.556	-0.001	1908	59	101.57	1.28	0.35	14.52	0.0000	0.0000	103.733	0.0031	101.88	-1.8	189.06	0.357	6749751	-0.00003	0.0000	2.8802E-06	0.0000	
14	0.0006	0.00	0.00%	189.06	67.50	0.556	-0.001	1891	59	101.88	1.28	0.35	11.85	0.0000	0.0000	103.733	0.0031	102.20	-1.8	187.29	0.387	72454028	-0.00003	0.0000	2.6217E-06	0.0000	
15	0.0007	0.00	0.00%	187.29	72.45	0.556	-0.001	1873	58	102.20	1.28	0.39	9.99	0.0000	0.0000	103.733	0.0031	102.52	-1.7	185.54	0.415	76977147	-0.00003	0.0000	2.415E-06	0.0001	
16	0.0008	0.01	0.00%	185.54	76.98	0.556	-0.002	1855	58	102.52	1.28	0.41	8.52	0.0000	0.0000	103.733	0.0031	102.84	-1.7	183.81	0.441	81124177	-0.00003	0.0000	2.2445E-06	0.0001	
17	0.0009	0.01	0.00%	183.81	81.14	0.556	-0.002	1838	57	102.84	1.28	0.44	7.41	0.0000	0.0000	103.733	0.0031	103.16	-1.7	182.09	0.467	8502535	-0.00003	0.0000	2.1004E-06	0.0001	
18	0.0010	0.01	0.00%	182.09	85.00	0.556	-0.002	1821	57	103.16	1.28	0.47	6.52	0.0000	0.0000	103.733	0.0031	103.48	-1.7	180.39	0.491	88601277	-0.00003	0.0000	1.9763E-06	0.0001	
19	0.0011	0.01	0.00%	180.39	88.60	0.556	-0.002	1804	56	103.48	1.28	0.49	5.79	0.0001	0.0000	103.733	0.0031	103.80	-1.7	178.71	0.515	91970562	-0.00003	0.0000	1.8677E-06	0.0001	
20	0.0012	0.01	0.00%	178.71	91.97	0.556	-0.002	1787	56	103.80	1.28	0.51	5.19	0.0001	0.0000	103.733	0.0031	104.12	-1.7	177.04	0.537	95136526	-0.00003	0.0000	1.7716E-06	0.0001	
21	0.0013	0.01	0.00%	177.04	95.14	0.556	-0.002	1770	55	104.12	1.28	0.54	4.67	0.0001	0.0000	103.733	0.0031	104.45	-1.7	175.39	0.559	98120522	-0.00003	0.0000	1.6855E-06	0.0001	
22	0.0014	0.01	0.00%	175.39	98.12	0.556	-0.003	1754	55	104.45	1.28	0.56	4.23	0.0001	0.0000	103.733	0.0031	104.77	-1.6	173.75	0.581	10094928	-0.00003	0.0000	1.6077E-06	0.0001	
23	0.0015	0.01	0.00%	173.75	100.94	0.556	-0.003	1738	54	104.77	1.28	0.58	3.85	0.0001	0.0000	103.733	0.0031	105.10	-1.6	172.13	0.602	10361072	-0.00003	0.0000	1.5369E-06	0.0001	
24	0.0016	0.01	0.00%	172.13	103.61	0.556	-0.003	1731	54	105.10	1.28	0.60	3.52	0.0001	0.0000	103.733	0.0031	105.42	-1.6	170.52	0.622	10614458	-0.00003	0.0000	1.4721E-06	0.0001	
25	0.0017	0.01	0.00%	170.52	106.14	0.556	-0.003	1705	53	105.42	1.28	0.62	3.23	0.0001	0.0000	103.733	0.0031	105.75	-1.6	168.93	0.643	10855282	-0.00003	0.0000	1.4123E-06	0.0001	
26	0.0018	0.01	0.00%	168.93	108.55	0.556	-0.003	1689	53	105.75	1.28	0.64	2.97	0.0001	0.0000	103.733	0.0031	106.08	-1.6	167.35	0.662	11084496	-0.00003	0.0000	1.3569E-06	0.0001	
27	0.0019	0.01	0.00%	167.35	110.84	0.556	-0.004	1674	52	106.08	1.28	0.66	2.73	0.0001	0.0000	103.733	0.0031	106.41	-1.6	165.79	0.682	11302936	-0.00003	0.0000	1.3053E-06	0.0001	
28	0.0020	0.02	0.00%	165.79	113.03	0.556	-0.004	1658	52	106.41	1.28	0.68	2.52	0.0001	0.0000	103.733	0.0031	106.74	-1.5	164.24	0.701	11511399	-0.00003	0.0000	1.257E-06	0.0002	
29	0.0021	0.02	0.00%	164.24	115.11	0.556	-0.004	1642	51	106.74	1.28	0.70	2.34	0.0001	0.0000	103.733	0.0031	107.07	-1.5	162.71	0.720	11710386	-0.00003	0.0000	1.2118E-06	0.0002	
30	0.0022	0.02	0.00%	162.71	117.10	0.556	-0.004	1627	51	107.07	1.28	0.72	2.16	0.0001	0.0000	103.733	0.0031	107.41	-1.5	161.19	0.738	11900587	-0.00003	0.0000	1.1691E-06	0.0002	
31	0.0023	0.02	0.00%	161.19	119.01	0.556	-0.004	1612	50	107.41	1.28	0.74	2.01	0.0001	0.0000	103.733	0.0031	107.74	-1.5	159.68	0.757	12082545	-0.00003	0.0000	1.1288E-06	0.0002	
32	0.0024	0.02	0.00%	159.68	120.83	0.556	-0.005	1597	50	107.74	1.28	0.76	1.86	0.0002	0.0000	103.733	0.0031	108.08	-1.5	158.19	0.775	12256712	-0.00003	0.0000	1.0907E-06	0.0002	
33	0.0025	0.02	0.00%	158.19	122.57	0.556	-0.005	1582	49	108.08	1.28	0.77	1.73	0.0002	0.0000	103.733	0.0031	108.41	-1.5	156.72	0.793	12423519	-0.00003	0.0000	1.0544E-06	0.0002	
34	0.0026	0.02	0.00%	156.72	124.24	0.556	-0.005	1567	49	108.41	1.28	0.79	1.61	0.0002	0.0000	103.733	0.0031	108.75	-1.5	155.25	0.811	1258336	-0.00003	0.0000	1.0199E-06	0.0003	
35	0.0027	0.03	0.00%	155.25	125.83	0.556	-0.005	1553	48	108.75	1.28	0.81	1.49	0.0002	0.0000	103.733	0.0031	109.09	-1.4	153.80	0.828	12736595	-0.00003	0.0000	9.87E-07	0.0003	
36	0.0028	0.03	0.00%	153.80	127.37	0.556	-0.005	1538	48	109.09	1.28	0.83	1.39	0.0002	0.0000	103.733	0.0031	109.43	-1.4	152.37	0.846	12883554	-0.00003	0.0000	9.555E-07	0.0003	
37	0.0029	0.03	0.00%	152.37	128.84	0.556	-0.005	1524	47	109.43	1.28	0.85	1.29	0.0002	0.0000	103.733	0.0031	109.77	-1.4	150.95	0.863	13024444	-0.00003	0.0000	9.253E-07	0.0003	
38	0.0030	0.03	0.00%	150.95	130.25	0.556	-0.006	1509	47	109.77	1.28	0.86	1.20	0.0002	0.0000	103.733	0.0031	110.11	-1.4	149.54	0.880	13159484	-0.00003	0.0000	8.9635E-07	0.0004	
39	0.0031	0.04	0.00%	149.54	131.60	0.556	-0.006	1495	47	110.11	1.28	0.88	1.12	0.0003	0.0000	103.733	0.0031	110.45	-1.4	148.14	0.897	13289715	-0.00003	0.0000	8.6845E-07	0.0004	
40	0.0032	0.04	0.00%	148.14	132.90	0.556	-0.006	1481	46	110.45	1.28	0.90	1.04	0.0003	0.0000	103.733	0.0031	110.80	-1.4	146.76	0.914	1341444	-0.00003	0.0000	8.4166E-07	0.0004	
41	0.0033	0.04	0.00%	146.76	134.14	0.556	-0.006	1468	46	110.80	1.28	0.91	0.96	0.0003	0.0000	103.733	0.0031	111.14	-1.4	145.39	0.931	13534223	-0.00003	0.0000	8.1579E-07	0.0005	
42	0.0034	0.05	0.00%	145.39	135.34	0.556	-0.006	1454	45	111.14	1.28	0.93	0.89	0.0003	0.0000	103.733	0.0031	111.49	-1.4	144.03	0.948	13649295	-0.00003	0.0000	7.908E-07	0.0005	
43	0.0035	0.05	0.00%	144.03	136.49	0.556	-0.007	1440	45	111.49	1.28	0.95	0.82	0.0004	0.0000	103.733	0.0031	111.84	-1.3	142.69	0.964	13759514	-0.00003	0.0000	7.6663E-07	0.0005	
44	0.0036	0.05	0.00%	142.69	137.60	0.556	-0.007	1427	44	111.84	1.28	0.96	0.76	0.0004	0.0000	103.733	0.0031	112.18	-1.3	141.35	0.981	13865562	-0.00003	0.0000	7.4323E-07	0.0006	
45	0.0037	0.06	0.00%	141.35	138.66	0.556	-0.007	1414	44	112.18	1.28	0.98	0.70	0.0004	0.0000	103.733	0.0031	112.53	-1.3	140.03	0.997	13967413	-0.00003	0.0000	7.2054E-07	0.0006	
46	0.0038	0.06	0.00%	140.03	139.67	0.556	-0.007	1400	44	112.53	1.28	1.00	0.65	0.0005	0.0000	103.733	0.0031	112.88	-1.3	138.73	1.014	1406523	-0.00003	0.0000	6.9852E-07	0.0007	
47	0.0039	0.07	0.00%	138.73	140.65	0.556	-0.007	1387	43	112.88	1.28	1.01	0.59	0.0005	0.0000	103.733	0.0031	113.24	-1.3	137.46	1.030	14157988	-0.00003	0.0000	6.7732E-07	0.0008	
48	0.0040	0.08	0.00%	137.46	142.48	0.556	-0.008	1382	42	113.24	1.28	1.05	0.50	0.0010	0.0000	103.733	0.0051	114.16	-1.1	134.06	1.073	14389229	-0.00003	0.0000	6.564E-07	0.0008	
49	0.0041	0.09	0.00%	134.06	143.89	0.556	-0.008	1341	42	114.16	1.28	1.07	0.42	0.0010	0.0004	103.733	0.0044										



Implementing MCC by modifying MCC sheet

ModCamClay_txl_u_mj.xlsx

60%

Search in Sheet

Calibri (Body) 12

Home Layout Tables Charts Formulas Data Review

CONSTANTS		STEP 1: Get soil state variables		STEP 2: Apply Flowline		STEP 3: Use Hardening Law		STEP 4: Inveke Consistency condition		STEP 5: Add in elasticity & update strains																
Δe_p	Δe_p	e	p	M	D_p	$d_{pQ, D}$	$d_{pV, D}$	$d_{pC, over, P_c}$	σ_p	σ'_p	σ	$d_{ep, e}$	ep_{VV}	$d_{ep, e}$	ep_{QQ}											
0.0001	1000	---	---	---	---	---	---	---	---	---	---	---	---	---	---											
MPa \Rightarrow kPa	ratio K/G =	---	---	---	---	---	---	---	---	---	---	---	---	---	---											
1.33	2.00	---	---	---	---	---	---	---	---	---	---	---	---	---	---											
8	0.0000	0.00	0.00%	200.00	0.00	0.556	0.000	1981	62	100.00	1.28	0.00	100.00	0.00000	0.000	100.31	-1.9	198.13	0.143	28.428435	-0.00003	0.000	1.4348E-05	0.0000		
9	0.0001	0.00	0.00%	198.13	28.43	0.556	0.000	1981	62	100.31	1.28	0.14	78.58	0.00000	0.000	100.73	-0.0031	100.62	-1.8	196.28	0.204	39.953453	-0.00003	0.000	5.8168E-06	0.0000
10	0.0002	0.00	0.00%	196.28	39.95	0.556	0.000	1981	61	100.62	1.28	0.20	38.54	0.00000	0.000	100.73	-0.0031	100.94	-1.8	194.45	0.250	48.628306	-0.00003	0.000	4.4196E-06	0.0000
11	0.0003	0.00	0.00%	194.45	48.63	0.556	-0.001	1945	61	100.94	1.28	0.25	25.20	0.00000	0.000	100.73	-0.0031	101.25	-1.8	192.64	0.290	55.802098	-0.00003	0.000	3.6893E-06	0.0000
12	0.0004	0.00	0.00%	192.64	55.80	0.556	-0.001	1936	60	101.25	1.28	0.29	18.52	0.00000	0.000	100.73	-0.0031	101.57	-1.8	190.84	0.325	62.00124	-0.00003	0.000	3.2181E-06	0.0000
13	0.0005	0.00	0.00%	190.84	62.00	0.556	-0.001	1908	59	101.57	1.28	0.32	14.52	0.00000	0.000	100.73	-0.0031	101.88	-1.8	189.06	0.357	67.497651	-0.00003	0.000	2.8802E-06	0.0000
14	0.0006	0.00	0.00%	189.06	67.50	0.556	-0.001	1891	59	101.88	1.28	0.36	11.85	0.00000	0.000	100.73	-0.0031	102.20	-1.8	187.29	0.387	72.454028	-0.00003	0.000	2.6217E-06	0.0000
15	0.0007	0.00	0.00%	187.29	72.45	0.556	-0.001	1873	58	102.20	1.28	0.39	9.95	0.00000	0.000	100.73	-0.0031	102.52	-1.7	185.54	0.415	76.977147	-0.00003	0.000	2.415E-06	0.0001
16	0.0008	0.01	0.00%	185.54	76.98	0.556	-0.002	1855	58	102.52	1.28	0.41	8.52	0.00000	0.000	100.73	-0.0031	102.84	-1.7	183.81	0.441	81.241717	-0.00003	0.000	2.2445E-06	0.0001
17	0.0009	0.01	0.00%	183.81	81.14	0.556	-0.002	1838	57	102.84	1.28	0.44	7.41	0.00000	0.000	100.73	-0.0031	103.16	-1.7	182.09	0.467	85.025355	-0.00003	0.000	2.1004E-06	0.0001
18	0.0010	0.01	0.00%	182.09	85.00	0.556	-0.002	1821	57	103.16	1.28	0.47	6.52	0.00000	0.000	100.73	-0.0031	103.48	-1.7	180.39	0.491	88.601277	-0.00003	0.000	1.9763E-06	0.0001
19	0.0011	0.01	0.00%	180.39	88.60	0.556	-0.002	1804	56	103.48	1.28	0.49	5.79	0.00001	0.000	100.73	-0.0031	103.80	-1.7	178.71	0.515	91.970562	-0.00003	0.000	1.8677E-06	0.0001
20	0.0012	0.01	0.00%	178.71	91.97	0.556	-0.002	1787	56	103.80	1.28	0.51	5.19	0.00001	0.000	100.73	-0.0031	104.12	-1.7	177.04	0.537	95.136526	-0.00003	0.000	1.7716E-06	0.0001
21	0.0013	0.01	0.00%	177.04	95.14	0.556	-0.002	1770	55	104.12	1.28	0.54	4.67	0.00001	0.000	100.73	-0.0031	104.45	-1.7	175.39	0.559	98.120522	-0.00003	0.000	1.6855E-06	0.0001
22	0.0014	0.01	0.00%	175.39	98.12	0.556	-0.003	1754	55	104.45	1.28	0.56	4.23	0.00001	0.000	100.73	-0.0031	104.77	-1.6	173.75	0.581	100.949028	-0.00003	0.000	1.6077E-06	0.0001
23	0.0015	0.01	0.00%	173.75	100.94	0.556	-0.003	1738	54	104.77	1.28	0.58	3.85	0.00001	0.000	100.73	-0.0031	105.10	-1.6	172.13	0.602	103.61072	-0.00003	0.000	1.5369E-06	0.0001
24	0.0016	0.01	0.00%	172.13	103.61	0.556	-0.003	1721	54	105.10	1.28	0.60	3.52	0.00001	0.000	100.73	-0.0031	105.42	-1.6	170.52	0.622	106.14458	-0.00003	0.000	1.4721E-06	0.0001
25	0.0017	0.01	0.00%	170.52	106.14	0.556	-0.003	1705	53	105.42	1.28	0.62	3.23	0.00001	0.000	100.73	-0.0031	105.75	-1.6	168.93	0.643	108.55282	-0.00003	0.000	1.4123E-06	0.0001
26	0.0018	0.01	0.00%	168.93	108.55	0.556	-0.003	1689	53	105.75	1.28	0.64	2.97	0.00001	0.000	100.73	-0.0031	106.08	-1.6	167.35	0.662	110.84496	-0.00003	0.000	1.3569E-06	0.0001
27	0.0019	0.01	0.00%	167.35	110.84	0.556	-0.004	1674	52	106.08	1.28	0.66	2.73	0.00001	0.000	100.73	-0.0031	106.41	-1.6	165.79	0.682	113.02936	-0.00003	0.000	1.3053E-06	0.0001
28	0.0020	0.02	0.00%	165.79	113.03	0.556	-0.004	1658	52	106.41	1.28	0.68	2.52	0.00001	0.000	100.73	-0.0031	106.74	-1.5	164.24	0.701	115.11399	-0.00003	0.000	1.257E-06	0.0002
29	0.0021	0.02	0.00%	164.24	115.11	0.556	-0.004	1642	51	106.74	1.28	0.70	2.34	0.00001	0.000	100.73	-0.0031	107.07	-1.5	162.71	0.720	117.10306	-0.00003	0.000	1.2118E-06	0.0002
30	0.0022	0.02	0.00%	162.71	117.10	0.556	-0.004	1627	51	107.07	1.28	0.72	2.16	0.00001	0.000	100.73	-0.0031	107.41	-1.5	161.19	0.738	119.00587	-0.00003	0.000	1.1691E-06	0.0002
31	0.0023	0.02	0.00%	161.19	119.01	0.556	-0.004	1612	50	107.41	1.28	0.74	2.01	0.00001	0.000	100.73	-0.0031	107.74	-1.5	159.68	0.757	120.82545	-0.00003	0.000	1.1288E-06	0.0002
32	0.0024	0.02	0.00%	159.68	120.83	0.556	-0.005	1597	50	107.74	1.28	0.76	1.86	0.00002	0.000	100.73	-0.0031	108.08	-1.5	158.19	0.775	122.56712	-0.00003	0.000	1.0907E-06	0.0002
33	0.0025	0.02	0.00%	158.19	122.57	0.556	-0.005	1582	49	108.08	1.28	0.77	1.73	0.00002	0.000	100.73	-0.0031	108.41	-1.5	156.72	0.793	124.23519	-0.00003	0.000	1.0544E-06	0.0002
34	0.0026	0.02	0.00%	156.72	124.24	0.556	-0.005	1567	49	108.41	1.28	0.79	1.61	0.00002	0.000	100.73	-0.0031	108.75	-1.5	155.25	0.811	125.8336	-0.00003	0.000	1.0199E-06	0.0003
35	0.0027	0.03	0.00%	155.25	125.83	0.556	-0.005	1553	48	108.75	1.28	0.81	1.49	0.00002	0.000	100.73	-0.0031	109.09	-1.4	153.80	0.828	127.36959	-0.00003	0.000	9.87E-07	0.0003
36	0.0028	0.03	0.00%	153.80	127.37	0.556	-0.005	1538	48	109.09	1.28	0.83	1.39	0.00002	0.000	100.73	-0.0031	109.43	-1.4	152.37	0.846	128.83554	-0.00003	0.000	9.555E-07	0.0003
37	0.0029	0.03	0.00%	152.37	128.84	0.556	-0.005	1524	47	109.43	1.28	0.85	1.29	0.00002	0.000	100.73	-0.0031	109.77	-1.4	150.95	0.863	130.24444	-0.00003	0.000	9.253E-07	0.0003
38	0.0030	0.03	0.00%	150.95	130.25	0.556	-0.006	1509	47	109.77	1.28	0.86	1.20	0.00002	0.000	100.73	-0.0031	110.11	-1.4	149.54	0.880	131.59844	-0.00003	0.000	8.9635E-07	0.0004
39	0.0031	0.04	0.00%	149.54	131.60	0.556	-0.006	1495	47	110.11	1.28	0.88	1.12	0.00003	0.000	100.73	-0.0031	110.45	-1.4	148.14	0.897	132.89715	-0.00003	0.000	8.6845E-07	0.0004
40	0.0032	0.04	0.00%	148.14	132.90	0.556	-0.006	1481	46	110.45	1.28	0.90	1.04	0.00003	0.000	100.73	-0.0031	110.80	-1.4	146.76	0.914	134.1444	-0.00003	0.000	8.4166E-07	0.0004
41	0.0033	0.04	0.00%	146.76	134.14	0.556	-0.006	1468	46	110.80	1.28	0.91	0.96	0.00003	0.000	100.73	-0.0031	111.15	-1.4	145.39	0.931	135.34123	-0.00003	0.000	8.1579E-07	0.0005
42	0.0034	0.05	0.00%	145.39	135.34	0.556	-0.006	1454	45	111.14	1.28	0.93	0.89	0.00003	0.000	100.73	-0.0031	111.50	-1.3	144.03	0.948	136.49095	-0.00003	0.000	7.908E-07	0.0005
43	0.0035	0.05	0.00%	144.03	136.49	0.556	-0.007	1440	45	111.49	1.28	0.95	0.82	0.00004	0.000	100.73	-0.0031	111.84	-1.3	142.69	0.964	137.59514	-0.00003	0.000	7.6663E-07	0.0005
44	0.0036	0.05	0.00%	142.69	137.60	0.556	-0.007	1427	44	111.84	1.28	0.96	0.76	0.00004	0.000	100.73	-0.0031	112.18	-1.3	141.35	0.981	138.65562	-0.00003	0.000	7.4323E-07	0.0006
45	0.0037	0.06	0.00%	141.35	138.66	0.556	-0.007	1414	44	112.18	1.28	0.98	0.70	0.00004	0.000	100.73	-0.0031	112.53	-1.3	140.03	0.997	139.67413	-0.00003	0.000	7.2054E-07	0.0006
46	0.0038	0.06	0.00%	140.03	139.67	0.556	-0.007	1400	44	112.53	1.28	1.00	0.65	0.00005	0.000	100.73	-0.0031	112.88	-1.3	138.73	1.014	140.6523	-0.00003	0.000	6.9852E-07	0.0007
47	0.0039	0.07	0.00%	138.73	140.65	0.556	-0.007	1387	43	112.88	1.28	1.01	0.59	0.00005	0.000	100.73	-0.0031	113.23	-1.3	137.46	1.030	141.67988	-0.00003	0.000	6.7732E-07	0.0008
48	0.0040	0.08	0.00%	137.46	142.48	0.556	-0.008	1382	42	113.23	1.28	1.05	0.50	0.00005	0.000	100.73	-0.0031	113.58	-1.2	136.24	1.046	142.67498	-0.00003	0.000	6.5682E-07	0.0008
49	0.0041	0.09	0.00%	136.24	143.89	0.556	-0.008	1341	42	114.16																

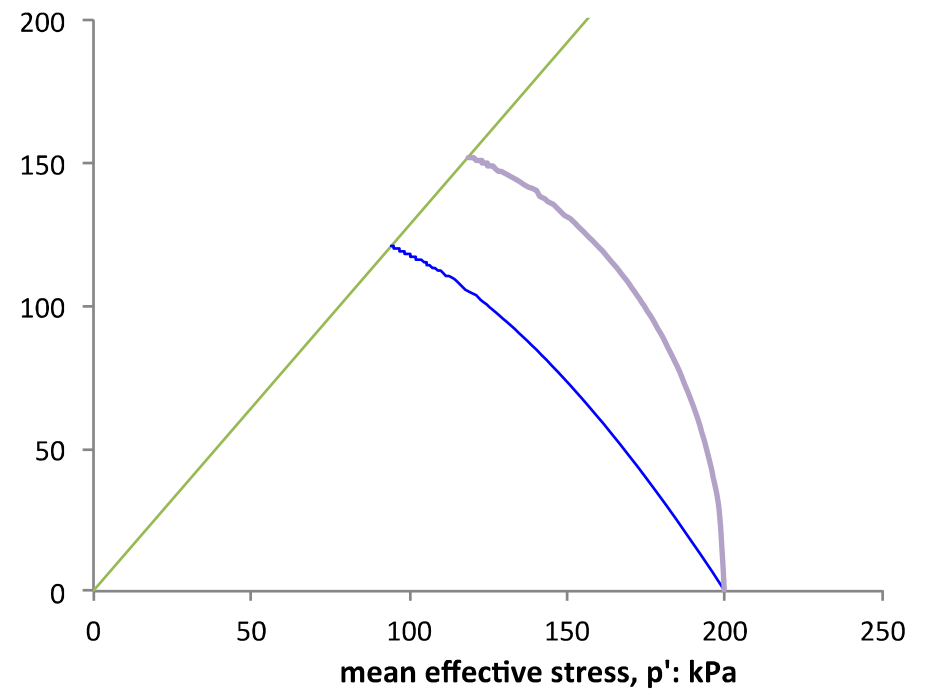
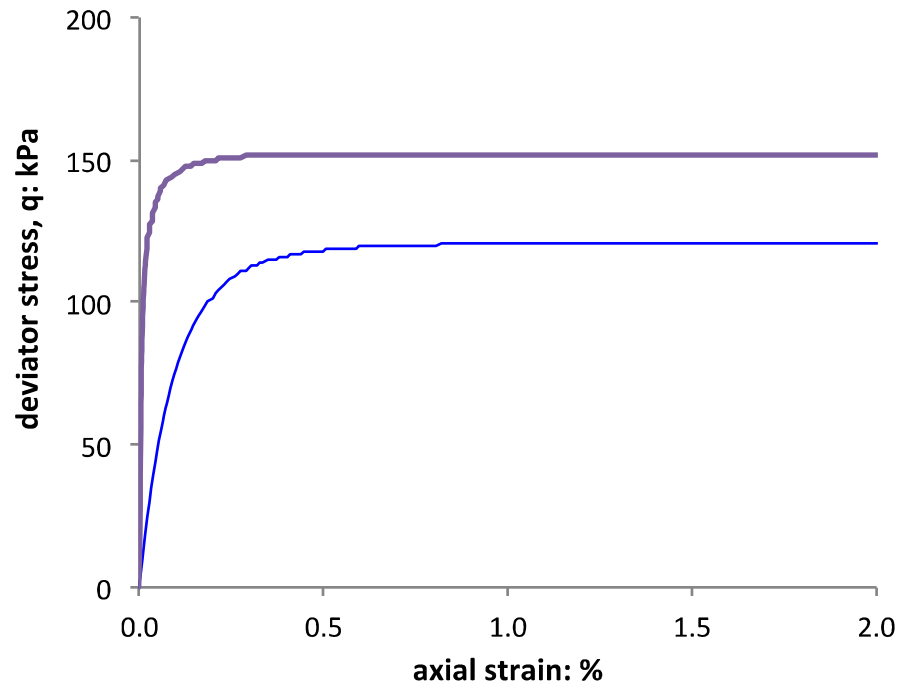


Over to you...



Computed soil response

Original Cam Clay
Modified Cam Clay





Mod Cam Clay

- “Improved theory” simply shows lack of understanding
- Work dissipation is unclear / unreasonable
- Mathematically “pathological” to implement
- Does not fit any known soil data